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Preface

The twenty-third Western Conference on Linguistics (WECOL 93) was held at the University of Washington, Seattle, October 22–24, 1993. The theme of WECOL 93 was Theoretical Contributions of Native American Languages. Invited speakers were Emmon Bach, Eloise Jelinek, James Kari, and Patricia Shaw.

In addition to those included in this volume, the following papers were presented at WECOL 93:

Jill Anderson, "West Greenlandic Noun Incorporation: Evidence for Lexicality"
Emmon Bach, "Varieties of Word Structure in Some Native American Languages"
Marcel den Dikken, "Binding, Expletives and Levels"
Colleen Fitzgerald, "Too Many Vowels: The Phonology of Syllables in Tohono O'odham Songs"
Kazuhiko Fukushima, "Explaining Zibun without Subject, C-Command, or Logophoricity"
Dwight Gardiner, "Binding and Coreference Conditions in Shuswap"
Jong-Bok Kim, "Clause Internal Scrambling and Scope Ambiguity in Korean Psych Constructions"
Kenjiro Matsuda, "A Quantitative Approach to Accusative Case Marker Deletion in Japanese"
William J. Poser, "Phonological Adjacency and its Consequences"
Patricia Shaw, "Minimal Prosodic Constituency"

WECOL 93 was organized by a committee consisting of Margaret Campos, Michael Gamon, Sharon Hargus, Vern Lindblad, Alice Taff, and Siri Tuttle. Kristin Denham assisted the editors by checking submitted manuscripts for their adherence to style requirements.

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Condition A without A-Binding

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Since Chomsky (1981) proposed Condition A of the binding theory, given below, it has been taken for granted that the specification of A-binding is necessary in formulating this condition:

(1) An anaphor must be A-bound in its governing category.

The relevant examples that show the necessity of A-binding in its formulation are given below:

(2) a. *John$_1$, pictures of himself$_1$ showed t_1 to be uninteresting.
b. *The professors$_1$, each other$_1$'s students criticized t_1.

In these sentences, *John* and *the professors* occupy A'-positions, hence they cannot serve as the antecedents of the anaphors *himself* and *each other*. In this paper, I argue that the requirement that the antecedent of an anaphor must be in A-position follows from a constraint on weak crossover (WCO), under the assumption that an anaphor is a bound variable by its nature, which is proposed by Williams (1977) and Reinhart (1983) and is further supported by Abe (1992a; 1993).

1. Anaphors as Bound Variables at LF

1.1. Bound Variables and the C-Command Condition

It has often been claimed in the literature (see Bouchard (1984) and Aoun (1986), among others) that unlike pronouns, anaphors lack inherent reference and hence require linguistic antecedents. One plausible way to capture this property of anaphors is to hypothesize that anaphors are interpretable only as bound variables, as Reinhart (1983) does. Under this hypothesis, she claims, we would expect that some conditions on bound variables should also apply to anaphors. She notes that bound variables cannot be anaphoric to non-c-commanding quantified NPs, as shown below:

(3) a. I showed everyone$_1$ his$_1$ face in the mirror.
b. Everyone$_1$ heard rumors about his$_1$ mother.
(4) a. *I spoke about everyone$_1$ with his$_1$ mother.
b. *The rumor about everyone$_1$ bothered his$_1$ mother.

In the sentences in (3), *everyone* c-commands *his*, and hence the latter can be interpreted as a variable bound by *everyone*. In the sentences in (4), in contrast,

everyone does not c-command *his*, and hence the latter cannot be interpreted as a bound variable. This c-command condition also applies to anaphors, as shown below:

(5) a. I showed Rosa$_1$ herself$_1$ in the mirror.
    b. The new neighbors$_1$ heard rumors about each other$_1$.
(6) a. *I spoke about Rosa$_1$ with herself$_1$.
    b. *The rumor about the new neighbors$_1$ bothered each other$_1$.

Thus, the fact that anaphors and variables bound by quantified NPs obey the same bound anaphora condition, namely, the c-command condition, motivates Reinhart's claim that anaphors are also interpreted as bound variables.

An immediate question arises with this claim; namely, what is a bound variable or how is it defined, since anaphors can take as their antecedents all sorts of NPs, including a proper name such as *Rosa* in (5a). It has been standard to define a bound variable in semantic terms; typically, a variable is an element whose value is dependent on that of a universal or existential quantifier. Thus, *his* in (3) is regarded as a bound variable since its value is dependent on that of the universal quantifier *everyone*. On the other hand, a proper name such as *Rosa* is not regarded as an operator binding a variable. This is indicated by the fact that the c-command condition on bound variables, observed in the contrast between (3) and (4), is not required for the relationship between a proper name and a pronoun bound by it, as illustrated below:

(7) a. I spoke about Rosa$_1$ with her$_1$ mother.
    b. The rumor about Rosa$_1$ bothered her$_1$ mother.

Such an anaphoric relation is not an operator-variable one, but rather a coreferential one, and it is not subject to the c-command condition, unlike bound variable anaphora. The contrast between (6a) and (7a) indicates that a bound variable in the sense relevant here is not defined in terms of the semantic property of its antecedent, since, even though the anaphor in (6a) obeys the c-command condition and the pronoun in (7a) does not, it is the same antecedent, i.e., the proper name *Rosa* that serves as their antecedent in both sentences.

Reinhart (1983) gives further empirical evidence against the claim that the c-command condition holds only for the semantically-determined set of quantified NPs. This is concerned with the availability of the sloppy reading in elliptical constructions. It has been well-known since Ross (1967) that the following sentence is ambiguous between a sloppy reading indicated in (a) and a strict reading indicated in (b):

(8) John scratched his arm and Mary did too.
    a. Mary scratched her arm (too).
    b. Mary scratched John's arm (too).

It has been generally claimed (see Lasnik (1976), Sag (1976) and Williams (1977), among others) that a sloppy reading obtains when a pronoun and its antecedent involve bound variable anaphora, whereas a strict reading obtains when they involve coreferential anaphora. Sag (1976) and Williams (1977) argue that an operator-variable relationship is created for the subject and the

pronoun in (8) by the *Derived VP Rule (DVPR)*, proposed by Partee (1973), which converts a VP in surface structure into a predicate with a lambda operator, and by what Williams calls the *Pronoun Rule*, which optionally converts a pronoun in a VP into a variable bound by the lambda operator of that VP. Then, the first conjunct of (8) will have the following representation after the Pronoun Rule applies to *his*:

(9) John [λx(x scratched x's arm)]

In (9), *his* is interpreted as a variable bound by the lambda operator. When the predicate in (9) is copied onto that of the second conjunct (the interpretive approach taken by Williams (1977)) or the predicate of the second conjunct is also given the same structure as that of the first conjunct and is deleted under identity (the deletion approach taken by Sag (1976)), a sloppy reading obtains.

Lasnik (1976) and Reinhart (1983) give support to this analysis by noting that the availability of the sloppy reading is subject to the same condition as bound variable anaphora. Lasnik notices the following contrast:

(10) a. Harry believes he is intelligent, and Bill does too. (sloppy)

b. The woman who emulated Harry believes he is intelligent and the woman who emulated Bill does too. (non-sloppy)

In (10a), *Harry* c-commands *he* whereas it does not in (10b). Thus, the above analysis correctly predicts that a sloppy reading is available to (10a), but not to (10b). These data also indicate that the c-command condition on bound variables is not limited, in its applicability, to the semantically-determined set of quantified NPs, but rather applies to all NPs.

Williams (1977) also claims that anaphors are interpreted only as bound variables. He proposes Reflexivization, which obligatorily converts reflexive pronouns into variables bound to NPs, as shown below:

(11) ... NP_i ... refl pro ... -> ... NP_i ... x_i ...

With this claim, it is predicted that reflexives only produce a sloppy reading. This is in fact the case, as Williams notes in the following sentence:

(12) John shot himself and Bill did too.

In (12), Reflexivization converts *himself* into a variable bound by the lambda operator introduced to the VP by the DVPR, so that we obtain the following representation:

(13) John [λx(x shot x)] and Bill did too.

After the VP of the first conjunct is copied into the null VP of the second conjunct, the resulting representation represents the sloppy reading of (12). Since Reflexivization is obligatory, this is the only derivation we can obtain for (12). Thus, the fact that reflexives only produce a sloppy reading in the VP-deletion construction lends further support to the claim that an anaphor is intrinsically a bound variable.[1]

To summarize the discussion so far, I showed some arguments for the claim that anaphors are interpreted only as bound variables and further that the c-command condition on bound variables applies to all sorts of antecedents, including proper names. This leads Reinhart (1983) to consider that there should be a syntactic procedure to represent operator-variable relationships irrespective of the semantic property of the antecedents of anaphoric elements. She proposes that coindexation is a device to represent an operator-variable relationship and that coindexed anaphoric elements, and only they, are translated as bound variables. Then, the c-command condition applies only to coindexed anaphoric elements. Under this proposal, anaphors must always be coindexed with their antecedents, and hence obey the c-command condition. In contrast, pronouns are optionally coindexed with their antecedents. If they are, they involve bound variable anaphora and hence obey the c-command condition. If they are not, they involve coreferential anaphora and hence do not obey this condition, as illustrated in (7). This contrasts with the cases where singular pronouns take as their antecedents universal quantifiers, as in (3) and (4), which demands coindexation due to the inherent nature of such relations as operator-variable ones and hence imposes the c-command condition upon them.

Even though this analysis nicely accounts for the data considered so far, it leads to a controversial claim that no condition applies to coreferential anaphora in syntax. It has been quite often claimed (see Langacker (1969), Jackendoff (1972), Wasow (1972) and Lasnik (1976), among others) that coreferential anaphora also obeys a structural condition. In fact, Reinhart suggests the following condition, which is abandoned later in her book (see also Reinhart (1976)):

(14) A given NP must be interpreted as non-coreferential with any non-pronoun that it c-commands.

This condition accounts for the contrast shown below:

(15) a. She denied that Rosa met the Shah.
b. The man who travelled with her denied that Rosa met the Shah.

In (15a), *she* must be non-coreferential with *Rosa* since it c-commands the latter. In (15b), in contrast, *her* can be coreferential with *Rosa* since it does not c-command the latter. After proposing that only coindexed pronouns obey the c-command condition and pronouns that do not bear any indices are unrestricted in referring to their antecedents in syntax, Reinhart abandons (14) and attributes what is explained by this condition to pragmatic conditions. This, however, raises important questions which have been under debate in the literature; see Lasnik (1989), Higginbotham (1989) and Heim (1992), among others. For this reason, I propose, in the next section, another way of representing operator-variable relationships in syntax which is compatible with the standardly assumed condition (14).

1.2. Bound Variables and Quantifier Raising

In his influential work, May (1977) proposes an LF rule which is later referred to as *Quantifier Raising (QR)* in order to express the scope of a quantifier phrase syntactically. He formulates it as follows:

(16) Adjoin Q (to S)

Here, Q refers to a quantifier phrase such as *everyone* and *someone*. With this rule, (3b) is represented at LF as follows:

(17) [$_S$ everyone$_1$ [$_S$ t_1 heard rumors about his$_1$ mother]]

In this representation, *everyone* undergoes QR and is adjoined to the matrix S. This clearly represents an operator-variable relationship syntactically; namely, *everyone* forms such a relationship with its trace and the pronoun *his*. May limits the application of QR to the "semantically-determined set of quantified NPs," so that proper names such as *John* do not undergo QR. Thus, in the following sentence, *John* stays in its original position at LF:

(18) [$_S$ John$_1$ heard rumors about his$_1$ mother]

Contrary to (17), (18) represents the coreferential relationship between *John* and *his*. Thus, QR is a syntactic device to represent an operator-variable relationship, and such a relationship is distinguished from a coreferential relationship with respect to whether QR is applied or not.

However, it was shown in the preceding section that an operator-variable relationship should be syntactically represented regardless of the semantic property of the antecedents of anaphoric elements. This is incompatible with May's claim that QR only applies to quantified NPs. I follow, instead, Clark's (1992) claim that QR applies to any kind of NPs freely. Thus, sentence (18) can have a representation other than (18), in which *John* undergoes QR, as shown below:

(19) [$_S$ John$_1$ [$_S$ t_1 heard rumors about his$_1$ mother]]

In this representation, *John*$_1$, t_1 and *his*$_1$ are in an operator-variable relationship.

With this proposal, the antecedents of anaphors must undergo QR to meet the requirement that anaphors must be identified as bound variables. Thus, the sentences in (5) must have the following representations:

(20) a. [$_S$ Rosa$_1$ [$_S$ I showed t_1 herself$_1$ in the mirror]]
b. [$_S$ the new neighbors$_1$ [$_S$ t_1 heard rumors about each other$_1$]]

In these representations, the anaphors are bound by the operators *Rosa* and *the new neighbors* and hence are properly identified as bound variables. Thus, when an NP serves as the antecedent of an anaphor, it behaves like a quantified NP in that it obligatorily undergoes QR; compare (20) with the LF representations of the sentences in (3), given below:

(21) a. [S everyone$_1$ [S I showed t$_1$ his$_1$ face in the mirror]]
b. [S everyone$_1$ [S t$_1$ heard rumors about his$_1$ mother]]

Recall that anaphors as well as pronouns bound by quantified NPs obey the c-command condition, as shown in the ungrammatical sentences in (4) and (6), repeated here as (22) and (23):

(22) a. *I spoke about everyone$_1$ with his$_1$ mother.
b. *The rumor about everyone$_1$ bothered his$_1$ mother.
(23) a. *I spoke about Rosa$_1$ with herself$_1$.
b. *The rumor about the new neighbors$_1$ bothered each other$_1$.

(22a) and (23a), for instance, will have the following LF representations under the present analysis:

(24) *[S everyone$_1$ [S I spoke about t$_1$ with his$_1$ mother]]
(25) *[S Rosa$_1$ [S I spoke about t$_1$ with herself$_1$]]

The ungrammaticality of these representations is, then, derived from the following condition on bound variables:

(26) α is a variable only if
(i) α is a trace bound by an operator; or
(ii) α is bound by a variable.

In (24) and (25), *his* and *herself* are bound by *everyone* and *Rosa*, respectively, and they must be identified as variables; *his* is intended to be a variable bound by *everyone* here, and *herself* is identified as such by its inherent property. However, they are not bound by the traces of these operators, hence violate the condition stated in (26). (24) and (25) contrast with the representations in (20) and (21), where the bound pronouns and the anaphors are bound by the traces of the operators, satisfying (26).

We saw in the preceding section that sentence (8), repeated here as (27), is two ways ambiguous, as indicated in (27a) and (27b):

(27) John scratched his arm and Mary did too.
a. Mary scratched her arm (too).
b. Mary scratched John's arm (too).

Under the present analysis, the first conjunct of (27) can have the following two representations:

(28) a. [S John$_1$ [S t$_1$ [VP scratched his$_1$ arm]]]
b. [S John$_1$ [VP scratched his$_1$ arm]]

In (28a), *John* undergoes QR and as a result *his* may be identified as a variable bound by the operator *John*. In (28b), in contrast, *John* does not undergo QR and hence *his* is in a coreferential relationship with *John*. When the predicate in (28a) is copied onto that of the second conjunct (the interpretive approach) or the predicate of the second conjunct is also given the same structure as that of the first conjunct and is deleted at PF (the deletion approach), the pronoun

in the second conjunct also functions as a variable bound by the local subject, i.e., *Mary*; hence the sloppy reading indicated in (27a) obtains. On the other hand, when the predicate in (28b) is copied onto that of the second conjunct or the second conjunct is deleted under identity, the pronoun in the second conjunct refers to what *his* in the first conjunct refers to; hence the strict reading indicated in (27b) obtains.[2] We also saw that a sloppy reading obtains only when the pronoun is c-commanded by its antecedent, as shown in (10b), repeated here as (29):

(29) The woman who emulated Harry believes he is intelligent and the woman who emulated Bill does too. (non-sloppy)

In order to obtain a sloppy reading, we must apply QR to *Harry*, the antecedent of *he* in the first conjunct, so that we will obtain the following representation:

(30) *the woman who$_1$ [$_S$ Harry$_2$ [$_S$ t_1 emulated t_2]] believes he$_2$ is intelligent

In (30), *Harry* is adjoined to the immediately dominating S by QR under the clause-boundedness requirement on this rule, proposed by May (1977). Here, *he* is not bound by *Harry* and hence cannot be identified as a variable bound by this operator according to (26). Therefore, (29) cannot have a sloppy reading.

Further, we saw that reflexives only produce a sloppy reading, as shown in (12), repeated here as (31):

(31) John shot himself and Bill did too.

Under the present analysis, the first conjunct of this sentence must have only the following representation:

(32) [$_S$ John$_1$ [$_S$ t_1 [$_{VP}$ shot himself$_1$]]]

This representation satisfies the requirement on anaphors, namely, that they must be bound variables. When a structure parallel to (32) is constructed in the second conjunct, the reflexive in this conjunct also functions as a variable bound by the local subject, i.e., *Bill*; hence the sloppy reading of (31) obtains. Since (32) is the only well-formed representation for the first conjunct of (31), this sentence only has a sloppy reading.

To summarize, I showed that the free application of QR to any kind of NPs, which is proposed by Clark (1992), enables us to represent an operator-variable relationship syntactically irrespective of the semantic nature of the NPs involved.

2. Eliminating A-Binding from Condition A

I have argued in the preceding section that anaphors are bound variables at LF. In this section, I will argue that the specification of A-binding is eliminable from Condition A, under the assumption that anaphors are bound variables. More specifically, I will argue that the configuration in which an

anaphor is locally bound by its antecedent in an A'-position, as in (2a) and (2b), repeated here as (33), violates whatever constraint rules out weak crossover (henceforth, WCO) cases:

(33) a. *John$_1$, pictures of himself$_1$ showed t_1 to be uninteresting.
b. *The professors$_1$, each other$_1$'s students criticized t_1.

In so doing, I will first show how standard WCO cases are ruled out.

A WCO effect occurs when a pronoun bound by an operator neither c-commands nor is c-commanded by its trace, as illustrated in the LF representations in (35), which are mapped from (34) by application of QR to quantified NPs such as *everyone*:[3]

(34) a.?*Who$_1$ does his$_1$ mother like t_1?
b.?*His$_1$ mother likes everyone$_1$.
(35) a.?*[$_{CP}$ who$_1$ does [$_{IP}$ his$_1$ mother like t_1]]
b.?*[$_{IP}$ everyone$_1$ [$_{IP}$ his$_1$ mother likes t_1]]

In these representations, *his* is intended to function as a variable bound by the operators *who* and *everyone*. The ungrammaticality of these representations follows from the c-command requirement on bound variables stated in (26), repeated here as (36):

(36) α is a variable only if
(i) α is a trace bound by an operator; or
(ii) α is bound by a variable.

In either representation of (35), *his* is not bound by the trace of the operator; hence it cannot be identified as a variable bound by that operator, according to (36).

Now, the sentences in (33) are also ruled out by (36). In these sentences, *himself* and *each other* must be variables bound by *John* and *the professors*, respectively, to satisfy the LF requirement on anaphors. However, they are not bound by the traces of these operators, and hence are not identified as variables, according to (36). This contradicts the LF requirement on anaphors; thus, the ungrammaticality of (33).

Compare (33a) with the following sentence:

(37) John$_1$, pictures of him$_1$ showed t_1 to be uninteresting.

if *him* were taken as a variable bound by *John*, then (37) would be ruled out for the same reason as (33a); since *him* is not bound by the trace of *John*, it cannot be identified as a variable, according to (36). The grammaticality of (37) can, then, be attributed to the fact that pronouns, unlike anaphors, can be involved in coreferential anaphora. Thus, in (37), *him* is in a coreferential relation with *John*, which makes the c-command requirement on variables stated in (36) irrelevant.

To summarize, I argued that the requirement that the antecedent of an anaphor must be in an A-position follows from the condition on bound variables, under the assumption that anaphors are bound variables by their nature.

Therefore, we can eliminate the specification of A-binding from the formulation of Condition A.

2.1. Implications for Weakest Crossover

Lasnik and Stowell (1991) discuss constructions involving operator-variable chains where WCO effects do not arise, despite their apparent similarities to typical WCO configurations. They refer to these as instances of *weakest crossover*. Representative examples involve *tough*-movement (38a), parasitic gap (38b) and topicalization (38c) constructions, as shown below:

(38) a. Who$_1$ t_1 will be easy for us [OP$_1$ [PRO to get his$_1$ mother to talk to e_1]]
b. Who$_1$ did you stay with t_1 [OP$_1$ before his$_1$ wife had spoken to e_1]
c. This book$_1$, I expect its$_1$ author to buy e_1

Chomsky (1977) argues that *tough*-movement constructions such as (38a) involve an operator movement, as indicated. With this assumption, *his* in (38a) should not be identified as a variable of the null operator OP, since it is not bound by the trace of this operator, but it appears to be identified as such. As for parasitic gap constructions such as (38b), Chomsky (1986) argues that parasitic gaps are in fact traces of the movement of null operators within the adjunct clauses containing them. Under this assumption, *his* in (38b) should not be a variable of the null operator, since it is not bound by the trace of this operator, but again it appears to function as such. The same observation obtains in topicalization constructions such as (38c), where *its* is not bound by the trace of the topic operator *the book*, hence it should not be identified as a variable of this operator, but the fact appears to be contrary.

Lasnik and Stowell provide the following generalization to describe the structures where WCO effects arise (p. 707):

(39) WCO effects arise only in contexts where a pronoun is locally A'-bound at LF by a true quantifier ranging over a possibly nonsingleton set.

Thus, in the cases of weakest crossover, illustrated in (38), the relevant operators are not true operators in the sense stated in (39); null operators do not have their own quantificational force, hence must be supplied with their semantic value, and topic operators are referential. Hence, these constructions do not induce WCO effects.

Notice that this analysis is incompatible with my account of the contrast exhibited between (33a) and (37), reproduced here as (40) and (41):

(40) *John$_1$, pictures of himself$_1$ showed t_1 to be uninteresting.
(41) John$_1$, pictures of him$_1$ showed t_1 to be uninteresting.

I argued that (40) is an instance of WCO, since *himself*, which is intrinsically a bound variable, is not bound by the trace of the topic operator *John*. On the other hand, the reason for the grammaticality of (41) is that pronouns, unlike anaphors, can participate in coreferential anaphora. However, according to

Lasnik and Stowell's generalization (39), both sentences are instances of weakest crossover, the topic operators functioning as referential. Hence (40) should be grammatical if we give up the A-binding requirement on anaphors. More generally, Lasnik and Stowell's approach to WCO is in conflict with my main theme, which follows Reinhart (1983), that the conditions on bound variables apply equally to all NPs bound by operator-variable chains, irrespective of the semantic nature of the operators. Notice that their analysis implies that "WCO does not follow exclusively from the structural configuration of A'-binding, ...; the logical status of the operator in the A'-position must be taken into account." (p. 707) In what follows, I argue that WCO does follow from the structural configuration of the operator-variable relationship.

In order to maintain my account of the contrast between (40) and (41) (or (38c) for that matter) while rejecting Lasnik and Stowell's generalization (39), I must offer an alternative account of the grammaticality of sentences (38a) and (38b). Let us first consider *tough*-movement constructions, shown in (38b). Recall that we proposed (36), repeated here, as the condition on bound variables:

(42) α is a variable only if
(i) α is a trace bound by an operator; or
(ii) α is bound by a variable.

Notice that this condition correctly explains the fact that *his* in (38b) may function as a variable of the operator *who*, since this pronoun is c-commanded by the real trace of *who*, as shown in the following representation:[4]

(43) [who$_1$ [t_1 will be easy for us [OP$_1$ [PRO to get his$_1$ mother
↑_____|
to talk to e_1]]]]

As is indicated with a link, *his* is c-commanded by t_1 and hence can function as a variable bound by *who*, according to (42). In short, it is the availability of an extra antecedent for a pronoun that makes *tough*-movement constructions free from WCO effects.

Finally, let us consider parasitic gap constructions, shown in (38b), repeated here as (44):

(44) [who$_1$ did you stay with t_1 [OP$_1$ before his$_1$ wife had spoken to e_1]]

Unlike *his* in (43), *his* in (44) is not c-commanded by the real trace of *who*, i.e., t_1. Thus, this pronoun should not function as a variable of *who* according to (42). Why is, then, (44) grammatical?

I propose that a null operator functions as a variable if it is bound by another operator. Notice that we are assuming, following Chomsky (1986), that the parasitic gap creates a chain independent of the chain of the real gap. Thus, as Chomsky claims, the parasitic gap construction seems to involve an operation of chain composition. I assume, following Barss (1986), that the chain of the parasitic gap creates a "composed chain" with the operator of the real gap.[5] Then, in (44), (*who, OP, e*) constitutes a composed chain. In this chain, OP functions like a variable bound by *who*, since its value is supplied by

this *wh*-operator. If it is in fact identified as a variable, *his* in (44) can correctly function as a variable bound by *who*, since it is c-commanded by the variable of this operator, i.e., OP. Let us modify the condition on bound variables stated in (42) into the following:

(45) α is a variable only if
(i) α is a trace or a null operator bound by an operator;
or (ii) α is a bound by a variable.

With this condition, *his* in (44) can function as a variable bound by *who*, since it is bound by the null operator which is, in turn, bound by *who*.[6]

It is predicted under this analysis that the null operator of the parasitic gap can license an anaphor as well as a bound pronoun. This seems to be borne out; compare the following examples:

(46) a. ?Which professors$_1$ did you ask me to fire t_1 [after each other$_1$'s students criticized e_1]
b. ?*Which professors$_1$ did you ask me to fire t_1 [after each other$_1$'s students criticized them$_1$]

Some speakers tolerate sentences where *each other* is embedded within an adjunct clause and takes its antecedent outside that clause.[7] Those speakers find (46a) fairly good whereas they find (46b) degraded. These sentences will have the following representations under the present analysis:

(47) a. which professors$_1$ did you ask me to fire t_1 [OP$_1$ after
↑
[each other]$_1$'s students criticized e_1]
|
b. *which professors$_1$ did you ask me to fire t_1 [after [each other]$_1$'s students criticized them$_1$]

In (47b), neither the trace of *which professors* nor *them* c-commands *each other*, hence this reciprocal violates the condition on bound variables (45). In (47a), in contrast, OP is identified as a variable according to (45i), since it is bound by an operator. *Each other* is, then, correctly identified as a variable according to (45ii), since it is bound by a variable, i.e., OP, satisfying the requirement on anaphors; hence the grammaticality of (47a). This lends support to my claim that a null operator may be identified as a variable.

To summarize, I argued that WCO follows from the structural configuration of the anaphoric relation between a pronoun or an anaphor on the one hand and an operator-variable chain on the other. I believe that this analysis is at least as tenable as Lasnik and Stowell's (1991) in explaining instances of weakest crossover. More crucially, this analysis, unlike Lasnik and Stowell's, is in accordance with my main theme that the conditions on variables apply equally to all NPs bound by operators, irrespective of the logical status of these operators.

Notes

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[1] Bouchard (1984) and Lebeaux (1984/85) observe that, when reflexives are not 'locally bound," they can produce a strict reading, as shown below:

(i) John thought that there were some pictures of himself inside, and Bill did too. (sloppy and strict readings)

This appears to be a counterexample to the claim that reflexives are inherently bound variables. However, see Abe (1992a; 1993) for a solution to this problem.

[2] See Abe (1992a) for detailed mechanisms of how to derive the sloppy and strict readings from representations similar to (28a,b).

[3] I assume that *wh*-phrases appear in the Spec position of CP, unlike NPs that undergo QR, which are adjoined to IP (= S). However, nothing crucial hinges on this assumption in the following discussions.

[4] Here a link is used only for expository purposes without any commitment to the linking theory proposed by Higginbotham (1983).

[5] Contrary to Barss, Chomsky claims that a "composed chain" consists of the chains of the real gap and of the parasitic gap. However, since the real gap does not seem to c-command the parasitic gap, it will be more natural to assume that only the operator of the real gap participates in a "composed chain," so that each member of the composed chain c-commands the next member.

[6] This analysis implies that topicalization does not involve a null operator movement. If it did, sentence (40) could have the following representation:

(i) *John$_1$ [OP$_1$ [pictures of himself$_1$ showed t$_1$ to be uninteresting]]

In (i), *himself* would be licensed as a variable bound by *John*, since it is c-commanded by the null operator bound by *John*. Since this sentence is ungrammatical, the option of a null operator movement must be excluded in topicalization.

[7] Other speakers find such sentences degraded. This will be attributed to the island effects of *each other* that arise from *each* moving across an adjunct island at LF under Heim, Lasnik and May's (1991) *each*-movement analysis. See Abe (1992b) for relevant discussion.

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The Case for a Pharyngeal Glide: Evidence from Interior Salish*

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1.0 Introduction

This paper presents evidence that the pharyngeal segments /ʕ, ʕ', ʕʷ, ʕ'ʷ/ in Interior Salish are [Pharyngeal, +sonorant]. As such they are pharyngeal glides. While pharyngeal glides are not unprecedented outside Salish their existence poses some empirical and theoretical questions (see Pulleyblank (Ms.) for evidence of a pharyngeal glide in some Chinese languages). On the empirical side, the only pharyngeal segments charted by the International Phonetic Association (1989) are ʕ and ħ, defined as a voiced and voiceless pharyngeal fricative respectively. There is no symbol for a pharyngeal approximant, or glide, although approximants are attested at other places of articulation, from Labial to Dorsal: /ʋ, ɹ, j, ɰ/. The IPA chart reflects the understanding that known pharyngeals are fricatives rather than approximants, although the possibility of approximant pharyngeals is not denied. On the theoretical side, it is a prediction of feature theory as articulated by Halle (1992) that pharyngeals cannot be [+consonantal] and must instead be glides on a par with /j, w/. This position requires [+consonantal] segments to exhibit a degree of constriction in the oral cavity as executed by either the Labial, Coronal or Dorsal articulators. Since pharyngeals are articulated by neither of these, they are predicted to be glides, that is [-consonantal, +sonorant]. It might be thought then that the IPA chart is phonetically, but not phonologically, accurate, and that Halle's predictions about pharyngeal behaviour are correct.

However, Salish is unique in presenting clear evidence for a pharyngeal glide. While recent phonological investigation of /ʕ, ħ/ in Arabic assumes they are approximants, or glides, along with the laryngeals /ʔ, h/ and the other gutturals /χ, ʁ/ (McCarthy 1991), there is little direct phonological evidence in support of this position. There is, however, some evidence that Semitic pharyngeals undergo and trigger voicing alternations and so bear [voice] distinctions typical of

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obstruent articulation. This is congruent with the cross-language occurrence of pharyngeals, where a voiced/voiceless opposition is preserved 81% of the time. Insofar as [voice] oppositions are typical of obstruent articulation, these facts argue for Semitic /ʕ, ħ/ as fricatives, whereas Salish provides firm phonological evidence for /ʕ/ as a sonorant. In this respect it is significant that Interior Salish inventories do not contain /ħ/ (with the exception of a recent innovation in Nxa'amxcin (Moses-Columbia Salish)) and hence the issue of representing a voice distinction among pharyngeals does not arise. This is as predicted by the analysis of Salish /ʕ/ as a glide, and is in accordance with the presence of only voiced sonorants throughout Interior Salish.

This paper first considers the general distribution of pharyngeals, and assesses phonetic and phonological evidence for the status of Arabic pharyngeals as fricatives. Further evidence that pharyngeals can be [-sonorant] is presented from harmonic clustering in Kabardian, and from allomorphy in two other Caucasian languages. Data from Stoney Dakota, Masset Haida and Ahousaht (Nuuchahnulth) also require the specification [-sonorant, Pharyngeal], providing further evidence that pharyngeals can pattern as obstruents. Finally, the full range of evidence for [+sonorant, Pharyngeal] segments in Interior Salish is presented. It is concluded that pharyngeals have the same basic variation in manner articulation that is found at other places of articulation, that is to say, they occur as both obstruents and sonorants.

2.0 Distribution of pharyngeals

The inventory of pharyngeal segments as recognized by the International Phonetic Association (1989) is given in (1).

1. International Phonetic Alphabet (revised 1989)

	Velar	Uvular	Pharyngeal	Glottal
Plosive	k g	q ɢ		ʔ xxxxxx
Nasal	ŋ	ɴ	xxxxxxxxxxxx	xxxxxxxxxxxx
Trill		ʀ		xxxxxxxxxxxx
Fricative	x ɣ	χ ʁ	ħ ʕ	h ɦ
Approximant	ɰ			xxxxxxxxxxxx
Ejective stop	kʼ	qʼ		xxxxxxxxxxxx
Implosive	ɠ	ɢ		xxxxxxxxxxxx

It is immediately noticeable that velar and uvular segment-types are more extensive, including nasals, approximants, ejectives and implosives, while glottal and pharyngeal segments are more limited in type. The absence of symbols for pharyngeal plosives, trills, approximants, ejectives and implosives indicates that examples of such articulation are not attested. Pharyngeal nasals are ruled out on physiological gounds. Glottals are similarly limited in type, but with more extensive physiological reasoning for the exclusion of certain types. Finally, glottals have a stop articulation lacking in the pharyngeal series.

The cross-language distribution of pharyngeals shows they are quite rare. Their appearance is concentrated in three areas of the world, *viz.*, Africa/Arabian Peninsula/Middle East, parts of the Caucasus mountains and the Pacific Northwest of North America.

2. Cross-language distribution of pharyngeals (Ruhlen 1975, 693 inventories)

	Number	Percent
L's w. pharyngeals	48/693	7%
/ħ/ and /ʕ/	39/48	81%
/ħ/ only	3/48	6%
/ʕ/ only	6/48	13%

Furthermore, there is an overwhelming tendency for pharyngeals to appear in voiced/voiceless pairs. This is in accordance with the IPA paradigm, and suggests we are dealing with obstruents, since obstruents canonically bear voice distinctions.

The conflict between Halle's articulation of feature geometry and the distributional leanings of pharyngeals can be explored by considering the

phonetics and phonology of pharyngeal articulation in as many languages as possible. Turning first to Arabic pharyngeals, phonetic cues to manner of articulation indicate segments with a considerable range of variation. Thus, Butcher and Ahmad (1987) conclude their study of Iraqi Arabic pharyngeals, 'It could be argued that both /ʕ, ħ/ are 'target' fricatives in an area of the vocal tract not particularly well suited to such articulations. The available alternatives are either an approximant articulation ... or a stop articulation, either at the epiglottis or ... at the glottis'. /ħ/ is phonetically a 'voiceless continuant sound with high rates of airflow, high intensity noise and marked formant structure', while /ʕ/ is a 'voiced approximant, which in final position is often followed by a stop articulation, and which is almost invariably accompanied by creaky voice'. As such, the phonetics of Iraqi pharyngeals do not decide the manner of articulation question, since pharyngeals are on the approximant side of the fricative/glide divide in some respects, but not in others. This leaves us dependent on phonological data.

It is well-known that many Semitic languages identify a phonological class of 'gutturals', which generally consists of uvular and pharyngeal segments bearing a voice disinction, glottal stop and /h/.

3. Semitic 'gutturals': χ, ʁ , ʕ, ħ, ʔ, h
   [+sonorant, Pharyngeal] (McCarthy 1991)

McCarthy (1991), in a major investigation of guttural phonology, does not provide evidence directly bearing on the major class or stricture features of gutturals. Direct evidence does not seem to be forthcoming. However, McCarthy does present some data indicating that Semitic pharyngeals bear voice distinctions, and that they can undergo and trigger voicing assimilations.

4. Voice alternations involving pharyngeals
   a. 'Afar (East Cushitic): b, d, g, ʕ —> pʔ, tʔ, kʔ, k*ʔ/__##
      —> p, t, k, k* /__ [-voice]
      k*ʔ is a voiceless pharyngeal plosive followed by glottal closure
      k* is a voiceless pharyngeal plosive without glottal closure

   b. North Israel Bedouin: b, d, g, ʕ —>p, t, k, ħ
   c. Daragozo: b, d, z, ɣ, ʕ —> p, t, s, x, ħ
   d. Sudanese: ʕ, ħ condition voice-assimilation.

While the phonetics of Iraqi Arabic pharyngeals do not allow us to distinguish between pharyngeals as fricative or approximant articulations, the phonology of pharyngeals in some Semitic and Cushitic languages indicates that [voice] distinctions can be relevant. Insofar as voicing distinctions canonically characterize obstruents, this would suggest that at least some pharyngeals are [-sonorant]. If [-sonorant, -consonantal] is considered impossible (Chomsky and Halle 1968, Halle 1992) then these pharyngeals must also be [+consonantal].

This finding is supported by the patterning of pharyngeals in Caucasian languages. The Caucasian languages are well-known for their consonant inventories, with huge numbers of multiply-articulated segments. In some languages clustering possibilities are governed by restrictions referring to laryngeal features and place of articulation. For example, in Kabardian, clusters agree in laryngeal features of voicing, aspiration and glottalisation (Kuipers 1960). Furthermore, it is argued by Kuipers (1960), Anderson (1978) and Padgett (1991) that Kabardian harmonic clusters are complex segments, with all articulations linked to the same [-sonorant] root node. This analysis correctly excludes the glides /w, j/ and other sonorants from participating in harmonic clusters. The patterning of Kabardian /ħ/ (it does not have /ʕ/), indicates that it is (i) [-sonorant], or else it could not be in a cluster in the first place, and (ii) voiceless. This is as predicted by the IPA paradigm. Kabardian and Bezedukh data are exemplified in (5) (data from Kuipers (1960) and Kuipers (1963)).

5. i) Kabardian Harmonic clusters: ps, pq, pˀcˀ, bz, bɣ
tx, tχ, tħ
st, skʷ, sx, sħ
st, sx, sʼħ
tɬp, tɬx, tɬħ
psʼħ

ii) Bezedukh (East Circassian): tħ, sʼħ, tɬħ, pšħ, psʼħ

A second piece of evidence that Caucasian pharyngeals are obstruents comes from morphologically-governed voicing alternations in pronominal clitics. On the assumption that voicing distinctions are canonically associated with

obstruents, these alternations argue for [-sonorant] pharyngeals. The alternations discussed here are not pan-Caucasian.

The type (iv) transitive paradigm in Abaza has voiced allomorphs of 1Sg /s-/, 1Pl /ʃʷ-/ and 2Pl /ħ-/ when the radical to which it is prefixed begins with a voiced consonant (Allen 1956). Abaza has both voiced and voiceless /ʕ, ħ/, and 2Pl /ħ-/ voices to [ʕ-] in this paradigm. The rule is clearly morphologically governed since the clitics for possessive marking of nominals are phonologically identical to the transitive subject markers, but the voicing rule is not triggered. The rule does not apply to intransitive subject pronominals either.

6. Abaza (NW Caucasian) : Transitive subject pronominal paradigm

1Sg	s, z	1Pl	ħ, ʕ
2Sg. m.	w	2Pl	ʃʷ, ʒʷ
2Sg. f	b		

The transitive subject paradigm of Shapsug (West Circassian) has a slightly more complicated distribution whereby all laryngeal features, including those for glottalisation, must match those of the first segment of the radical. Stem-initial /ħ/ patterns with voiceless segments in triggering the 1Sg allomorph /s-/. Resonant-initial stems condition /sə-/, voiced stems condition /z-/ and glottalised stems condition /s'-/ (Smeets 1984).

7. Shapsug pronominal allomorphy

1sg.	s, z, s', sə	
s-ħə-ʃt		
3Sub/1Agent-to carry-Future 1		'I will carry it'

There is evidence from Caucasian, then, that its pharyngeals pattern as obstruents in bearing [voice] distinctions. I move now to the Pacific Northwest where pharyngeals are found in Haida, Nuuchahnulth (Nootka) and Interior Salish. Before examining these languages, I consider first a case of pharyngeal development in Stoney Dakota (Shaw 1980).

The voiced and voiceless velar fricatives /ɣ, x/ of Dakota have become pharyngeal /ʕ, ħ/ in the Stoney dialect (Shaw 1980).[1] Despite this transition to Pharyngeal place of articulation, Stoney /ʕ, ħ/ continue to pattern as fricatives in

[1] Older speakers apparently still evince some variation between velar and pharyngeal pronunciation.

undergoing a fricative devoicing rule exclusive to reduplicated CVC roots. Of interest here is that despite specification for Pharyngeal place, /ʕ, ħ/ behave phonologically as obstruents. Thus, if we assume a process (exclusive to Stoney) substituting Pharyngeal for Dorsal place of articulation on velar fricatives, an accompanying shift in major class features to [-consonantal, +sonorant] will incorrectly prevent Stoney /ʕ, ħ/ from undergoing fricative de-voicing.

8. Stoney Dakota fricative devoicing (Shaw 1980)
   čʰóða —> čoθ+čʰóða 'to be warm'
   čʰaʕa —> čʰa ħ + čʰaʕa 'to be icy'

The Ahousaht dialect of Nuuchahnulth (Nootka) contains two pharyngeals, one which is described much as Arabic /ħ/. The other pharyngeal, symbolized here /ʕ/, is phonetically a voiceless stop articulation with concomitant low, pharyngeal constriction (Bessell 1993). It is not clear whether the stop component is articulated by the glottis or epiglottis.

Ahousaht phonology, as presented by Rose (1976), shows /ħ/ patterning as a fricative, and /ʕ/ as a stop Evidence for this comes from a set of lenition suffixes which convert root-final fricatives into a homorganic glide. The attested alternations are given in (9).

9. Ahousaht lenition (Rose 1976)
   s, ʃ, ɬ —> j
   x^w, $ħ^w$ —>w

The segments /x, ħ/ are unchanged, although as fricatives they are targets of the lenition rule. This is accounted for if Ahousaht lenition is structure preserving, since there is no pharyngeal glide in the inventory. /ʕ/ is not targetted, as predicted if it is a stop, but also by structure preservation. However, /$ħ^w$/ undergoes the rule given its status as a fricative and the presence of /w/ in the inventory as a Labial glide.

Ahousaht also has a morphologically-governed rule that converts stem-final stops to a homorganic ejective. The process is triggered by a set of so-called glottalisation or fortition suffixes. In the presence of such suffixes stem final /q/ surfaces as [ʕ]. This motivates the analysis of /ʕ/ as a glottalised stop, homorganic

in some relevant way with /q/. Stem-final fricatives surface as homorganic, glottalised glides.

10. Ahousaht fortition (Rose 1976)

Glottalisation suffixes: [-cont] —> C'		[+cont] —> Glide'
Stop, affricate, nasal —> C'		fricative —> w', j'
p—> p'	t—> t'	s—>j—>j'
ts—> ts'	tʃ—>tʃ'	ʃ—>j—>j'
tɬ—>tɬ'		ɬ—>j—>j'
k^w—>k'^w	k—>k'	x
q—>ʕ	q^w—>ʕ	x^w—>w—>w'
		ħ
m —> m'	n —> n'	$ħ^w$—>w—>w'

Given the q—>ʕ alternation, Rose (1976) assumes that /ʕ/ is a glottalised uvular stop in feature representation. Jacobsen (1969) argues that Proto-Nootkan *q' and *q'^w merged into ʕ, which forms some background for the synchronic alternation as it appears with the glottalisation suffixes. Phonetically, there is some evidence that the formant structure of vowels adjacent to /ʕ/ is different from that found with uvulars, and that lower pharyngeal rather than uvular constriction is involved in the articulation of /ʕ, ħ/. Further phonetic work is required to resolve these issues, but the fact remains that phonetic pharyngeals in Ahousaht are patterning as [-sonorant]. Furthermore, while Rose argues that /ʕ/ bears the same place features as uvular /q/, it is clear from lenition alternations that total identity of place is not required. Otherwise, neither the /s, ʃ, ɬ /—> [j] nor the /x^w, $ħ^w$/ —>[w] alternations would be sanctioned. Thus, it is entirely possible that the Ahousaht q—>ʕ alternation trades on a Pharyngeal specification common to both /q/ and /ʕ/, and that uvular /q/ is differentiated from /ʕ/ by a specification for Dorsal as well as Pharyngeal place.

Massett Haida contains two pharyngeals which Enrico (1991) describes as phonetically similar to Nuuchahnulth /ʕ ħ/. As analysed by Enrico (1991) Masset presents a second case of pharyngeal stop articulation.[2] The principle arguments

[2]Evidence distinguishing the phonological place features of Massett pharyngeals from uvulars is difficult to find. Historically these sounds are derived from an unaspirated uvular stop and a uvular fricative. Enrico (1991) states that the loss of *ɢ, *χ in Massett leaves a gap in the uvular inventory, since [ɢ, χ] are both borrowed back into Massett without being converted into pharyngeals. This suggests that Massett pharyngeals are not featurally identical with uvulars.

for this analysis come from clustering restrictions. While word-initial onsets may be any single consonant, bi-consonantal word-initial clusters are of two types only: obstruent+glide or fricative+stop. In the latter case, only the coronal fricatives /s, ɬ/ can occupy C1 postion, and C2 must be [-continuant]. Massett /ʕ/ may occupy C2 position in these clusters.

11. Massett Haida pharyngeals in initial clusters (Enrico 1991)
#{s, ɬ} C—
[-cont]

stal	'slope'	ɬtaan	'blueberry'
stʰiid	'elderberry bush'	ɬtʼaj	'carrying strap'
stɬʼaŋ	'hand'	ɬkun	'skunk cabbage'
skʼaka	'dog salmon'	ɬqʰaam	'bull kelp'
sʕalaaŋ	'song'	ɬʕa	'rock'
sʔaay	'merganser'	ɬʔaan	'saliva'

Secondly, whereas the full range of sonorants, /n, ŋ, w, j, l/, are found in sonorant-stop coda sequences, /ʕ, ħ/ are not. This is as predicted if /ʕ, ħ/ are obstruents. The only other permissable CC codas require /s/ or /ɬ/ in C1 position.

Finally, consider Interior Salish. The Proto-Salish inventory in (12) illustrates the range of consonantal articulation found in these languages.

12. Proto-Salish consonant inventory (Kinkade 1990)

Labial	Coronal				Velar		Uvular		Phary	Glottal
p	t	c			k	k^w	q	q^w		ʔ
pʼ	tʼ	cʼ	ƛʼ		k	k'^w	qʼ	q'^w		
		s	ɬ		x	x^w	χ	$χ^w$		h
m	n	r	l	y	ɣ	w			ʕ	$ʕ^w$
mʼ	nʼ	rʼ	lʼ	yʼ	ɣʼ	wʼ			ʕʼ	$ʕ'^w$

The following distributional remarks can be made about the overall structure of Salish inventories. First of all, the major inventory division is between obstruents and resonants. All obstruents are voiceless, all sonorants are voiced. /ʕ/ patterns as a resonant in two ways: (i) it is a voiced segment and (ii) the distribution of glottalisation on the pharyngeals is typical of the resonant series. There are no glottalised fricatives in the inventory, which is where the pharyngeal series might otherwise be placed.

The participation of pharyngeals in the resonant inventory is confirmed by various morphologically governed glottalisation processes,where resonants, to the systematic exclusion of stops and fricatives, are targetted.

(13) Resonants exclusive targets of morphologically triggered glottalisation

Non-glottalised forms	Glottalisation
a) √šɛl-ít-kəp 'he split wood for immediate use'	šə+šə**l'**=úl'm'x^{w}-n' 'hoe' (lit: sth. which gives ground little chops)
b) hn√laʕ^{w}=íčt=ɛtk^{w}ɛʔ 'he plunged his hand in water'	č√l'əʕ'^{w}+l'əʕ'^{w}-p=ól'q^{w} 'pocket knife' (lit: long thing thrust point-first on bottom repeatedly)
c) **j**ɛ**r**+jɛ**r**-p 'wagon, they roll'	**j'**+**j'**ɛ**r'**+**j'**ɛ**r'** 'cart'
d) ʕac+ʕací-m 'he broke a horse'	s-x^{w}-**ʕ'**a+**ʕ'**ací-**m'** 'a trapper'

Diminutive reduplication is not the only context triggering resonant glottalisation. Nɬe?kepmxcin (Thompson River Salish) has a specializing affix which manifests itself as glottalisation on resonants. The exact distribution of glottal spread is somewhat unclear, but the rule targets only resonants (Thompson and Thompson 1992).

14. Nɬe?kepmxcin specializing affix

?es√píʕ	'(of a slit) open, split'
?es√píʕ'	'(of a wound) remaining open'
n√zén-**m**	'go right around'
n√zén-**m'**	'struggle to get around'

There are also regular rules governing the appearance of syllabic resonants. Such rules reference syllable structure, which is quite restricted in these languages. Of relevance to the present discussion is that the pharyngeal series patterns with the resonants for these processes. The basic paradigm is given in (15) using data from Shuswap, with some examples from Nxa'amxcin (Moses-Columbia Salish).

15. Resonant syllabicity

a) Shuswap resonant syllabicity (Kuipers 1989:12)

/y, ɣ, w, ʕ, ʕ^{w}/ —> [i/e, ʌ, u/o, a, ɔ]

/y', ɣ', w', ʕ', ʕ'ʷ/ —> [i?/e?, ʌ?, u?/o?, a?, ɔ?][3]
/m, m', n, n', l, l'/ —> [m̥, m̥', n̥, n̥', l̥, l̥']; [ᵊm, mᵊ; ᵊn, n,ᵊ; ᵊl, lᵊ]

b) Nxa'amxcin resonant syllabicity (Bessell and Czaykowska-Higgins 1991)[4]

Root	Reduplication	Syllabification	
√c'w'	c'w'+c'w'=kst-m	c'u?+c'ǽw'=kst-m	'wash hands'
kyəʕ'=ánaʔ	kyəʕ'+yəʕ'=anaʔ	kya?+ya?=ánaʔ	'g'irls'
√yəw'	k-yǽw'+w'	k-yǽw'+u?	'its unwinding off a reel'

The phonetics of Interior Salish pharyngeals do not in any way contradict the phonology of the case. Interior Salish Pharyngeals are highly resonant articulations with the formant structure, roughly, of a low, back vowel (Bessell 1993)

3.0 Conclusion

The Salish data presented here require a symbol for a pharyngeal glide, distinct from a pharyngeal fricative. Data from Ahousaht and Massett Haida suggest a pharyngeal stop of some sort, although the precise articulatory gestures involved in these sounds are somewhat unclear. It may be that the symbols H (voiceless epiglottal fricative) and ʔ (epiglottal plosive) can be pressed into service here. While there is some evidence for a phonologically relevant glottalisation feature on Ahousaht ʕ, I know of no phonological evidence for such an analysis of Masset ʕ. Furthermore, if pharyngeals can be [-sonorant, +consonantal], then our definition and application of these features requires revision. Such revision has consequences for the representation of laryngeal segments also, since if pharyngeals are not necessarily [+sonorant, -consonantal] we expect cases where laryngeals do not carry these features either.

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[3]Kuipers (1989:12) notes that the [a, ɔ] vowels derived from pharyngeals have what he calls 'a pharyngealized character, especially in ES [Eastern Shuswap]'.

[4]I thank Ewa Czaykowska-Higgins and Agatha Bart for providing the pharyngeal example. The vowel in this form is transcribed by Czaykowska-Higgins as having a pharyngeal quality.

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Aspectual Licensing of Predication in Spanish*

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0. INTRODUCTION

This paper will argue for a syntactic representation of lexical aspectual properties, based on the distribution of two copular verbs in Spanish: *ser* 'to be (usually, always)' and *estar* 'to be (today, now)'. Following Zagona (1993), lexical aspectual properties will be represented as event arguments projected inside the VP. *Estar*, on the one hand, will be argued to project two event arguments, one of which is not syntactically active (much like implicit arguments in passives), whereas *ser* will be argued to project one. This distribution parallels that of telic versus atelic predicates in Zagona (1993)'s model.

1. DISTRIBUTION

Spanish has two distinct copular verbs: *ser* and *estar*. The former can be characterized as permanent[1], the latter as contingent[2]. I will review the distribution of adjectives, past participles and nominals with *ser* and *estar*.

1.1. *Ser and estar with adjectival predicates*. Adjectives with *estar* indicate a 'temporary' state, whereas adjectives with *ser* indicate a 'permanent' state. There are three groups of adjectives, however. One group only appears with *estar*, a second one appears with both *ser* and *estar*, and the third one appears only with *ser*:

(1) a. Napoleón está muerto 'Napoleon is(estar) dead'
b. *Napoleón es muerto 'Napoleon is(ser) dead'

---

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[1]The terms 'permanent' and 'contingent' are used descriptively, with no intended theoretical implication.

[2]Ser can in turn be equative or predicative. For a formal distinction between both, see Sánchez and Camacho (1993). In this paper, I will only be interested in predicative ser.

(2) a. Bessie está enferma 'Bessie is(estar) sick'
b. Bessie es enferma 'Bessie is(ser) sick'

(3) a. Esto es obvio 'This is(ser) obvious'
b. *Esto está obvio 'This is(estar) obvious'

Adjectives like *muerto* 'dead', *vivo* 'alive'[3], *seco* 'dry', *mojado* 'wet', *lleno* 'full', *vacío* 'empty', only appear with *estar*.

Most adjectives appear with both *ser* and *estar*, and generally they have a different meaning along the lines of temporary/permanent predicates, such as in (2): (2a) means 'Bessie is presently and temporarily sick', but (2b) means 'Bessie is constantly sick'.

A small group of adjectives (cfr. Luján, 1981) can be used with both verbs without change in meaning: *soltero* 'single', *casado* 'married'.

It must be noted that whether an adjective appears with *ser* or with *estar* or with both is a lexical property. Fernández-Ramírez (1987) point out that adjectives like *lleno* 'full', which only appears with *estar* today, used to appear only with *ser* in earlier stages of Spanish.

1.2. *Ser and estar with past participles*. Only past participles of achievement and accomplishment verbs appear with *estar*. Whenever they do, the internal argument of the corresponding verb becomes the external argument of the participle (and subject of *estar*), in a sort of lexical passive:

(4) a. Marta descubrió el error 'Marta discovered the mistake'
b. El error está descubierto 'The mistake is discovered'

(5) a. Miguel construyó una casa 'M built a house'
b. La casa está construida 'The house is built'

Past participles with *estar* sometimes admit an agent, but they generally don't:

(6) a. *El error está descubierto por Marta
'The mistake is(estar) discovered by Marta'
b. El cuadro está firmado por Picasso
'The painting is(estar) signed by Picasso'

Ser, on the other hand, only appears with past participles in verbal passive sentences:

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[3]Vivo has another meaning: 'smart', which does appear with estar.

(7) El error fue descubierto (por Marta)
'The mistake was(ser) discovered (by Marta)'

To summarize, participles and adjectives that appear with *estar* denote a "temporary" state. We will call this kind of adjectives "perfective", following previous research (Luján, 1981; Hernanz, 1988; Bosque, 1990). This notion a notion can be defined by saying these adjectives denote a state which is temporally bound.

1.3. *Ser and estar with nominal predicates*. *Ser* can occur with any kind of noun, which can be bare or have a definite article:

(8) a. Juan es presidente/abogado/un hombre
'Juan is(ser) president/lawyer/a man'
b. *Juan está presidente/abogado/un hombre'
'....is(estar)...'
c. Juan está de presidente 'J is(estar) of president'
d. *Juan es de presidente 'J is(ser) of president'

As (8) shows, an NP predicate can only appear with *ser* (8a), not with *estar* (8b)[4]; however, if there is a preposition *de* 'of' appears, then *estar* allows the NP as a predicate (8c) but *ser* doesn't (8d).

It should also be noted that although the aspectual distinction between *ser* and *estar* as manifested with adjectives, (see below) seems to be disappearing in some dialects of Spanish (cfr. Silva-Corvalán, 1986); however, to the best of our knowledge, no dialect breaks the sharp subcategorization frames of both verbs: no dialects have *estar* with NP's.

To summarize section 1, perfective adjectives only appear with *estar*, nominals only appear with *ser*.

2. AGAINST A STAGE/INDIVIDUAL-LEVEL ANALYSIS

It has been suggested that the difference between *ser* and *estar* corresponds to Carlson's individual/stage level distinction (see, for example Diesing, 1990, Mejías-Bikandi, 1992). However, the rage of phenomena correlated with that distinction does not hold consistently in the case of *ser* and *estar*. Schmitt (1992) shows, for example, that *ser*, the alleged individual-level predicate can appear in "whenever" clauses (examples adapted from Schmitt, 1992):

(9) Siempre que María es cruel, es muy cruel.
'Whenever Maria is cruel, she is very cruel'

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[4]This has also been noted by Hernanz (1988).

To overcome this unexpected behavior of the individual-level predicate, Diesing states that *ser* is a control verb but *estar* is a raising verb. However, as we will see below, there are several of arguments against considering *ser* a control verb. Making this distinction would miss a broad range of syntactic generalizations.

Another compelling argument against a Diesing style analysis is that it can have expletives (as Schmitt points out):

(10) Es tarde
'It is late'

Individual-level predicates are not supposed to have an expletive subject, since they assign an external theta-role. To sustain the analysis, one would be forced to claim that there are two verbs *ser*: one assigns an external theta-role (the individual-level *ser*) and the other one does not (the stage-level *ser*). However, none of the other individual-level properties correlate with individual-level *ser*, and none of the stage-level properties correlate with stage-level *ser*. These inconsistencies in the analysis will lead me to reject it.

3. SMALL CLAUSE STRUCTURE

In this section I will provide arguments for what we can call the raising analysis of *ser* and *estar*, which was initially proposed by Stowell (1978) for *to be*, and extended by Burzio (1986) to Italian *essere*.

3.1. *The predicative 'lo' clitic*. In Spanish and in other Romance languages there is a clitic, *lo*, which represents a predicate, the so called predicate clitic (cfr. Sánchez, 1992 and the references cited there). Sánchez (1992) observes that in Spanish, the predicate clitic only appears in the context of raising[5], that is, with verbs such as parecer 'seem', passives, etc., as the following sentences show:

(11) a. Juan parece contento 'Juan seems happy'
b. Juan lo parece J CL-lo seems 'Juan seems it'
c. *Lo parece (lo=Juan contento)
Pro CL-lo seems (if lo=|Juan happy|)

(12) a. El libro ha sido comprado 'The book has been bought'
b. El libro lo ha sido The book CL-lo has been
c. *Lo ha sido (lo=el libro comprado)
Pro CL-lo has been (if lo=the book bought)

[5]This same point has been observed by Kayne for French.

(13) a. Considero a los niños inteligentes I consider to the boys intelligent 'I consider the boys intelligent'
b. Los considero inteligentes (los=los niños) Pro CL-los consider intelligent 'I consider them intelligent'
c. *Lo considero a los niños (lo=inteligentes) Pro CL-lo consider to the boys (lo=intelligent)

(11) is a raising construction; (11b) shows that the predicative clitic can refer to the predicate *contento*, (11c) shows that it cannot refer to the whole predication *Juan contento*. (12) is a passive, and exactly the same contrast can be observed.

On the other hand, in (13), a small clause, *lo* cannot refer to the predicate, because there is no raising (cfr. 13c). *Ser* and *estar* both pattern with raising predicates[6]:

(14) a. Pepa es una mujer 'Pepa is(ser) a woman'
b. Pepa lo es Pepa CL-lo [a woman] is(ser)

(15) a. Mi hermano está feliz 'My brother is(estar) happy'
b. Mi hermano lo es My brother CL-lo [happy] is(estar)

This suggests that *ser* and *estar* are both raising predicates.

3.2. *Agreement*. Agreement between subject, verb and predicate is obligatory both with *ser* and with *estar* when the predicate is an adjective:

(16) a. Las mujeres son/están felices
The women(pl) are(pl) happy(pl)
b. *Las mujeres son/están feliz
The women(pl) are(pl) happy(sg)

If agreement reflects a structural relation, for example between a head and its specifier, then it follows that the subject and the predicate of copular verbs must be in that structural relation at some point in the derivation. This distinguishes them from non-copular sentences, where no agreement between the subject and, for example, the direct object holds.

When the predicate of the copular structure is an NP, however, agreement is not always obligatory, as the following examples show:

(17) a. Ellos son una pareja They(pl) are(pl) a couple(sg)
b. Ella es un genio She(fem) is a genius(masc)

[6]Only the predicative use of ser, not the equative one does. Cfr. fn. 2 for references on the differences between both.

I believe that this lack of obligatory agreement is due to independent reasons. It is related to the fact that nouns in Spanish do not systematically have endings for both masculine and feminine. This defective agreement system also appears in cases of subcategorized small clauses:

(18) Los considero la pareja ideal
'I consider them(pl, masc) the ideal couple(sg, fem)'

In small clauses, however, there is independent evidence for a structural relation between the subject and the predicate of the small clause.

So disregarding the defective agreement pattern of nominals, the obligatory agreement with adjectives must still be explained somehow. The small clause structure provides a natural account for it:

(19) a. $|_{XP}$ ser/estar $|_{SC}$ la gente feliz$||$
b. $||$la gente $|$es/está $|$ t feliz$|||$
'People are happy'

If *la gente* 'the people' is generated in the specifier of the small clause, we have the structural configuration for agreement to obtain.

3.3. *Backwards anaphora*. Bosque (1992) argues that equative sentences[7] can be distinguished from predicative ones in that only the latter admit backwards anaphors, as illustrated in (20):

(20) a. La$_i$ |pro$_i$| de Pedro era una |familia$_i$|, extraña 'Pedro's is a strange family'
b.*El$_i$ |pro$_i$| del casino era el |dueño$_i$| del bar
'The casino's (owner) was the owner of the bar'

The anaphor in (20a), *pro*, is interpreted as *familia* under two types of recoverability conditions: local identification and lexical recoverability. The former is done through the definite article, which in Spanish has referential properties, as Torrego (1988) has shown. In fact, a possessive or an indefinite cannot license these anaphors. Lexical identification, according to Bosque, is done in the context of mutual c-command of the antecedent and the empty pronominal.

If *ser* is generated with a small clause as a complement, the mutual c-command condition will be met. This provides additional evidence for the small clause structure we are proposing for *ser*.

Although Bosque explicitly states that *estar* cannot license backwards pronominalization, and he takes this as evidence against its analysis as a small clause structure, the following example contradicts his statement:

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[7]In Bosques's terminology "especificativas".

(21) El |pro|, del Real Madrid está de |portero|, de la selección nacional
'The goalkeeper of 'Real Madrid' is(estar) that of the national team'

(21) shows two things. First, that *estar* patterns with *ser* in context of backwards anaphors, and this, therefore, favors a common small clause analysis. Second, that de does not prevent mutual c-command in these structures.

4. ASPECTUAL ANALYSIS

4.0. Traditional analyses already suggested that some notion of aspect underlies the opposition between *ser* and *estar*. As Luján (1981) points out, several traditional analyses have used the dichotomy 'essential' vs. 'accidental' properties. Other proposals used the notion of 'modification' or 'result from an action'. All these approaches have some intuition behind them, and some problems, as Luján shows.

The distinction has also been used more recently as a test for a loosely defined notion of perfectivity (cfr. Hernanz, 1988; A Suñer, 1990; Bosque, 1990; Demonte, 1992).

My proposal will be based on Zagona (1993)'s account of lexical aspect although with some crucial differences. Zagona's proposal in turn follows an original idea of Travis's (1992).

4.1. *Theoretical Assumptions*. The core ideas of Zagona's analysis are the following: lexical aspect (aktionsart) is projected syntactically through an event structure which must be licensed somehow, perhaps through spec-head agreement or through predication.

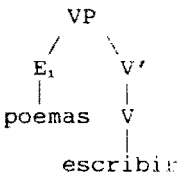
Event properties are not "visible" (Zagona, 1993) for the temporal structure of the sentence. There is a relationship between aspectual arguments and case assignment (Zagona, 1993): telic VP's have their internal argument marked

Zagona (1993) correlates telic and atelic aspect to case marking of the internal argument: telic arguments get structural accusative case, atelic arguments get inherent case.

Telic predicates project two subevents, atelic predicates only project one: Atelic

(22) a. Escribir poemas
Write poems

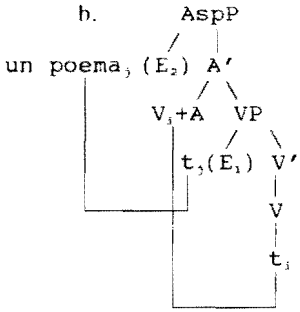
b.



Telic:

(23) a. Escribir un poema
Write a poem

b.



(22a) is interpreted atelicly because there is no E_2 involved, either it is absent, or it is absorbed. Accusative Case is not assigned either. (23a), on the other hand, is interpreted telicly because the object moves from Spec of VP, where it receives the E_1 temporal role, to the specifier of AspP, where it receives the secondary temporal location E_2. V+A assign Accusative Case. Thus, (23a) is interpreted as:

(24) "a state (E_1) which precedes a state (E_2), which bounds the event (i.e. bounds E_1), producing a state E_2 which is the 'final state' of the object" (Zagona, 1993)

4.2. *estar* vs. *ser*. My proposal for *ser* and *estar* will draw from the intuitions in Zagona's analysis. As I showed in the first part of this paper, *estar* denotes a temporally bound predicate, which is a final state of its subject. Thus, in the following example,

(25) Juan está contento 'Juan is happy'

the state of 'being happy' is a temporally bound state, which denotes a final state, although not necessarily a change of state. *Ser*, on the other hand, is not temporally bound.

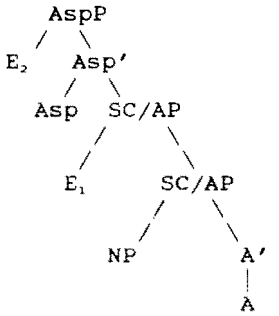
This will be formalized in the following terms: *estar* projects two events (E_1 and E_2), just like other telic predicates, however, one of them (E_1) is not syntactically active: it is an implicit argument. The parallelism with passives is clear: in a certain way sentences with *estar* are lexical passives, although not syntactic passives. This is captured by saying that it is the aspectual argument that is implicit. Implicit arguments do not have full syntactic existence, but they do have syntactic consequences. In the case of regular passives, for example, the

implicit argument controls purpose clauses, as for example Baker, Johnson and Roberts (1989) show.

In the case of *estar*, the secondary event argument is present and denotes the state preceding the result state, but since the event representing the preceding state is not active, it cannot be identified: in a way, there is a result without a cause.

I will propose that the implicit nature of the event argument (E_2) can be formalized by projecting it as adjunct, as in the representation in (26):

(26) *estar*



In (26), E_1 is an adjunct to the small clause.

Some researchers (cfr. Bosque, 1990, Hernanz, 1988) have suggested representing perfective adjectives as having an event arguments. Perfective adjectives, they argue, share a cluster of properties, which can be explained if they all share an event position. Among those properties, a crucial one for this proposal, is that they all appear with *estar*. I will follow this previous work and assume that perfective adjectives are those which have an event position in their thematic grid.

Suppose then that some sort of matching between aspectual features must take place (this could be formalized as specifier-head agreement)[8]. Then the eventive adjectives would match the E_2 argument in the specifier of ASPP, whereas those that lack the event argument cannot match it, and the sentence will be ungrammatical. This notion of "matching" under specifier-head agreement could be subsumed under Chomsky (1992)'s mechanism of 'checking'.

Another option is to adopt Higginbotham (1985, 1987)'s extended Thematic Criterion, which includes several modes of thematic discharge. In this vein, one could say that the event argument needs to be discharged. Discharge can be done by an appropriate head, by binding or in several other ways I will not

[8]In this respect, my analysis seems to differ from Zagona's who does not explicitly assume any matching mechanism.

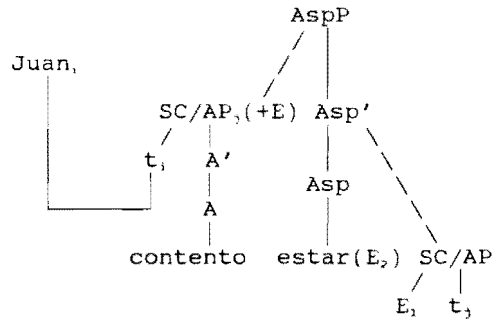
review here.

Whatever formalism is adopted, the general idea is that certain arguments need to be aspectually licensed when they are lexically marked for a certain aspect, in this case perfectivity.

Adopting this general idea, we would explain why certain adjectives are ungrammatical with *estar*: they lack the event argument which must be licensed by the aspectual head.

Let us see the details. In the case of *estar*, the whole small clause raises to the specifier of ASPP. The reason why the whole small clause raises, is that it is a projection of the adjectival phrase, so it has the features of the adjectival head, among them the event argument that needs to be licensed. Once in the Spec of ASPP, it is licensed, and then the subject raises further to receive/check its nominative case, as illustrated in (27):

(27) *Estar*



The meaning of sentences with *estar* would also follow: they are a result of a cause which is not present, just as in the case of telic verbs, but without an overt cause present.

Some adjectives usually don't appear with *estar*, but given certain conditions (namely, those that permit a perfective interpretation), they can:

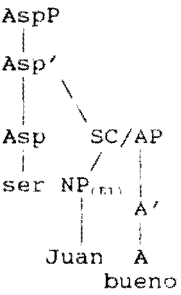
(28) a. Juan es inteligente 'Juan is intelligent'
b. Hoy Juan está inteligente 'Today Juan is being intelligent'

It is crucial for these examples to be grammatical, that a precise temporal/locative context be defined, normally through an adverb. In these cases, I will argue that although the adjective lacks an event argument, and therefore cannot be matched

with E_2, the temporal binds this variable[9].

Ser, on the other hand, only has one event argument (E_1) projected in its regular position (the specifier of the small clause), where the subject receives it. Since the small clause has no extra event argument to be licensed, it needs not move:

(29) *Ser*



The meaning also follows: *bueno* 'good' is a state with no temporal boundaries specified in the meaning of the sentence.

4.3. Nominals. The remaining issue is why a nominal cannot appear as a predicate of *estar* as seen below:

(30) *Juan está presidente 'Juan is(estar) president'

This is the case even with eventive nominals:

(31) *Esto está una destrucción 'This is(estar) a destruction'

I will argue that nominal small clauses cannot depict a complex aspect. In general, it seems to be the case that nominals do not have a complex aspect. Deverbal nominals, for example, are never achievements or accomplishments, even if the corresponding verb is.

A nominal with *estar* triggers a complex aspectual reading, since there are two events which determine the meaning of the sentence, as we saw earlier. This reading is not possible because nominals cannot be interpreted semantically as

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[9]Although this would argue for the Higginbotham view of an extended thematic criterion, it is not inconceivable to formalize it using the checking framework: the adverb could discharge the E argument and then move to the sentence initial position.

perfective predicates. Formally, I will say that nominals have no external event argument to match the one in the specifier of ASPP.

The reason why I say "external" event argument is that some authors (Higginbotham, 1985, 1987, for example) claim that nominals have an event argument, but it is locally bound by the determiner. This would be an "internal" event argument[10].

As I mentioned in the first part, nominals become possible with *estar* if a preposition de 'of' is present:

(32) a. Juan está de presidente — Juan is of president
b. Juan es presidente — Juan is president
'Juan is president'

The difference in meaning between (32a) and (b) is clear, with *estar* (32a), the sentence roughly means that his condition as president is somehow temporary, either because his job is not usually that of president, or because he is substituting the "real" president. But sentences such as the following, where the meaning would indicate a permanent condition, are excluded:

(33) #Juan ha terminado la carrera, ya está de médico
'J has finished his studies, now he is a doctor'

The preposition in these cases provides the necessary extra aspectual argument for *estar*, making the nominal, in fact, an imperfective nominal.

5. CONCLUSION

In this paper I have argued for a syntactic representation of lexical aspect. I have claimed that this representation accounts both for the distribution of *ser* and *estar* in Spanish, and also for the meanings of those verbs. This analysis can also account for the impossibility of having nominal phrases as predicates of *estar*.

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[10]At this point, a contradiction with Zagona (1993)'s analysis arises. For her, telic VP's are interpreted when the NP receives the second event argument. In my analysis, this should not be possible. I do not see an obvious way to reconcile this contradiction, except to say that perhaps a more complex aspectual structure is needed than the one adopted both by her and by myself.

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High Vowel Transparency in Korean Vowel Harmony

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1 Introduction

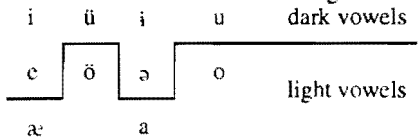
In the study of vowel harmony, the behavior of transparent phonemes, which are ignored by the harmony process, and of opaque phonemes, which block the harmony process, can offer insight into such issues as the nature of phonological representations (Ringen, 1988; Archangeli and Pulleyblank, 1989) and the definition of adjacency (Archangeli and Pulleyblank, 1987; Steriade, 1987). In Korean vowel harmony, high vowels act as transparent in noninitial syllables in that they act like they are invisible with respect to the harmony process. The purpose of this paper is to analyze high vowel transparency in Korean vowel harmony by adopting two aspects of Grounded Phonology as developed in Archangeli and Pulleyblank (to appear), namely Combinatorial Specification and grounded conditions. It will be shown that appropriate representations (Combinatorial Specification) and constraints (grounded conditions) governing the representations and phonological processes, in conjunction with prosodic structure, provide an explanatory account of high vowel transparency in Korean vowel harmony.

This paper will be organized as follows: In section 2 I present the data showing high vowel transparency in Korean vowel harmony. In section 3 I present a grounded phonology analysis of high vowel transparency in Korean vowel harmony offering an explanatory account of the somewhat different transparent behavior found between the vowel /u/ on the one hand and the vowels /i/ and /i/ on the other. Finally, in section 4 I summarize the analysis and the conclusions reached.

2 Vowel Harmony in Korean Ideophones: The Data

Vowel harmony in Korean is largely confined to ideophonic words or sound symbolic words. Korean has two forms of ideophones: dark and light forms. Dark ideophones are composed of what are traditionally known as dark vowels (i, e, ü, ɨ, ɔ, u) and they contain an augmentative connotation. Light ideophones are composed of what are traditionally known as light vowels (æ, ö, a, o) and they contain a diminutive connotation. The traditional division of dark and light vowels in the Korean vowel inventory is given in (1).

(1) The traditional division of dark and light vowels in Korean vowel inventory



It is traditionally assumed that dark ideophones have light counterparts which normally have a diminutive connotation. Examples illustrating the alternation between dark and light vowels in dark and light ideophones are shown in (2).

(2) Dark and light vowel alternations

	Dark	Light	Gloss
a. i - æ	cicəl	cæcal	'chattering'
b. e - æ	teŋkəŋ	tæŋkaŋ	'chopping all at once'
c. ü - ö	tüluk	tölok	'obese'
d. ï - a	k'ïtək	k'atak	'nodding'
e. ə - a	əlluk	allok	'mottled'
f. u - o	$c^hullə\eta$	$c^hollaŋ$	'splash'

Even though the high unround vowels /i/ and /ï/ are dark vowels which occur in dark ideophones, they can occur in light ideophones with light vowels as long as they are not in the initial syllable; thus they can act as neutral vowels. The data showing the neutral behavior of /i/ and /ï/ in noninitial position are given in (3).

(3) /i/ and /ï/ as neutral vowels in noninitial position

t'əlkilək	t'alkilak	'rattling'
həpicək	hapicak	'dig out with a fingernail'
k'ecilək	k'æcilak	'half-heatedly'
pusilək	pasilak	'rustling'
pisil	pæsil	'staggering'
hinil	hanil	'in an airy manner'

In addition to /i/ and /ï/, the high round vowel /u/ behaves as a neutral vowel because it can also occur with light vowels in light ideophones noninitially, as shown in (4)[1] .

(4) /u/ as a neutral vowel in noninitial position

cumullək	comullak	*comollak	'winding'
t'ekul	t'ækul	*t'ekol	'rolling'
$pup^huł$	pop^hul	*pop^hol	'swelling'
kəmus	kamus	*kamos	'black'

It is important to compare the harmony data in (3) and (4) with that in (2). In (3) and (4) the high vowels in noninitial syllables are neutral and do not harmonize. In (2), when high vowels are in initial position they harmonize. Moreover, /u/ unlike /i/ or /ï/ can sometimes undergo harmony even in noninitial syllables, becoming [o], as shown in (5).

(5) /u/ as a dark vowel in noninitial position

əlluk	*alluk	allok	'mottled'
culcul	*colcul	colcol	'flowing'
$ult^huŋbult^huŋ$	*$olt^huŋbult^huŋ$	$olt^hoŋbolt^hoŋ$	'unevenly'

[1] The high front round vowel /ü/ also seems to act as a neutral vowel as seen in *æc^{h}ü ~ *æc^{h}ö* 'sound of sneeze". However, I exclude the transparent behavior of /ü/ since there is not enough data regarding its behavior.

The most interesting aspect of the behavior of /u/ compared to /i/ and /i/ is that there are examples where /u/ displays variation within a morpheme; in some cases it behaves as a neutral vowel remaining as [u] and in other cases it behaves as a harmonizing vowel becoming [o], as shown in (6).

(6) Variation of /u/ within a morpheme

silc'uk	sælc'uk	sælc'ok	'grudging'
k'əŋc^{h}uŋ	k'aŋc^{h}uŋ	k'aŋc^{h}oŋ	'hopping'
pətuŋ	patuŋ	patoŋ	'struggling'
məlt'uŋ	malt'uŋ	malt'oŋ	'vacantly'

In the next section I offer an analysis of high vowel transparency in a grounded phonology framework making use of Combinatorial Specification interacting with grounded conditions. Specifically, I will account for why the unround vowels /i/ and /i/ are always transparent to the harmony process in noninitial position. Also I will account for why the high round vowel /u/ has noninitial variation that permits both harmonizing behavior alternating with [o] and neutral behavior without alternation. In doing this, I will propose new grounded conditions that shed light on the analysis of Korean vowel harmony and I will offer a reason for why the dark high vowels alternate with the corresponding light vowels initially whereas they do not noninitially.

3 Grounded Phonology Analysis

3.1 Grounded Phonology

Grounded Phonology takes the view that phonological representations consist only of feature elements (henceforth, F-elements). The notion of phoneme as a unit is then interpretable by the combination of F-elements. This view is referred to as Combinatorial Specification. Grounded Phonology also presents the view that the combinations of F-elements in representations and phonological processes may be constrained by conditions which are physically grounded in terms of articulation and/or acoustics. Such conditions are known as grounded conditions. Archangeli and Pulleyblank (to appear) and Spring (1993) have shown that grounded conditions play an important role in the analyses of phonological phenomena across a range of different languages.

Let us now consider a combinatorial specification analysis of Korean vowels. This is given in (7). Specifically, (7a) shows the active F-elements. (7b) shows a condition on the combination of F-elements, and (7c) shows the possible combinations of F-elements. I assume along with Archangeli and Pulleyblank a principle of representational simplicity so that if more than one possible feature combination results in the same vowel, the feature combination that is made use of is the one containing the fewer features. Thus, in (7c) the actual feature combination for the low vowels /æ/ and /a/ are those shown under $æ_2$ and a_2.

(7) Combinatorial Specification of Korean Vowels

a. F-elements: -HIGH, +LOW, +ROUND, +FRONT; -ATR

b. Conditions: if +round then not +low, if +low then not +round

c. combinations

*	*	æ$_1$	ö	*	a$_1$	o	e	*	æ$_2$	ü	ə	a$_2$	u	i	ɨ
-HI	-HI	-HI	-HI	+LO	-HI	-HI	-HI	+LO	+LO	+RD	-HI	+LO	+RD	+FR	
+LO	+LO	+LO	+RD	+RD	+LO	+RD	+FR	+RD	+FR	+FR					
+RD	+RD	+FR	+FR	+FR											
+FR															

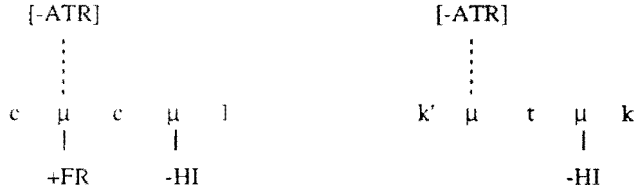
The choice of five active F-elements is based on phonological alternations. However, note that [-A(dvanced)T(ongue)R(oot)] does not characterize phonemes in their original combinations, but it is only introduced as a floating feature in light ideophones since the F-element [-ATR] shows very limited distribution, namely in the vowel harmony system of ideophones. The other four F-elements result in the 16 possible combinations shown in (7c). The Korean vowel inventory does not have a low round vowel, therefore, the combination of [+round] and [+low] is excluded. The remaining combinations of F-elements are interpreted as 10 phonemes, which correctly derive the Korean vowel system.

The floating feature [-ATR] which is introduced as part of the formation of light ideophones serves as a morpheme-level F-element which carries diminutive connotation. The floating [-ATR] feature is realized on the vowels of the light ideophone by two rules: initial [-ATR] linking and [-ATR] spreading.

When the morpheme-level [-ATR] links to the initial vowels, /i/ and /e/ are phonetically realized as [æ], /ü/ as [ö], /ɨ/ and /ə/ as [a], and /u/ as [o]. Thus, light ideophones are derived from dark ideophones by the linking of [-ATR] to the leftmost vowel; subsequently, there is the iterative spreading of [-ATR]. The sample derivations of *cicəl ~ cæcal* 'chattering' and *k'ɨtək ~ k'atak* 'nodding' are given in (8).

(8)
a. URs

b. [-ATR] Association



c. [-ATR] Spread

d. PR's

[cæcal] [k'atak]

The combination of the features [+front] and [-ATR] is phonetically interpreted as [æ]. Similarly, the combination of [-high] and [-ATR] is interpreted as [a].

Unlike the initial linking of [-ATR] the spreading of [-ATR] seems not to affect high vowels in noninitial position. This was seen by data in (3) and (4). In the next subsection the reason for why high vowels seem to be transparent noninitially and whether noninitial high vowels actually do receive the spreading of the harmonic feature will be considered.

3.2 High Vowel Transparency, Grounded Conditions, and the Strong Initial Syllable

While the underlying high vowels /i, ü, ı, u/ surface as [æ, ö, a, o] respectively when [-ATR] links to them in initial position, they do not undergo any

change due to [-ATR] spreading when in noninitial position, as shown in (3) and (4). Thus, high vowels alternate with [-ATR] counterparts with initial [-ATR] linking whereas they do not with [-ATR] spreading. Nonetheless, I will contend that [-ATR] spreads onto high vowels noninitially, but the feature [-ATR] is not interpreted phonetically in noninitial position. This is because of their relationship with the R(etracted)T(ongue)R(oot)/HI grounded condition as proposed in Archangeli and Pulleyblank (to appear).

The assignment of [-ATR] to /æ, ö, a, o/ is not arbitrary but has phonetic motivation. Archangeli and Pulleyblank propose grounded conditions from the interaction of tongue root position and tongue body height. The advancement and retraction of the tongue root tends to involve the raising and lowering of the tongue body, and vice versa. Thus, [-ATR] implies [+low] or [-high] because of their close physical correlatedness. These physical dependencies are formalized by Archangeli and Pulleyblank as grounded conditions, and the relevant grounded conditions for Korean vowel harmony are given in (9).

(9) Grounded conditions from the interaction of tongue root position and tongue body height

a. RTR/HI Condition:	If -ATR then -high	If -ATR then not +high
b. RTR/LO Condition:	If -ATR then +low	If -ATR then not -low

These conditions suggest favorable and disfavorable F-element combinations rather than an absoluteness that determines the compatible or incompatible F-element combinations. If the two gestures are sympathetic, the statement is expressed positively and if they are antagonistic, the statement is expressed negatively. Among these grounded conditions the RTR/LO condition permits low vowels /æ, a/ to surface with [-ATR] in Korean. Thus, the distribution of [-ATR] is predictable based on the F-element [+low].

However, the RTR/HI condition alone cannot correctly predict the [-ATR] assignment to nonhigh vowels because, as shown in (1), only mid round vowels are [-ATR] while mid unround vowels are not. In fact, the distribution of [-ATR] to mid round vowels can be motivated by grounded conditions for the following reason. Stevens, Keyser, and Kawasaki (1986) claim that the feature [round] can effect the enhancement of the feature [back] for nonlow vowels based on the acoustic study of tongue body backing and lip rounding. This can be formalized as a grounded condition, as shown in (10), because it is rooted in phonetics.

(10) Grounded condition from the interaction of tongue body backing and lip rounding

Back/Round Condition:	If +back then +round	If +back then not -round

The grounded conditions in (10) account for the tendency that front vowels are usually unrounded and back vowels are usually rounded in the majority of languages. (See Cole and Kuo (1991) and Spring (1993) for similar proposals.)

Archangeli and Pulleyblank propose another grounded condition from the interaction of tongue root position and tongue body fronting/backing since the advancement and retraction of the tongue root tends to accompany the fronting and backing of the tongue body, and vice versa. The physical connection of these two articulatory gestures can be formalized as follows in (11).

(11) Grounded condition from the interaction of tongue root position and tongue body fronting/backing

a. RTR/Back Condition: If -ATR then +back If -ATR then not -back
b. RTR/Front Condition: If -ATR then -front If -ATR then not +front

The union of the RTR/Back condition and the Back/Round condition allows us to posit another condition, namely RTR/Round condition, as given by the transitivity relation in (12).

(12) If -ATR then +back
If +back then +round

Therefore, if -ATR then +round

If the RTR/Round condition is motivated on phonetics, it may be a possible candidate to be a grounded condition. Acoustically the lowering of the second formant frequency (F_2) can be achieved by lip rounding (Catford, 1977: 173; Stevens, Keyser, and Kawasaki, 1986: 429). The lowering of F_2 also characterizes tongue root retraction (Goad, 1991: 163). Thus, it seems that lip rounding and tongue root retraction enhance each other. Therefore, RTR/Round can serve as a potential grounded condition. This would be formalized as follows in (13).

(13) Grounded condition from the interaction of lip rounding and tongue root position

RTR/Round Condition: If -ATR then +round If -ATR then not -round

These grounded conditions are not absolute. Since there are many cases of [+ATR] round vowels such as /u/ and /ü/, these grounded conditions are relatively weaker than those in (9), thus are expected to be invoked in a narrower range of cases. Consequently, they may be imposed as a sub-condition on the conditions in (9) rather than being an independent condition. This is true of the distribution of [-ATR] in Korean. The mid round vowels /ö, o/ can receive [-ATR] because of RTR/HI and RTR/Round conditions. To be more specific, the RTR/HI condition (if -ATR then -high) would select nonhigh vowels as potential [-ATR] vowels and RTR/Round (if -ATR then +round) further restricts [-ATR] only to round nonhigh vowels. Thus, Korean incorporates the RTR/Round condition as evidenced by the distribution of [-ATR] in the inventory.

While the initial linking of [-ATR] occurs unconditionally, the subsequent spreading of [-ATR] to high vowels seems not to. In the association of [-ATR] in light ideophone derivation, high vowels are phonetically realized as [-ATR] in the initial linking whereas they are not in noninitial spreading. Even though high vowels do not surface as [-ATR] in noninitial spreading, I assume that they receive the spreading of [-ATR]. High vowels that receive [-ATR] just do not get phonetically interpreted as [-ATR] because they are subject to the RTR/HI condition. One might argue that high vowels do not actually receive [-ATR] from the spreading, but there are two reasons for why they seem to receive [-ATR].

First, the vowel /i/ is completely unspecified in underlying representation. Since it has no F-element underlyingly, it should be the target of spreading of other F-elements. Therefore, there is no reason for [-ATR] not to spread to /i/. Second,

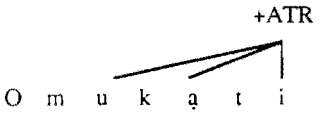
it is possible for noninitial high vowels to show alternations. For example, the noninitial high round vowel /u/ shows alternations as in (5) and (6). Also, it might be possible for the noninitial high unround vowel /i, ɨ/ to alternate with their [-ATR] counterparts in slips of the tongue or in fast speech, as shown in (14).

(14) t'alkilak ~ t'alkalak 'rattling' hapicak ~ hapæcak 'dig out'

Note that even in slips of the tongue, [a] derived from /ɨ/ that has no F-elements underlyingly, is a more plausible slip of the tongue than one involving [æ] derived from /i/ which is [+front] underlyingly. Thus, noninitial high vowels can be seen as receiving [-ATR] like initial high vowels but they just do not seem to surface phonetically as their [-ATR] counterparts.

Archangeli and Pulleyblank (to appear) also present similar cases where the spreading of the harmonic feature is not phonetically realized because of a grounded condition. In Kinande the harmonic feature [+ATR] of the final high vowel spreads leftwards deriving [u] of the prefix [mo/mu] in [ɔ̀mùkáːtî] 'bread', as seen in (15).

(15)



The low penultimate vowel is phonologically [+ATR] ([ạ]), but the [+ATR] value is not phonetically realized because of the negative ATR/LO condition (If +ATR then not +low], thus resulting in [a].

Both the Korean and Kinande cases show that the apparent skipping of the harmonic feature spreading on transparent vowels actually results from the phonetic nonrealization of the harmonic feature due to grounded conditions. Consequently, transparent vowels do receive the spreading of the harmonic feature. Skipping in feature spreading results in a gapped representation and is ill-formed because it violates the locality condition which restricts spreading only to the structurally adjacent element at either the root level, or at the level of prosodic structure. If transparent vowels were skipped in feature spreading, adjacency would need to be revised in order not to violate the locality condition.

The reason that prevents high vowels from surfacing as the [-ATR] counterpart in spreading is because the spreading of [-ATR] is subject to the RTR/HI condition whereas the linking of [-ATR] is not. This condition restricts the surface realization of [-ATR] only to vowels that have [-high]. Then, the question of why only the spreading of [-ATR] is constrained by the RTR/HI condition and not the initial linking of [-ATR] needs to be answered.

In standard Korean the initial syllable has been traditionally assumed as being strong, thus accented. This is supported by the fact that some phonological processes are limited to the initial syllable. Specifically, J-S Lee (1991) shows the strong initial syllable property is evidenced by the occurrence of underlying long vowels and compensatory lengthening. Underlying long vowels surface as long in the initial syllable but do not in noninitial syllables; this can be seen as reflecting the prominence of the initial syllable. For the same reason, compensatory lengthening

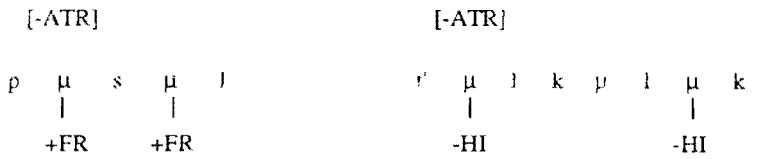
only occurs in the initial syllable, but not in noninitial syllables. J-S Lee and Davis (1993) further show that the laryngeal features of the stop consonants are lost in noninitial syllable as part of an infixing reduplication process in ideophones. All this type of evidence provides strong support that initial syllables can license more features and have fewer constraints apply to them than noninitial syllables; consequently the nature of the noninitial syllable in Korean is more restricted than the initial syllable. This type of situation occurs cross-linguistically. Bosch (1991) shows that an accented syllable bears more information than unaccented syllables cross-linguistically. For instance, an accented syllable may license a feature whereas an unaccented syllable may not. Since noninitial syllables are unaccented in Korean, they may bear fewer phonological features than the initial syllable in Korean.

One can take this observation for Korean and apply it to the case of high vowel transparency in vowel harmony. Specifically, while the feature [-ATR] can link to a high vowel and be phonetically realized in the accented initial syllable, [-ATR] cannot be realized in unaccented noninitial syllables because the RTR/HI condition only pertains to unaccented syllables. This is given in (16).

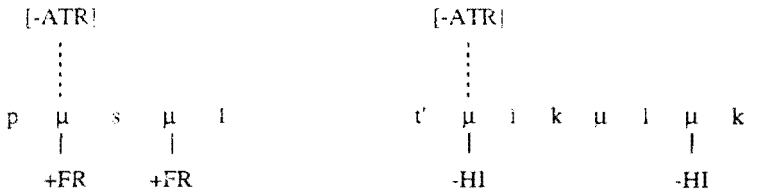
(16) RTR/HI condition holds only of unaccented syllables.

Sample derivations of *pisil ~ pæsil* 'staggering' and *t'əlkiləkˆ ~ t'alkilak* 'rattling' illustrating high vowel transparency are given in (17).

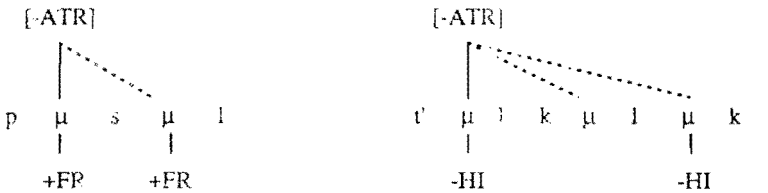
(17)
a. URs



b. [-ATR] Association



c. [-ATR] Spread



d. (16) applies so that [-ATR] is not phonetically interpreted on high vowels

e. PR's

[pæsil] [t'alkilak]

In the next subsection the reason for why the high round vowel /u/ behaves differently from other high vowels is considered with respect to its variable realization of [-ATR] as was seen by the data in (4), (5), and (6).

3.3 RTR/Round condition and /u/ variation

The main difference between /u/ and /i, ɨ/ is that the former is rounded whereas the latter is unrounded. Thus, we may presume that the F-element [+round] would cause the differential behavior of the high round vowel and the high unround vowels. As proposed in (13), [-ATR] and [+round] enhance each

other. Consequently, round vowels tend to be [-ATR]. The enhancement relation between [-ATR] and [+round] may influence the nature of inventories of some languages. For example, in Igbo (Maddieson, 1984: 292) there is the [-ATR] counterpart /ɷ/ for the high round vowel /u/ but no [-ATR] counterpart /ɨ/ for the high unround vowel /i/, as shown in (18).

(18)

i						u
					ɷ	
		e			o	
			ɛ	ɔ		
				a		

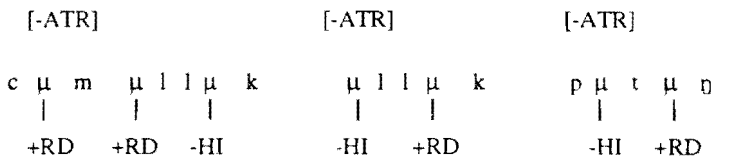
Since high vowels tend to be [+ATR] (if +high then +ATR)), high vowels often do not have [-ATR] counterparts. Nonetheless, there are languages like Igbo where the high round vowels may have the [-ATR] counterpart but the high unround vowels do not. This may be due to the Round/ATR condition (if +round then -ATR) discussed in (13). Therefore, the asymmetry of some high vowels having a [-ATR] counterpart while others do not might be due to the grounded condition from the interaction of lip rounding and tongue root position.

One instance where the grounded condition from the interaction of lip rounding and tongue root position governs phonological processes comes from the various *u* - *o* alternations in (4), (5), and (6). Because of the RTR/HI condition in unaccented syllables, high vowels receiving [-ATR] in unaccented syllables cannot be phonetically interpretable as their [-ATR] counterparts. While the data in (4) follows from this in that /u/ receiving [-ATR] in unaccented syllables is realized as [u], the data in (5) and (6) do not. Namely, if the high vowel is /u/, it is possible for the /u/ that received [-ATR] to be realized as its [-ATR] counterpart [o] in an unaccented syllable. The *u* - *o* alternation in this case is caused by the sympathetic relation between [-ATR] and [+round]. Namely, [-ATR] is phonetically interpretable because it spreads to [+round] by means of the RTR/Round condition. Thus, (16) should be revised to include this *u* - *o* alternation as in (19).

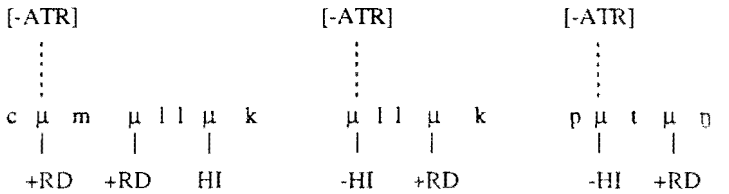
(19) RTR/HI and/or RTR/Round conditions hold of unaccented syllables.

Given this, /u/ variation where /u/ is realized as [u], [o], or both can be accounted for. /u/ surfaces as [u] in (4) because the RTR/HI condition applies, /u/ surfaces as [o] in (5) because the RTR/Round condition applies, and /u/ surfaces as either [u] or [o] in (6) because both the RTR/HI and RTR/Round conditions apply. The sample derivations for *cumullək ~ comullak* 'kneading', *əlluk ~ allok* 'mottled', *pəɪuŋ ~ paɪuŋ, paɪoŋ* 'struggling' are given in (20).

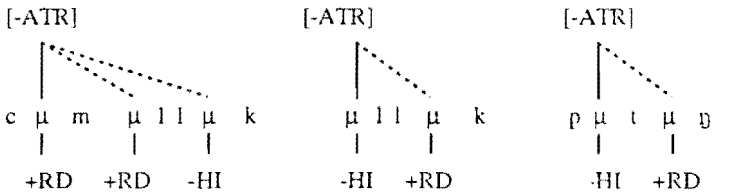
(20)
a. URs



b. [-ATR] Association



c. [-ATR] Spread



d.

(19)

RTR/HI	RTR/Round	RTR/HI and RTR/Round

e. PR's

[comullak]	[allok]	[patuŋ]	[patoŋ]

The variation of /u/ results from the interactions of the RTR/HI and RTR/Round conditions. If the RTR/HI condition controls the determination of the output, /u/ remains as [u] because it does not have [-high]. If the RTR/Round condition applies, /u/ becomes [o] because it has [+round] which is also eligible to cooccur with [-ATR]. If both conditions are selected, both outputs [u] and [o] are possible.

4 Summary

It has been shown that high vowel transparency in Korean vowel harmony results from the RTR/HI condition so that the harmonic feature [-ATR] is not realized on noninitial high vowels. In order to account for /u/ variation in which /u/ shows transparency in some cases but not in others, an additional RTR/Round condition has been proposed. Since the RTR/Round condition might be motivated in terms of phonetics and does play an important role in Korean phonology, it is suggested that it is a legitimate grounded condition. The vowel /u/ shows variation with respect to transparency because sometimes the RTR/HI condition constrains the output, sometimes the RTR/Round condition governs the output, and in cases like (6) where /u/ can be realized as either [u] or [o], it is optional as to which condition constrains the output.

Acknowledgments

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A Configurational Pronominal Argument Language[1]

Henry Davis, UBC

I. Introduction

This paper is concerned with the parameter or parameters responsible for the characteristic properties of so-called radical head-marking languages. The title of the paper, incidentally, is something of a misnomer. According to most proponents of the pronominal argument hypothesis, there is at some level of analysis a configurational structure even in the most radical of radical head-marking languages; the main issue, rather, is whether there is at **any** level of analysis a "non-configurational" structure where arguments and adjuncts are structurally parallel.

The Salish languages of the Pacific Northwest exemplify the typological traits associated with head-marking, and have been cited in support of what has become known as the "neo-Jelinekian hypothesis" (Jelinek 1984, 1993, Baker 1991, 1993). The core of this hypothesis is that there is a single "macro-parameter" responsible for a cluster of superficially divergent syntactic properties. Though there is disagreement as to exactly what form this parameter might take, the basic idea is that "pronominal" agreement morphology on the head satisfies at least some of the requirements met in non-head-marking languages by argument NPs. The most important corollary of the parameter is that overt arguments cannot occupy argument positions, due to uniqueness requirements on theta assignment (Jelinek) or Case-assignment (Baker); instead, they must be generated as adjuncts, linked to pronominal arguments by coindexing mechanisms.

The main part of this paper will involve an examination of the predictions made by pronominal argument parameters for St'át'imcets (Lillooet), a language which belongs to the Northern Interior branch of the Salish family. It will be shown that while St'át'imcets shows all the superficial traits of a pronominal argument language, binding, extraction, and quantification all show that it cannot be treated as such underlyingly.

At the end of the paper we will briefly examine the implications of these findings for the macro-parametric treatment of radical head-marking languages. It will be argued on learnability grounds that as currently conceived, a macro-parameter cannot account for the observed variation. An alternative parametric model will be tentatively outlined, based on a dynamic view of parameters as vectors rather than states.

II. Pronominal Argument Parameters

In this section, we will briefly outline the pronominal argument parameter as first conceived by Jelinek (1984), and subsequently modified by Baker (1991, 1993) and Jelinek (1989, 1993, in press).

The most salient characteristic of head-marking languages is the obligatory morphological registration, in the form of agreement markers, of argument NPs on the

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[1] I would like to thank my St'át'imcets consultants, Rose Whitley, Gertrude Ned, & Beverly Frank for their time, patience, and dedication to their language, as well as Dwight Gardiner and particularly Lisa Matthewson, with whom much of the fieldwork reported here was conducted. Support was provided by SSHRCC grant # 410-19-1629 to Patricia Shaw. Abbreviations in glosses are as follows: tr = transitive marker, s = singular, pl = plural, su = subject marker, abs = absolutive marker, erg = ergative marker, det = determiner, sbj = subjunctive mood, topo = topical object marker, nom = nominalizer, po = possessive, pas = passive, refl = reflexive , recip = reciprocal.

predicates which select them. As a direct corollary, overt nominals are strictly optional, and in some head-marking languages, quite restricted in occurrence.[2] There is a fairly long tradition (especially within Amerindian linguistics: see Mithun (1986) and references on Iroquoian, Van Valin (1985) on Siouan, for example) of interpreting these facts to mean that head-marking languages somehow satisfy the selectional requirements of predicates morphologically, rather than syntactically. In Jelinek (1984), this intuition is developed within GB theory as a parameter governing theta assignment: in "pronominal argument" as opposed to "lexical argument" languages, theta roles are assigned to agreement morphemes and not independent nominals. In other words, the agreement markers *are* the arguments, with overt nominals being adjuncts, thus optional, freely ordered with respect to one another, and (since agreement markers are pronominal) invariably definite in interpretation.

Later versions of Jelinek's pronominal argument hypothesis (e.g., Jelinek 1993, in press) relax this definiteness requirement to exclude absolutive DPs, which are taken to be "adjoined clauses", as opposed to ergatives, which are "adjoined topics". The core of the analysis, however, remains: all DPs are clauses in adjunct positions, and all subordinate clauses are DPs.

Baker (1991, 1993) develops a different line of inquiry, though with many of the same consequences. Unwilling to permit radical parametric variation in theta assignment, due to a commitment to the Uniformity of Theta Assignment Hypothesis in its rigid form (i.e., the view that thematic properties of predicates are projected into the syntax in an identical fashion cross-linguistically), Baker (1991) opts for a parametrization of Case assignment, the basic idea being that in head-marking languages agreement morphology absorbs Case, which is then unavailable to licence lexical NPs in argument positions, which in turn fall foul of the Case Filter.[3] It follows that only non-Case-marked elements may occupy argument positions; these include clauses and null NPs, including traces and the empty pronominal pro. Baker gives a series of elegant arguments from Mohawk in support of these claims, showing on the basis of extraction and binding asymmetries that clauses are indeed in argument positions, as are WH-traces (variables), whilst lexical NPs are in adjunct positions.

Baker (1993) further expands and generalizes his earlier paper, introducing a "macro-parameter", the "polysynthesis parameter", which unites the pronominal argument hypothesis together with the head-movement analysis of noun-incorporation introduced in Baker (1988) into a generalized head-marking parameter. The central principle of the parameter is given below:

(1) The Morphological Visibility Condition (MVC)
A phrase X is visible for Theta-Role assignment from a head Y only via:
(i) an agreement relation, or
(ii) a movement relationship

However, as Baker himself points out, the MVC still effectively includes two parameters, corresponding to (i) and (ii); Salish languages, which do not have syntactically active

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[2] Within the Salish family, it has been claimed that Lushootseed (and possibly other Central Coast languages) allow only a single lexical argument per clause. Jelinek (1993a) offers this as an explanation for the "one nominal interpretation" generalization of Gerdts (1989).

[3] In fact, Baker employs a bipartite Case filter; one part of it satisfies the Argument Visibility Criterion at LF (which specifies that an argument must be Case-visible to receive a Theta-role); the other half is a PF condition on Spell-out. It is the latter which accounts for the adjunctual status of lexical arguments in Mohawk.

incorporation mechanisms, fall only under (i), which is essentially another version of the pronominal argument hypothesis.[4]

Jelinek's and Baker's versions of the pronominal argument hypothesis generate a number of partially overlapping predictions. The main ones are listed below; unless otherwise stated, they refer to both versions of the hypothesis.

(2) Pronominal argument languages should show (ceteris paribus)

(i) No difference in word order between adjunct and argument DPs.
(ii) Obligatory pronominal affixes.
(iii) Optional overt DP arguments.
(iv) No overt NP-anaphors.
(v) No infinitivals.
(vi) Standard adjunct-argument asymmetries in WH-extraction out of clauses, but not out of NPs (Baker).
(vii) No condition C binding effects within clauses.
(viii) No WH in situ.
(ix) No non-referential NPs (Baker); no Determiner-type quantification (Jelinek).
(x) No Weak Crossover effects.

In the next sections, we will be applying these diagnostics to St'át'imcets; their relevance to the pronominal argument parameter will be explained as we work through them.

III. St'át'imcets and Pronominal Argument Parameters.

(i) First of all, we turn to the question of word order. Lexical NPs in Pronominal argument languages are expected to show the same word order restrictions as adjuncts, since the two are identical; however, it is known that in at least some radical head-marking languages (e.g., Navaho; see Jelinek 1989, Speas 1990, 1993), overt argument NPs are rigidly ordered with respect to one another, forcing Jelinek, for example, to find auxiliary ordering principles to explain the apparent anomaly. Even Mohawk, which according to Baker does freely order argument NPs, has relatively rigid (preverbal) ordering for adjuncts, again calling into question the validity of word order as a diagnostic for pronominal argument status. The possibility of scrambling in lexical argument languages (see Mahajian 1990, Saito 1985, Webelhuth 1989) further confuses the issue. It is thus unclear what word order has to say about pronominal argument status.

For what it is worth, however, and because free word order is still routinely presented as evidence for a pronominal argument language (e.g., by Baker 1993), we

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[4] There may be a more intrinsic connection between the two halves of the Polysynthesis Parameter, if clause (i) of the MVC is in fact a prerequisite for clause (ii). In that case, we would not expect to find a language with syntactically active noun incorporation but no pronominal argument morphology; and Baker does indeed make this claim. Salish languages clearly do not have the required type of noun incorporation; though they possess a large number of "lexical suffixes", mostly denoting body parts, incorporation is non-productive, incorporated elements are non-referential, and lexical suffixes cannot be used as independent nominals. The question then arises as to whether the MVC should be applied disjunctively or conjunctively. If it is applied disjunctively, then it is equivalent to another version of the pronominal argument hypothesis. If, on the other hand, it is applied conjunctively, then its range will be considerably diminished: Salish languages, for example will fall outside of the parameter altogether, and their head-marking properties will remain unconnected to those of, say, Mohawk or Nahuatl. In effect, Baker's "macro-parameter" will have micro-application.

present the St'át'imcets facts here. (For a more complete account of word order in Northern Interior Salish, see Gardiner, Davis, Matthewson 1993). St'át'imcets, like most Salish languages, is fairly rigidly head initial.[5] However, post-predicate word order of adjunct and argument is free, as shown below. (The VOSA word order in (3a) is unmarked in elicitation, but by no means preponderant in naturalistic language samples; texts, for example, are more likely to contain VSOA orderings:

3.(a) **čáqʷəńəš i šq̓ʷélə tə šk̓ʷúk̓ʷmi7tə ?inátxʷəš**

Ts'áqw-an'-as i sq'wél-a ta sk'úk'wmi7t-a i-nátcw-as.
eat-tr-3s.erg pl.det berry-det det child-det when-day-3s.sbj.su
"The child ate the berries yesterday." [6]

(b) Ts'áqwan'as i sq'wéla inátcwas ta sk'úk'wmi7ta.
(c) Ts'áqwan'as inátcwas i sq'wéla ta sk'úk'wmi7ta
(d) Ts'áqwan'as inátcwas ta sk'úk'wmi7ta i sq'wéla.
(e) Ts'áqwan'as ta skúk'wmi7ta inátcwas i sq'wela.
(f) Ts'áqwan'as ta sk'úk'wmi7ta i sq'wéla inátcwas.

All of (3a-f) are perfectly grammatical, though it is worth noting that the preferred option in all Salish languages is to have only a single lexical nominal per clause (see footnote 2); this is due to the discourse principles which associate overt nominals with new information, as opposed to pronominals, which keep track of old information; see Matthewson (1993) for an account of discourse tracking in St'át'imcets.

(ii-iii) Next, we turn to the relation between agreement morphology and lexical NPs. In order to qualify as a pronominal argument language, it is clear that a head-marking language must show obligatory (pronominal) agreement, and that lexical NPs must be optional. Both criteria are met in St'át'imcets, as shown in (4) through (6):

4.(a) **?íɬən**

ílhen
eat (intr)
"S/he ate."

(b) **xʷ?aoz kʷənšwá zwátən ɬ?íɬənəš**

cw7aoz kw(e)-n-s-wá zwát-en lh-7ílhen-as.
not det-1s.po-nom-asp know-tr if-eat-3s.sbj su
"I don't know if s/he ate."

---

[5] In fact, SVO order, which is common in the other Northern Interior languages (see Gardiner, Matthewson & Davis 1993), is possible for some St'át'imcets speakers. This appears, however, to be an innovation, triggered by extensive contact with Secwépmec (Shuswap) speakers; generally, the rigid predicate-initial order characteristic of Coast Salish is retained.

[6] Examples are presented both in the standard North West Coast phonemic script (in boldface) and in the practical orthography developed for the St'át'imc by Jan van Eijk (see van Eijk 1981). When a group of minimally contrasting examples is given, the phonemic script is used only for the first exemplar. Use of the practical orthography is designed to encourage St'át'imcets speakers to read and understand linguistic literature on their language.

(c) xʷʔaz kʷəš ʔɬənš
cw7aoz kw-s ɬhen-s
not det-nom eat-3s.po
"S/he didn't eat."

5.(a) čáqʷəɬ
Ts'áqw-an'
eat-tr
"Eat it." (imperative only)

(b) *čáqʷəɬ i sq̓ʷéla ta sk̓úk̓ʷmiʔta
*Ts'áqwan' i sq'wéla ta sk'úk'wmi7ta.

6. čáqʷəɬəš
Ts'áqw-an'-as.
eat-tr-(3abs)-3s.erg
"S/he ate it."

As (4a) shows, intransitive predicates in main clauses may appear with no overt agreement morphology; however, these forms are interpreted as containing a definite third person pronominal, which, moreover must be present overtly in both subjunctive and nominalized subordinate clauses, as shown in 4(b) and 4(c). The readiest (and generally accepted) explanation for this is that forms such as that in 4(a) contain a zero 3-absolutive agreement marker, in which case they conform to the pronominal argument pattern exhibited everywhere else in the language. Moreover, in transitive clauses with a third person subject, as shown in (5), a 3-ergative agreement marker is invariably obligatory, as opposed to lexical NPs, which are always optional, as shown in (4), (5a) and (6). Thus, morphologically, at least, St'át'imcets shows a pronominal argument profile.

(iv) As pointed out by Baker (1993), pronominal argument languages should lack lexical anaphors, which must according to Principle A of the binding theory be A-bound in their governing category. Since pronominal arguments are by definition non-anaphoric (being pronouns, they are subject to Principle B of the binding theory, and therefore must **not** be bound in their governing category), there is no way to reconcile the conflicting demands made by the two principles; hence, no lexical anaphors should be possible. This prediction is met in St'át'imcets, which makes use of detransitivizing suffixes, just like Mohawk, in deriving reflexive and reciprocal forms:

7. plan zúqʷənčut(*əš)
Plan zúqw-an-tsut(*as).
already die-tr-refl-(*3s.erg)
"He killed himself."

8. (a) nuǩʷʔantwáɬwit
Nuk'w7-an-twál'-wit
help-tr-recip-3pl.abs
"They helped each other."

(b) *nuǩʷʔantwáɬ'itaš
*Nuk'w7-an-twál-itas
help-tr-recip-3pl.erg

As shown in (7) and (8b), transitive agreement morphology is incompatible with reflexives and reciprocals. St'át'imcets thus conforms to the pronominal argument pattern.

(v) Next, consider the putative existence of infinitival constructions in pronominal argument languages. If the defining characteristic of such languages is obligatory agreement morphology, and the defining characteristic of infinitives is their lack of it, it will follow straightforwardly that infinitives will be impossible.[7] This appears to be the case in St'át'imcets:

9. χáx̌miɬ̓ɬkan kʷš čuẁn*(áš) ta máwa ta šmúɬača
xát'-min-lhkan kw-s tsuw'-n-ás ta máw-a ta smúlhats-a.
want-tr-1s.su det-nom kick-tr-3erg det cat-det det woman-det
"I want the woman to kick the cat.'

10. xʷʔaz kʷš ʔáma kʷá*(šu) q̓ʷezílx lta máqʔa ɬwáʔaš
cw7áoz kw-s áma kw-á-su q'wezílc l-ta máq7a lh-wá7-as
not det-nom good det-asp-2s.po dance in-det snow if-asp-3sbj.su
χaɬ
xelh
cold

"It's not good to dance in the snow when it's cold."

11. ʔálkštkan lta lep̓xálɬna nɬɬ ta*(n)šwá áz'an ta čqáχʔa
álkst-kan l-ta lep'cálten-a nilh t-(e)n-s-wá áz'-en .
work-1s.su in-det garden-det so det-1s.po-nom-asp pay-tr
ta ts'qáx7-a
det horse-det
"I worked in the garden to pay for a horse."

As (9-11) show, the St'átimcets equivalents of infinitival clauses in English all contain obligatory subject marking, as would be expected if St'átimcets was a pronominal argument language.

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[7] Obviously, this definition will exclude agreement-inflected infinitivals in languages like Portugese; these could indeed exist in pronominal argument languages. Thanks to Emmon Bach for pointing this out.

(vi) We now turn to a particular prediction of Baker's Case-based version of the pronominal argument hypothesis. Since non-NP clauses need not receive Case, it should follow that they may stay in argument position even in pronominal argument languages. This leads to the prediction that extraction from clauses in pronominal argument languages should show the same range of island effects as in lexical argument languages. Jelinek's theta-based pronominal argument hypothesis predicts on the contrary that all extraction from clauses should be impossible, because clauses, like other DPs, are in adjunct rather than argument positions, and thus should be subject to some version of the Constraint on Extraction Domains (see Huang 1981).

The St'átimcets facts support Baker's version of the hypothesis. To start with, long-range WH-movement is indeed possible out of complement clauses.[8] This is shown in (12):

12.(a) **čut kʷš Mary kʷš ʔáčχenaš kʷš John ta škíxzaʔša**

tsut kw- s Mary kw-s áts'x-en-as kw-s John ta skícza7-s-a
say det-nom Mary det-nom see-tr-3erg det-nom John det mother-3s.po-det
"Mary said John saw her mother."

(b) **šwat ku čut kʷš Mary kʷš ʔáčχenaš ta škíxzaʔša**

swat ku tsut kw-s Mary kw-s áts'x-en-as ta skícza7-s-a ?
who det say det-nom Mary det-nom see-tr-3erg det mother-3s.po-det
"Who did Mary say saw her mother ?"

This extraction is sensitive to the usual range of island effects, including the Complex NP Constraint (13), the Adjunct-island Condition (14), the WH-island Condition (15), and the Inner-island (Negative island) Condition (16):

13. (a) **pzán̓kan ta šqáyxʷa ta mayšentáliha ti nkáha**

pzán-lhkan ta sqáycw-a ta mays-en-táli-ha ti n-káo-ha.
meet(tr)-1s.su det man-det det fix-tr-topo-det det 1s.po-det
"I met the man who fixed my car."

(b) ***štam̓ ku pzán̓kaxʷ ta šqáyxʷa ta mayšentáliha**

*stam' ku pzá-n-acw ta sqáycw-a ta mays-en-táli-ha ?
what det meet-tr-2s.su det man-det det fix-tr-topo-det
*"What did you meet the man that fixed ?"

14. (a) **qʷačáčkaxʷ tuʔ nił̓ šc̓um̓qšán̓an ti šnúk̓ʷwaʔšwa**

qwatsáts-kacw tu7 nilh s-ts'um'qs-án'-an ti snúk'wa7-sw-a.
leave-2s.su pst so nom-kiss-tr-1s.su det friend-2s.po-det
"You left because I kissed your friend."

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[8] Recall that WH-traces are licensed in argument positions in Baker's version of the Pronominal Argument Hypothesis (since they escape the PF Case-filter). For Jelinek, on the other hand, long-range WH-movement should be simply impossible, contrary to the facts.

(b) *šwat ku qʷəčáčəxʷ tu? nɬ̓ ščum̓qšán̓ən

*swat ku qwatsáts-acw tu7 nilh s-ts'um'qs-án'-an ?
who det leave-2s.su pst so nom-kiss-tr-1s.su
*"Who did you leave because I kissed ?"

15.(a) šáwenɬkən šBill nka? ɬ?áčχənəš šJohn tə šəm?ámšə

sáw-en-lhkan s-Bill nka7 lh-7áts'x-en-as s-John ta sem7ám-s-a
ask-tr-1s.su nom-Bill where hyp-see-tr-3erg nom-John det wife-3s.po-det
"I asked Bill where John saw his wife."

(b) *šwat ku šáwənəxʷ šBill nka? ɬ?áčχənəš šJohn

*swat ku sáw-en-acw s-Bill nka7 lh-7áts'x-en-as s-John ?
who det ask-tr-2s.su nom-B where hyp-see-tr-3s.erg nom-J
*"Who did you ask where John saw ?"

16.(a) šwat ku čútkəxʷ kʷš xʷ?əz kʷš áčχənəš tə šqáyxʷə

swat ku tsút-kacw kw-s cw7aoz kw-s áts'x-en-as ta sqaycw-a ?
who det say-2s.su det-nom not det-nom see-tr-3s.erg det man-dett
"Who did you say didn't see the man ?"

(b) nka? ɬčútəxʷ kʷš xʷ?əy kʷš áčχənəš tə šqáyxʷə

nka lh-tsút-acw kw-s cw7ay kw-s áts'x-en-as ta sqáycw-a
where hyp-say-2s.su det-nom not det-nom see-tr-3s.erg det man-det
"Where did you say s/he didn't see the man ?"
(downstairs reading impossible for "where")

(14) and (16) are particularly relevant, in that they show an adjunct-argument asymmetry predicted to exist in Baker's but not in Jelinek's model.

(vii) We now turn to binding. As discussed in (iv) above, lexical anaphors are incompatible with the pronominal argument hypothesis, rendering Condition A irrelevant.[9] As for Condition B, it generally makes the same predictions for coreference in a pronominal argument language as in a lexical argument language with pro-drop.[10] This leaves Condition C, which requires that R-expressions in A-position be disjoint in reference from any c-commanding element. Since by hypothesis R-expressions in pronominal argument languages are not in A-position, we should expect to find no Condition C effects in such languages. Again, the Baker and Jelinek proposals make different predictions here. Since there is no clausal-nominal distinction in Jelinek's model, she predicts that Condition C effects should be systematically absent. On the other hand, in Baker's version we expect to find Condition C effects into complement clauses and with WH-traces (true variables),

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[9] NP traces seem to be systematically absent in head-marking languages, which follows straightforwardly from the unavailability of any A-position for Case-assignment, and thus the impossibility of A-chains.
[10] Independent pronouns in Salish languages are predicative, and when nominalized act like names (R-expressions) rather than pronouns.

since both are in A-positions, but not with possessives or relative clauses, which are constituents of nominals in adjunct positions.

Neither version accounts for the facts in St'át'imcets. In order to show this, however, it will be necessary to briefly digress to discuss the structure of St'at'imcets DPs. As shown in (17), possessors are obligatorily marked on the head. Lexical possessor DPs can occur on either side of the head in singly possessed structures, but the examples of multiple possession in (18) demonstrate that the basic order is head-initial, with the head-final order presumably derived by scrambling. Importantly, as shown in (19), possessor and head form a constituent which cannot be discontinuous.

17. (a) **ta škíxza?ša š-John**

ta skícza7-s-a s-John
det mother-3s.po nom-John
"John's mother."

(b) sJohn ta skícza7sa
"John's mother."

18.(a) **ta škíxza?ša ta šnúǩʷa?ša šJohn**

ta skícza7-s-a ta snúk'wa7-s-a sJohn
det mother-3s.po-det det friend-3s.po-det nom-John
"John's friend's mother." (*John's mother's friend.)

(b) ta snúk'wa7-s-a ta skícza7-s-a sJohn
"John's mother's friend." (*John's friend's mother.)

19. **ʔáčχenaš ta škíxza?ša š-John š-Bill ta šnúǩʷa?ša**

áts'x-en-as ta skícza7-s-a s-John s-Bill ta snúk'wa7-s-a.
see-tr-3s.erg det mother-3s.po-det nom-John nom-Bill det friend-3s.po-det
"Bill's friend saw John's mother./John's mother saw Bill's friend."
(Only interpretations).

Significantly, (19) cannot mean something like "John saw Bill's mother's friend" or "Bill saw John's friend's mother", indicating that an argument of the main predicate may not interrupt a possessive DP.

Now we are in a position to examine binding of possessors, as exemplified in (20) below:

20. (a) **áčχenaš š-John ta škíxza?ša ta šnúǩʷa?ša**

áts'x-en-as s-John ta skícza7-s-a ta snúk'wa7-s-a.
see-tr-3s.erg nom-John det mother-3s.po-det det friend-3s.po-det
"**John** saw **his** friend's mother."
"John's **mother** saw **her** friend."
"**John**'s mother saw **his** friend."
"**His** friend's mother saw **John**."
"**Her** friend saw John's **mother**."
"**His** friend saw **John**'s mother."

(b) áts'xenas ta skícza7sa ta snúk'wa7sa sJohn.
(same range of meanings)

(c) áts'xenas ta skícza7sa sJohn ta snúk'wa7sa
*"**John** saw **his** friend's mother."
(= ***He** saw the friend of **John**'s mother)

(NB: bold-face signals coreference)

In the (a) and (b) examples, the nominal "sJohn" can either be part of the possessive NP (as possessor) or the main clause (as either subject or object; see (i) above on post-predicative word order). In (c), on the other hand, "sJohn" must be part of the possessive DP (since St'át'imcets does not allow a discontinuous DP). This means that the only way that the impossible interpretation could be excluded would be via Condition C, as indicated in the parenthesized gloss; but this means in turn that Condition C must be operating into possessives in St'at'imcets, which means that possessive DPs must be in argument positions, contrary to the predictions of the pronominal argument hypothesis.

A second, similar argument is provided by coordination. The nominal "sMary" in (22) and (23) below must be a possessor rather than an argument of the main clause, because, just as with multiple possessives, a coordinate DP cannot be discontinuous. This is shown in (21). But if so, the only way to rule out the impossible interpretations is once again via Condition C. Note that in fact St'át'imcets is **more** restricted in binding possibilities than English (the English equivalent of (23) is grammatical).

21. **čuẇnáš šJohn múta? šMary šBill.**
tsuw'-n-ás s-John múta7 s-Mary s-Bill
kick-tr-3s.erg nom-John and nom-Mary nom-Bill
"Bill kicked Mary and John." (Only interpretation).

22. **čuẇnáš šJohn múta? šMary ta qéqčekša**
tsuw'-n-ás s-John múta7 s-Mary ta qéqtsek-s-a
kick-tr-3s.erg nom-John and nom-Mary det older.brother-3s.po-det
"**His** brother kicked **John** and Mary."
"**Her** brother kicked John and **Mary**."
*" **Mary** kicked John and **her** brother."
(= ***She** kicked John and **Mary**'s brother)

23. **čuẇnítaš šJohn múta? šMary ta qéqčekša**
tsuw'-n-ítas s-John múta7 s-Mary ta qéqtsek-s-a
kick-tr-3pl.erg nom-John and nom-Mary det older brother-3s.po-det
" Mary & **John** kicked **his** brother."
" **Mary** & John kicked **her** brother."
*"John & **Mary**'s brother kicked **her**."

The ungrammaticality of the last reading of (23), however, falls out from a separate condition, the "one nominal interpretation" generalization, which forces a single overt

nominal to be interpreted as absolutive rather than ergative. Thus in (24) below, the overt nominal must be interpreted as object rather than subject:

(24) ʔáč̓χenəš ti šqáyxʷa
áts'x-en-as ti sqáycw-a
see-tr-3erg det man-det
S/he saw the man/ *The man saw him/her

This condition characterizes both coastal and interior Salish languages; see Gerdts (1989) for discussion.

Once one-nominal effects are factored out, the possessor binding evidence indicates that St'át'imcets is showing Condition C effects much like those of English, and quite unlike those reported for Mohawk or predicted by either Baker or Jelinek.

(vi) Next, we turn to WH in situ, which according to Baker (1993) should simply be impossible in a pronominal argument language. This is because non-referential elements (including WH-phrases, other quantifiers, and idiom chunks) cannot form chains with empty pronominals in argument position (see Cinque 1990), and cannot themselves occupy argument positions, because of Case requirements. Thus the only licit WH-construction in Mohawk contains aWH phrase in COMP, from where it can license a variable in argument position; WH in situ is impossible. As mentioned above, Jelinek's position is more extreme; she states that there is simply no WH-movement in Straits Salish, which presumably means that not even WH-traces are licensed in argument positions.

This is not the case, however, in St'át'imcets, as shown below:

25.(a) šwat ku ʔač̓χentáli ku štam̓
swat ku ats'x-en-táli ku stam' ?
who det see-tr-topo det what
"Who saw what ?"
(Distributive reading preferred).

(b) *stam' ku áts'xenas ku swat ?
"What did who see ?"

(26) shows not only Wh in situ, but a conventional Superiority effect (subject-object asymmetry) in the contrast between the (a) and (b) examples.[11] Once again, St'át'imcets is not showing pronominal argument behaviour.

(ix) The same reasoning which leads Baker to outlaw WH in situ in pronominal argument languages precludes the existence of quantifiers in argument positions. (Since they are non-referential, they can neither directly occupy argument positions nor form a chain with pro.) It is predicted, then, that only adverbial "unselective" quantification should be possible. (For the latter notion see Heim 1982). One direct consequence of this is that intra-clausal scope interactions between quantifiers should be largely absent, since the quantifiers

[11] WH-phrases in St'át'imcets and other Salish languages, like those in Japanese and Chinese, have no quantificational force of their own, and act as indefinites in the scope of affective operators. Examples like (26) are thus ambiguous between a multiple WH interpretation and an indefinite interpretation; the latter will mean something like "Who saw anything ?" The superiority contrast in (26), however, is unaffected by this ambiguity. See Davis, Gardiner, & Mattewson (1993) for details.

(adverbials adjoined to IP) will all be in each other's scope. Another is that universal quantifiers, for example, should be unable to range over singular NPs: they will resemble English "all" as in "all men" rather than "every" as in "every man".

Jelinek's theory of pronominal arguments works slightly differently, but makes more or less the same predictions. For, her, the relevant distinction is D(eterminer)-quantification versus A(dverbial)-quantification. The former, she claims, is a property of NPs in argument position; since DPs in Straits Salish are all in non-argument position, only A-type quantification is permitted. The consequences are the same as in Baker's model: no quantifier interaction, and no non-WH variables in A-positions.

While I am not yet in a position to offer a detailed analysis of quantification in Stát'imcets, it does appear that at least one quantifier, "zí7zeg'w", meaning "each", is inherently distributive and can range over singular NPs, as shown in (26) below:

(26) kʷánɬkən kʷu mulx ɬlti zízəʔʷə šǩʷúǩʷmi?t

kwá-n-lhkan ku mulc lh-l-ti zí7zeg'w-a sk'úk'wmi7t.
take-tr-1s.su det stick from-at-det each-det child
"I took a stick from each child."

Crucially, the determiner "ti...a" is singular in (26); the quantifier "zí7zeg'w" is therefore acting like a "true" (D-type) quantifier. (Though actually here it is an "adjectival" modifier of the head "sk'úk'wmi7t", rather than a determiner, it is still definitely part of the DP). This appears to contradict the predictions of Baker and Jelinek for a pronominal argument language.

(x) Finally, we turn to weak crossover (WCO). WCO violations occur when a (non-resumptive) pronominal is directly bound by a quantificational element, without a mediating variable (trace) in A-position. (For details see e.g. Reinhart 1987). The prediction of the pronominal argument hypothesis is in fact that **all** bound pronouns should be ungrammatical, because (at least in the well-known possessive and relative clause cases) the adjunct DP containing the pronoun will not be c-commanded by any variable in argument position. Baker (1991) shows that in fact there are **no** WCO violations in Mohawk; he rescues the pronominal argument hypothesis by constructing a parasitic gap analysis for the relevant examples. What kind of WCO facts would then constitute counterevidence to the pronominal argument hypothesis ? The answer is: one in which an asymmetry appears between subject and object; this would be inexplicable if lexical DPs were not in argument positions.

Such an asymmetry does indeed characterize St'át'imcets, though its effects are subtler than in English. In a normal WH-question with two third person arguments, an object interpretation is strongly favoured for the WH-word, as shown in (27a); a subject interpretation is generally signalled by the use of a special "topical object" marker on the predicate (see Davis, Gardiner & Matthewson 1993, Matthewson 1993), as shown in (27b):

27.(a) šwat ku χʷíšáš sJohn

swat ku xwi-s-ás s-John ?
who det like-tr-3s.erg nom-J
"Who does John like ?" (strongly favoured interpretation)
"Who likes John ?"

(b) **šwat ku ɬʷištálɬ sJohn**

swat ku xwi-s-táli s-John ?
who det like-tr-topo nom-John
"Who likes John ?" (only interpretation)

However, when a potential WCO configuration arises, the interpretation of the WH-phrase switches; now a subject interpretation is strongly favoured, as shown in 28(a). In order to WH-question the object, passive is employed, as in 28(b), while the use of the topical object marker leads to a disjoint reference interpretation, as shown in 28(c):

28.(a) **šwat ku χʷišáš ku škíxzaʔš**

swat ku xwi-s-ás ku skícza7-s ?
who det like-tr-3s.erg det mother-3s.po
"**Who** loves **her** mother ?" (only interpretation)

(b) **šwat ku χʷištúm ku škíxzaʔš**

swat ku xwi-s-túm ku skícza7-s ?
who det like-tr-pas det mother-3s.po
"**Who** is loved by **her** mother ?"

(c) **šwat ku χʷištálɬ ku škíxzaʔš**

swat ku xwi-s-táli ku skícza7-s ?
who det like-tr-topo det mother-3s.po
"Who likes her mother ?" (disjoint reference only).

This would appear to constitute strong evidence for a subject-object asymmetry in WCO configurations, and thus, once again, weigh against an analysis of St'át'imcets as a pronominal argument language.

IV. Consequences

In the last section, we reviewed a number of diagnostics for pronominal argument status in St'át'imcets. The results are presented below (with comparative data for English and Mohawk) :

(29)		English	Mohawk	St'át'imcets
(i)	Free ordering of DPs	No	Yes	Yes
(ii)	Obligatory pronominal affixes	No	Yes	Yes
(iii)	Overt DPs optional	No	Yes	Yes
(iv)	Overt NP-anaphors	Yes	No	No
(v)	Infinitivals	Yes	No	No
(vi)	WH-extraction asymmetries	Yes	No	Yes
(vii)	Condition C effects in DP	Yes	No	Yes
(viii)	WH in situ	Yes	No	Yes
(ix)	D-type quantification	Yes	No	Yes
(x)	Weak Crossover effects	Yes	No	Yes

Clearly, St'át'imcets emerges as a "mixed" language; it shares the first five diagnostic properties with the pronominal argument language Mohawk, the second with the lexical argument language English. This in itself (though hardly unusual from a typological perspective) causes problems for an "all or nothing" parametrization. However, of greater interest is the nature of the diagnostic split. The first five properties are all the ones for which evidence is readily available from surface properties of the input, whereas the latter five are "deep" properties unlikely to be encountered unless consciously elicited. In other words, St'át'imcets is a lexical argument language disguised as a pronominal argument language.

Now, consider the learnability issue this raises for a classical parametric account of pronominal argumenthood. The child learning St'át'imcets will not be able to use the available morphological and surface syntactic evidence to set the pronominal argument parameter, because it is compatible with either setting. Instead, s/he will have to focus on properties that are very unlikely to be in the primary linguistic data (PLD) at all (and of course, the young child cannot elicit them). Ceteris paribus, then, St'át'imcets should be unlearnable.

Lack of space precludes a detailed analysis of the available solutions to this paradox. However, there are really only three possible avenues of explanation:

(i) Change the relation between a parameter setting and the evidence which triggers it. It could be, for example, that while still available in the PLD, the relevant evidence for the pronominal argument parameter had nothing to do with agreement marking. This appears implausible, but is certainly not logically impossible.

(ii) Abandon the idea that there is a single parameter responsible for pronominal argument behaviour. On this view, the correlation between properties (i-v) and properties (vi-x) above is accidental in languages like Mohawk. This predicts the existence of the converse of St'át'imcets, a language in which the "deep" properties are those of Mohawk and the surface properties those of English. To my knowledge, such a language does not exist.

(iii) Change the way we look at parameters. For example, suppose we took a "dynamic" view of parameter setting (as opposed to the static (instantaneous) model which is generally adopted). According to such a view, the Mohawk-type pattern would represent the culmination of a historical process of pronominal incorporation, whilst the isolating English-type pattern would represent precisely the reverse. In the former, pronouns would be strictly affixal, in the latter, strictly lexical. St'át'imcets would lie in between. There are two obvious advantages to this view. First, it allows us to understand "mixed" languages, since it treats pronominal argumenthoood as a continuum rather than an off-on switch. Second, it allows us to examine a parameter as a vector, with a particular **direction**: a language can be moving towards an incorporating or an isolating system, and its morphological properties will differ according to which direction it is going in. While space precludes an in-depth examination of the difference between languages heading towards pronominal argument status and thus moving away from it, even a cursory examination of St'át'imcets shows a range of properties that seem to indicate it falls into the latter class. These include (i) the remnants of a formerly more extensive noun incorporation system (ii) pronominal paradigms that contain extensive suppletion, portmanteau morphology and paradigm gaps, indicating morpho-phonological erosion of a formerly transparent system (iii) the incipient development of a set of independent (clitic) pronominals (derived from deictics) (iv) the relaxation of constraints on the number and type of lexical arguments (v) the loss of oblique marking on lexical arguments, and (vi) the development of SVO word

order. A detailed examination of these properties, however, must await further investigation.

Ultimately, the choice between (i-iii) is of course an empirical one. In any case, the problems raised by the existence of "mixed" languages like St'át'imcets for the classic parametric model are clear, even if the solution is not.

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Modifying Affixes[1]

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0. Introduction

This paper explores the properties of prefixes in French verb formation within a configurational theory of morphology (Di Sciullo 1990, 1991, 1993) and a spatio-temporal theory of event structure (Klipple 1991, 1992). We argue that prefixes in French verb formation are adjuncts and that they provide aspectual modification to the projection to which they adjoin. The corollaries of our hypothesis are that i) the prefixes do not project an X' structure; ii) they are not category-changing; iii) they do not in general affect the argument structure of the projection to which they are adjoined.

This paper is organized as follows. In the first section, the syntactic properties of the prefixes are discussed. In the second section, two levels of prefixes are distinguished, and the contribution of the prefixes to the event structure denoted by the verbal projection is analysed. The third section considers their conceptual contribution.

1. Syntactic properties

1.1. Categorial features

The first question that we would like to consider is the categorial nature of the prefixes in the verbal constructions in (1).[2]

(1) a. apporter, emporter, déporter, reporter
'carry to', 'carry from', 'deport', 'carry back'
b. atterrir, enterrer, déterrer, appauvrir, embellir, reblanchir
'to land', 'bury', 'unearth', 'impoverish', 'embellish', 'rebleach'[3]

Two analyses are possible for the prefixes in verbal constructions, putting aside the possibility of leaving the prefix unspecified for a lexical category. One analysis, assumed in Lieber 1992, takes the prefix to be a verbal causative marker. This approach is based on denominal and deadjectival verbs with en- and

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[2] We will not consider prefixes such as in- (impossible, intemporel) in French adjectival constructions. We argued in Di Sciullo and Tremblay (1993) that these prefixes were adjuncts to an adjectival projection. We restrict ourself here to prefixed verbal constructions.

[3] The glosses given are approximate; the reader should bear in mind that the French verb may differ from the English verb, especially with respect to transitivity, possible PP complements, and selectional restrictions. The meaning of the root is generally deducible in context from the gloss of the prefixed verb.

a-, as in (1b) and (2a), in which the prefixed verb has a causative/inchoative (change of state/location) interpretation, and there is usually no independent non-prefixed verb which can be formed.

(2) a. accrocher, *crocher; appauvrir, *pauvrir
'hook', 'hook'; 'impoverish', 'poverish'
b. porter, apporter; mener, amener
'bring', 'bring to'; 'lead', 'lead to'

The second analysis, which we adopt, focusses on the fact that in structures such as (1a) and (2b) the root verb and the prefixed verb are both attested in the language. The verbal prefix is taken to be a prepositional element which modifies an abstract verbal projection, which already has causative-/inchoative properties[4].

The first argument for this point is that the phonological shape of the prefix is similar to French prepositions a, de, en on the one hand,[5] and to the Latin prepositions in, trans, re and ex on the other. Under the view that the prefix is verbal, the phonological similarity between the prefix and the preposition would be accidental.

The second argument is that the prefix sometimes licenses a spatial (locational) PP complement to the verbal projection, as in (3).

(3) Ils ont amené les livres à la bibliothèque.
'They brought the books to the library.'
(4) *Ils ont mené les livres à la bibliothèque.
'They brought the books to the library.'

Without the presence of a prefix, certain PP complements cannot be licensed in the domain of the verbal projection, as in (4). The expression of this relation requires that both the prefix and the complement share their categorial features.

The third argument is that there exist many denominal and deadjectival verbs which carry no prefix, and these all have a causative/inchoative semantics. Thus, the presence of a prefix does not contribute the verbal properties. These facts strongly suggest that the prefixes in verb formation are prepositional.

(5) beurrer 'butter', farcir 'stuff', seller 'saddle', marteler 'hammer'
(6) grandir 'get big', vieillir 'grow old', rougir 'redden', pâlir 'get pale'

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[4] A prepositional analysis of prefixes in English denominal verbs is argued for in Walinska (1985).

[5] En- and a- also show a semantic resemblance to and the clitic en and the clitic y, respectively, although the properties of clitics and prepositional prefixes are not isomorphic.

Thus, even though prefixed denominal and deadjectival verbs have no non-prefixed verbal counterpart, the verbal features of the construction do not originate in the prefix. A verbal analysis of the prefix does not cover the cases where the prefix is not required in the verbal projection and does not capture the relation between prepositions and prefixes in French.

1.2 Structural properties

We will now argue that prepositional prefixes are adjuncts to a verbal projection. The prefixes exhibit adjunct-like properties and differ sharply from suffixes.

Prepositional prefixes in French do not head the construction they are part of, which is a verbal projection. In this respect they differ from category-changing suffixes which determines the categorial features of their projection. Thus, the prefixes in (1) are not heads. They do not project an X' structure, given that they do not take a complement, as it is the case for category-changing suffixes (Di Sciullo 1993).

Instead, prepositional prefixes have adjunct-like properties. One property of adjuncts, which differentiates them from arguments, is that adjuncts may co-occur.[6] This is also the case for certain prefixes such as re- and dé-, but not a- and en-, as in (7). Another property of adjuncts is their optionality; prefixes are optional in some cases, though in denominal and deadjectival verbs they are generally obligatory, as in (8). Another property of adjuncts is that they may occur at the periphery of the projection. In French, a prepositional affix may never precede a category-changing affix, and it may not follow it, as in (9).

(7) a. redéménager, réapporter, retransformer; reremettre, dédéfaire
'remove', rebring', 'retransform'; 'put back again', 'ununde'
b.*aaménager, *enemporter, *transemporter,
'arrange up up', 'encarry to', transcarry to'

(8) a. mener, emmener, lever, enlever
'bring', 'bring along', 'lift', 'lift off'
b. coder, encoder; *terrer, enterrer; *bellir, embellir, *pauvrir, appauvrir
'code', 'encode'; 'earth', 'bury'; 'beautiful', 'embellish', 'impoverish'

(9) a.transportable, exportable
'transportable', 'exportable'
b.*portinable, *portablex
'portinable', 'portablex'

[6] The ability to be repeated is a property of syntactic adjuncts, which distinguishes them from arguments (see Bresnan 1982, Klipple 1991).

(i) On Monday in Boston we had tea at 4 at the Ritz.

The fact that these affixes do not occur in the right periphery of the structure is predictable since they are not heads of words (Williams 1981, Di Sciullo and Williams 1987). Given that they occur at the left periphery of the structure and thus precede the verbal complex, they must be adjuncts (Kayne 1993).

1.3 X/XP adjuncts

If prefixes are adjuncts to a verbal projection, there are reasons to distinguish two adjunction sites. The fact that the prefixes re- and dé-, and not a- and en-, must precede the other prefixes and may be iterated, suggests that these prefixes have different adjunction sites. Moreover, that a prefix such as a- and en- is generally required in denominal and deadjectival verbs, and not when the prefix attaches to verbs, suggests that such prefixes are in different positions.

We will thus distinguish two basic adjunction sites for a prepositional prefix, adjoined to either V or VP, and propose that prepositional prefixes give rise to the adjunction structures in (10) at the interface between word structure and the conceptual-intentional system, i.e. at Morphological Form (Di Sciullo 1993). A prepositional prefix may be adjoined to a full verbal projection, as in (10a), which is the case for re- and in some cases dé-; or to a sub-part of the verbal projection as in (10b), which is specific to a- and en-type prefixes.

(10) a.

b.

The following paragraphs detail our proposal.

1.3.1 VP adjuncts

The prefixes re- and dé-, in verbs such as recomposer and décomposer are not related to an argument position of the verbal projection they are part of. This is evidenced by the fact that simple transitive verbs such as composer as well as verbs with a PP complement such as distribuer allow re- and verbs such as charger allow dé-. This indicates that these prefixes are outside of the maximal argument structure domain of the verb, VP.

(11) a. refaire, défaire, recomposer, décomposer
'redo', 'undo', 'recompose', 'decompose'
b. redistribuer, réétager, décharger, décongeler
'redistribute', 'restore', 'unload', 'unfreeze'

Furthermore, both re- and dé- can occur with other prefixes, and are always ordered before the other prefixes. This shows that they must be structurally higher than those prefixes. Both prefixes may occur together, re- must occur before dé- and both can be repeated in the same word.

(12) a. remporter, rapporter, désenterrer
'carry back', 'bring back', 'unearth'
b.*enreporter, *areporter , *endéterrer
'report from', 'report to', 'dig out from'
(13) redéfaire, *dérefaire; rerefaire, dédéfaire
'reundo', 'deredo'; 'reredo', 'unundo'

The fact that re- and dé- are ordered before other prefixes, can sometimes be repeated, and resemble certain syntactic adjuncts indicate that they are adjuncts at the VP level as depicted in (10a).

1.3.2 V adjuncts

The distributional difference between re-/dé- and a-/en- and the fact that the former precede the latter follow from our analysis. Re- and dé- are VP adjuncts while a-/en- are V adjuncts in structures such as apporter and emporter. In these structures, the prefix is a direct sister of the verb. This analysis is motivated by the fact that the prepositional prefix may be related to a variety of PP complements of the verbal projection it is a part of.

(14) a. Il l'a amené au parc / à Marie / en voiture
'He took (it/her/him) to the park / to Mary / in a car.'
b. Il l'a emmené au parc/hors du parc / en voiture.
'He took (it/her/him) to the park / out of the park / in a car.'

In the representation in (10b), which we propose for these structures, the prefix is in the domain of the lowest verbal projection. The representation captures the fact that there is a local relation between the PP complement of the verb and the prepositional prefix, even though there might not be identity between the prefix and the head of the PP complement. The prefix is not adjoined to the higher verb. If this were the case, the prefix would wrongly have scope over the direct internal argument of the projection. However, prefixes such as a- and en- do not affect the direct internal argument of the verbal projection they are part of, as we will see.

2. Prefixes as Aspectual Modifiers

The proposal that French prefixes are adjuncts is further motivated by their semantic properties. They are modifiers, elements which are predicates of an entity or event, adding further information about the event without becoming the head, without changing the syntactic category, and without serving as an argument. Modifiers occur in adjunct positions, correlating with the semantic properties.

We argue that they are semantically aspectual in nature, that is they modify temporal, spatial and scalar properties[7] of the element to which they are attached. By aspectual structure, we mean not only the temporal properties of events, but also more abstract properties involving what Pustejovsky 1988 call the "geometry of the event". Let us assume the definitions in (15).

(15) Aspectual structure: The temporal, spatial and scalar vectors in the geometry of the event.
Definition of vector: A quantity having direction as well as magnitude, denoted by a line drawn from its original to its final position. (Oxford English Dictionary)

Following the Davidsonian approach, extended by Higginbotham (1985), we take modifiers to be predicates directly of an event variable e, or in the case of nominals, of the entity r (Williams 1981, Di Sciullo and Williams 1987). It is thus possible to have the adjunction of a prefix to a verbal projection in morphology, licensing event identification, as argued in Di Sciullo (1990) for prefixed verbs in Italian. It is also possible to modify subparts of the internal structure of the event (the aktionsart), as argued in Klipple (1991) for the licensing the adjunction of PPs interior to VPs in English syntax.

We claim that these possibilities for adjunction allow at least two levels of aspectual modification, which differentiate the re- type modifiers from the en- type. This semantic difference maps onto the structural difference between the suffixes discussed above.

Postulating these two levels leads us to predict that the aspectual contribution of VP and V adjuncts may differ: VP adjuncts are sensitive to aktionsart but do not change it, while V adjuncts can change aktionsart. The following paragraphs show that this prediction is borne out.

2.1. VP adjuncts

The prefixes re- and dé- are examples of VP-adjuncts at Morphological Form, as seen in section 1.4. Semantically, re- and dé- modify the entire event associated with the verbal root. Re- has the meaning of "again"; it indicates that the event associated with the verb is repeated. On the other hand, dé- has a meaning of "reversal" of the event associated with the verb.

(16) refaire, reboutonner, rehabiliter, regagner
'redo', 'rebutton', 'rehabilitate', 'regain'

[7] This implies that we see aspect as including more than temporal properties, but as subsuming a group of related abstract properties. This is argued for in Klipple (1991), following Hale (1984) and Kipka (1990).

(17) déboutonner, déficeller, décharger, dégraisser
'unbutton', 'untie', 'unload', 'degrease'

These prefixes have in common that they take the entire event denoted by the verb in their scope. They modify that event, and construct another event related to it; but note that the event denoted by the verb is also implicitly stated to occur. The prefixes are modifiers at the event level, as opposed to modifying at the aktionsart level, which is the aspectual function of V adjuncts such as the prefixes en- and a-.

Re- and dé- impose selectional restrictions on the verbal root to which they attach. These restrictions are aspectual, and do not involve the argument structure of the verb. Re- must take a non-stative verb, but can appear with transitives and unergatives as well as unaccusatives. Dé- also selects only non-stative verbs, and may equally appear with transitives, unergatives and unaccusatives. However, the event denoted by the verb must be iterable in the re- case and reversable in the dé- case.

(18) a. redevenir, repartir, renaître: *resavoir, *reaimer, *reappartenir
'rebecome', 'releave', 'reborn'; 'reknow', 'relove', 'rebelong'
b. défaire, départir, dérougir; *désavoir, *déaimer, *déappartenir
'undo', 'relinquish', 'take the redness off', 'deknow', 'unlove', unbelong

Dé- can attach to the verb posséder "to possess", which is usually a stative verb. However, the prefix can only occur with this verb when it is used as an eventive, causative verb; this supports the contention that the prefix selects only non-stative verbs.

(19) a. Jean (*dé)possède un château.
'John possesses a castle.'
b. Marie dépossède Jean de ses biens.
'Mary depossesses John of his belongings.'

In fact, re- does not attach to non-eventive nouns, as in (20a), it attaches only to denominal verbs which already exist, or to prefixed denominal or deadjectival verbs, as in (20b). This is because it selects an event, and denominal verbs (at least the ones only good with prefixes) are not events, VPs, unless they have a V prefix in French.

(20) a.*reboîter, *recrocher, *renuager
'recase', 'rehook', 'recloud'
b. rebeurrer, recode; raccrocher, raffermir
'rebutter', 'recode'; 'hang up', 'firm up'

As predicted, VP adjunct prefixes do not change the aktionsart of the verbal projection they are adjoined to. Thus, re- adjoined to a verbal projection does not change its aspectual class. The verb (re)construire ((re)construct) is an accomplishment. It does not allows durative adverbials such as for an hour but does allow frame temporal expressions (Bennett and Partee 1972) such as in an hour. Moreover, it may be in the complement of the verb finir (finish), as is typical of accomplishments (Dowty 1979).

(21) a. Marie a (re)construit une maison en un an / *?pendant un an.
'Mary (re)built a house in a year / for a year.'
b. Marie a fini de (re)construire une maison.
'Mary finished (re)building a house.'

2.2 V adjuncts

When a prefix attaches to a verbal root, it in general specifies the orientation of the event denoted by the verb. Prefixes such as en-, a-, sous-, trans- and the like modify the aspectual properties of the verb. Since they are structurally closer to the verb than re- and dé-, and their semantics involves the internal aspectual structure of the event denoted by the verb, we claim that they are adjuncts directly of the V.

If we suppose that the VP node corresponds to the level where the event is lexically "closed off" and that below this node the corresponding semantic structure may be broken into subevents, we may propose that the semantic relation between the verb and the prefix is closer than that with VP adjuncts, in that the prefixes can modify subparts of the event.

We predict that V adjunct prefixes may have an effect on the aktionsart of the verb. This corresponds to the facts. The verb fuir (flee) is an activity. Thus durative adverbs are acceptable modifiers, but not frame temporal expressions. The reverse is true for the prefixed verb s'enfuir (escape).

(22) Marie a fuit pendant une heure / *?en une heure.
'Mary fled for an hour / in an hour.'
(23) Marie s'est enfuit en une heure / *? pendant une heure
'Mary escaped in an hour / for an hour.'

The fact that V adjunct prefixes may change the aspectual nature of the event is predicted by our analysis since they are part of the internal substructure of the event denoted by the verb.

3. Semantic fields and the conceptual structure of prefixes

This section explores the conceptual contribution of V adjunct prefixes to the projection of which they are a part, and provides additional evidence that they

are aspectual modifiers of subparts of the event. The V adjunct prefixes we have seen above, which include en-, a-, sous-, trans-, and the like, help to shape the aktionsart of the verbal projection in specifying properties such as its beginning point, its endpoint, its spatial relations, its trajectory, and its polarity on a scale.

Determining the semantic properties of these prefixes is complicated by the fact that their interpretation depends on the kind of root they occur with; in fact, it varies with what is called the "semantic field" of the root. We maintain, however, that each prefix and all aspectual modifiers should be treated as having a single lexical entry, that is, their lexical conceptual structure (LCS), independent of semantic fields, must be underspecified and highly abstract.

The idea of semantic field has been argued for by many authors, including Gruber (1965), Jackendoff (1983), Talmy (1985), Hale (1984). The essential idea is that a wide variety of lexical items may share an abstract semantic element; this element has a common meaning abstracted away from the context inherent in a specific lexical item. This inherent lexical context is the semantic field of the expression.

A semantic field is a sort of conceptual pseudospace; we consider semantic fields to be part of the human conceptual-intensional system. They form a mathematical space, which can be instanciated as a 3-dimensional grid (as in the case of physical space), or a directed line (as in the case of temporal or scalar dimensions).

3.1 Semantic fields and aspectual modifiers

In the case of prefixed verbs, the root conceptually sets up some sort of point, shape or vector within a semantic field. The prefix, as an aspectual modifier, specifies some component of this point, shape or vector. The prefix itself does not belong to any semantic field, but takes on a different interpretation in each field. This semantic behavior is like that of prepositions and particles, which has been noted by many authors (Jackendoff 1983, Herskowits 1986, Vandeloise 1991).

The semantic fields that we find with the prefixed verbs considered here are the following: Static spatial (physical), Directional (dynamic spatial), Stative (abstract space), Scalar (measure; directional stative). The following paragraphs illustrate the varying interpretation of V adjunct prefixes with respect to semantic field.

Directional (dynamic spatial): With verbs of motion, which have an inherent spatial vector, prefixes can specify the directional component, and/or be related to the beginning or endpoint of the path. En- indicates direction away from, or source; a- indicates direction towards, or goal[8]:

[8] Some of these verbs, notably emmener, have the additional sense of enclosing an object while taking it with oneself.

(24) en- "away from": emporter, emmener
'carry away with', 'bring away with'

(25) a- "towards": apporter, attirer, accourir
'carry to', 'pull towards self', 'run to/towards'

(26) de- "out of"[9]: déterrer, dégainer, découper
'unearth', 'unsheathe', 'cut out'

(27) in- "into": importer, infiltrer
'import', 'infiltrate'

(28) ex- "out of": émettre, exporter,
'emit', 'export'

(29) trans- "across": transporter, transmettre
'transport', 'transmit'

Scalar properties and states: Aspectual prefixes can also combine with roots in a stative semantic field. In the case of a deadjectival verbs, which take the prefixes en- and a-, the notion of a scale is often present, for an adjective often indicates a state or property that has an inherent scale, from positive (the full instanciation of the property) to negative (the opposite property), and along which the degree of the property attained can be measured. Sous- occurs with verbs with inherent measure, and indicates "under" with respect to canonical value on a scale.

(30) enrichir, ennoblir, endurcir
'make rich', 'ennoble', 'harden'

(31) appauvrir, amollir, annuler
'impoverish', 'soften', 'cancel'

(32) sous-alimenter, sous-estimer
'undernourish', 'underestimate'

Directional and Scalar Combined: Some motion verbs have both a directional and a scalar component. These verbs also seem to indicate that the action goes to a certain predetermined point, whereas the corresponding non-prefixed verbs do not indicate any endpoint to the action. The contrast in (33) is illustrative:

[9] Note that we include dé- among the V adjunct prefixes, although we have said above that in can function as a VP adjunct. In fact, we claim that it can serve as both, and its exact interpretation depends on its site of attachment; it is "inverse" at the VP level, and "out of" at the V level. The two interpretations are related, for both are in a sense negative; inverse is a negative concept, and the notion of "out of" or "from" has been argued to be a composition of "not at" (Jackendoff 1983).

(33) a. enlever 'lift off': positive/up + away from
b. abaisser 'lower to a certain degree': negative/down + towards

Static spatial: A prefix sometimes has a spatial interpretation, especially when combined with a concrete noun (and forming a denominal verb). In a spatial (static) interpretation, en- always has roughly the meaning of "within", a- roughly meaning of "at, to, contact".

(34) emboîter, enterrer, enchaîner
'to box', 'to bury', 'to chain
(35) accrocher, atterrir, s'accouder
'to hook/hang', 'to land', 'lean on elbow'
(36) souligner, soupeser
'underline', 'to weigh with one's hand'
(37) expatrier 'expatriate'

The individual relation in space to the object denoted by the root is further determined according to the spatial characteristics of the object (Herskowits 1986, Vandeloise 1991). All manifestations of en- have the same sort of spatial meaning, i.e. "cause to be in", which is spelled out as "contain" or "surround with", depending on the semantic type of the NP for the exact interpretation (Herskowits 1986). Similarly, a- generally implies contact, though it may or may not imply motion.

Abstract Space: With an abstract noun or verb, an aspectual prefix may still have a remnant of its spatial meaning, but the resulting verb is more naturally interpreted as indicating change relative to a state rather than a spatial location. The state can in fact be seen as an abstract location.

(38) s'enamourer, s'enrhumer, s'acclimater
'enamor', 'get a cold', 'acclimate'
(39) s'endormir 'fall asleep'
(40) soumettre 'submit', sous-louer 'sublease'

3.2 Summary: Behavior of each prefix across semantic fields

(41) summarizes the above findings about the interpretations of the prefixes in each semantic field:

(41) en- Static spatial: in, within, surrounded by
Directional: away from
Stative: into state
Scalar: positive

a-	Static spatial: at, to, in contact with
	Directional: towards, to
	Stative: at, in a state
	Scalar: negative
dé-	VP modifier (level above aktionsart): inverse
	Directional: out of
sous-	Static spatial: underneath
	Stative: below abstract space
	Scalar: low on scale
ex-	Static spatial: exterior to
	Directional: out of
in-	Directional: into
trans-	Directional: across

So, for instance, a- interpreted in a stative field becomes "at, to STATE"; sous- in a scalar field becomes "low in SCALE". Dé- is special in that it can vary according to level of attachment as well as semantic field.

The directional component of en- as "away from" is not accounted for, and is surprising; however, it is interesting to note that the clitic en shares this meaning component. The scalar properties of en- and a- also do not follow directly from their other uses, although the fact that these two prefixes form a basic contrast is consistent across all semantic fields. We leave a full exploration of these problems to further research.

4. Summary

This paper presents the basic ingredients for a unified analysis of prefixes in French, correlating their syntactic and semantic properties. We proposed that prefixes are adjunct to a X or an XP projection and that they provide aspectual modification to the projection they are part of. We predict different properties of prefixed verbal structures including the linear order properties of the prefixes as a function of their level of attachment. We also predict the difference in their semantic contribution to the event structure they modify. Finally, we account for the variation in meaning of the prefixes, which as we proposed are underspecified with respect to semantic fields.

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VOWEL ASSIMILATION IN LEKEITIO BASQUE AND ITS IMPLICATIONS FOR THE MINIMALIST THEORY

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0. Introduction.

In this paper I am going to study the phonological process of Vowel Assimilation (VA) in Lekeitio Basque.[1] This is a rule which can be classified as a postlexical rule, but its distribution calls the theory of lexical phonology in question, and poses serious problems for an analysis under the best known theories of phrasal phonology. I will present a new insight, claiming that certain syntactic domains defined by minimalist principles may be carried over as phonological domains at PF, where VA applies.

1. Vowel raising and vowel assimilation in Lekeitio Basque. Distribution.

In this paper we focus on the phonological process of Vowel Assimilation in Lekeitio Basque. This is an optional fast-speech rule by which a vowel assimilates in all its features to an immediately preceding vowel. The boundaries created by nominal inflectional endings provide one of the contexts for the application of the rule, as illustrated in (1). For each of the underlying forms in (1) we can obtain two alternative outputs, as the slash indicates. The forms to the left of the slash correspond to the output of the application of the rule of Vowel Raising, by which a stem-final non-high vowel raises before the initial vowel of an inflectional suffix. This rule applies obligatorily and feeds the optional later rule of VA, which the forms to the right of the slash reflect. The forms on the left correspond to a careful style, whereas those on the right are

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pronounced in a more relaxed, rapid style:[2]

(1) a. /orma-a/ -> ormia / ormii
wall-det.sg.
'wall'

b. /baso-ak*/[3] -> basúak / basúuk
forest-det.pl.
'forests'

c. /ume-en*/ -> umíen / umíin
child-gen.pl.
'of the children'

d. /kale-eta*-n/ -> kaliétan / kaliítan
street-det.pl.-iness.
'in/at the streets'

e. /guraso-ak*-kin*/ -> gurasuákiñ /gurasuúkiñ
parent-det.pl.-soc.pl.
'with the parents'

High vowels do not undergo the rule simply because they never occur in the relevant contexts. The round mid vowel /o/ does not assimilate, as shown in (2):

(2) a. /baso-ok*/ -> basúok / *basúuk
forest-prox.
'forests (proximative)'

b. /ume-on*/ -> umíon / *umíin
child-prox.
'of the children (prox.)'

VA may also apply in underived domains, although the application of the rule seems to be lexically determined (cf. (3) for the native vocabulary). Among borrowings, Spanish verbs ending in *-ear*, adapted as *-ia* by VR, are the only ones that systematically undergo VA (cf. (4)):[4]

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[2] The following abbreviations will be used in the text: *sg.*= singular, *pl.*= plural, , *det.*= determiner, *abs.*= absolutive, *erg.*= ergative, *gen.*= genitive, *dat.*= dative, *soc.*= sociative, *prox.*= proximative, *infl.*= (verbal) inflection, *fut.*= future, *neg.*= negation.

[3] An asterisk placed behind a morpheme indicates that that morpheme is accented, i.e., that it triggers penultimate accent on the phonological word which results from concatenation (cf. (1b-e)). Morphemes with no asterisks are unaccented, i.e., they only surface with final stress when they are in phrase-final position.

[4] The vowel appearing before the *-r* in Spanish infinitives has often been considered in Spanish

(3) biar / biir 'to need'
siar / *siir 'through'

(4) a. Sp. siesta 'nap' -> siesta / siista
Sp. viaje 'trip' -> biáje / *biíje
Sp. suerte 'luck' -> suerte / *suurte
b. Sp. mosquear 'to get angry' -> moskia / moskii
Sp. sortear 'to raffle' -> sortia / sortii

Derivational morphemes do not undergo this rule, since they are consonant-initial. The rule of VA does not apply between two members of a compound or across words (see (5) and (6), respectively):

(5) a. /buru-andi/ head-big 'big-headed' -> buruándi / *buruúndi
b. /seme-alabak/ son-daughters 'children' -> semealábak / *semeelábak

(6) a. /seru asula/ sky blue 'blue sky' -> seru asula / *seru usula
b. /etxe andiža/ house big 'big house' -> etxe andiža / *etxe endiža

The rule of VA can also apply between a lexical verb and a vowel-initial inflection, namely a past tense inflection whose initial vowel is the third person agreement marker. In this context no VR occurs, since VR is restricted to nominal inflection and nonderived environments:

(7) a. /žo eban/ hit infl. '(s)he/it hit him/her/it' -> žo eban / žo oban
b. /galdu ebasan/ lose infl. '(s)he lost them' -> galdu ebasan / galdu ubasan

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descriptive grammars as a separate morpheme, called *thematic vowel*. Since no notion of a morpheme or grammatical category similar to a thematic vowel exists in Basque, I assume that this vowel does not constitute a morpheme on its own. Thus, the Basque adaptations in (4b) can be considered nonderived roots.

c. /ikasi ében/ -> ikasi ében / ikasi íben
learn infl.
'they learnt it'
d. /atrapa ebésen/ -> atrapa ebésen / atrapa abésen
catch infl.
'they caught them'

VA does not occur between a verb and a following lexical element, as illustrated in (8):

(8) a. /saldu etxia/ -> saldu etxia / *saldu utxia
sell house
'sell the house'
b. /ekarri ardawa/ -> ekarri ardawa / *ekarri irdawa
bring wine
'bring the wine'

Once the distribution of the rule of VA has been presented, in the following sections we are going to show that these data cannot be accounted for under any theory of postlexical phonology developed so far, and we will propose an alternative analysis.

2. A puzzle posed by VA.

The first problem that the rule of VA presents is that of its classification as a lexical or postlexical rule, following the assumptions of classical lexical phonology. We have seen that it applies in nonderived environments in some words, apparently lexically restricted (cf. (3)-(4)), and in nominal and verbal inflection (cf. (1) and (7)). VA cannot be simply lexical, since it applies across words, i.e., between a verb and its inflection, and it cannot be classified as a clear postlexical rule either, since, contrary to what has been claimed for postlexical rules by Archangeli 1985, Pulleyblank 1986, Kaisse & Shaw 1985, among others, VA does not apply across-the-board; it only applies in the syntactic context of a lexical verb and its inflection. Moreover, it has lexical exceptions (cf. (3)-(4)), and this is a property which is recognized for lexical rules, not postlexical rules.

The existence of postlexical rules which also show properties of lexical rules has not passed unnoticed for some phonologists, such as Ellen Kaisse. In Kaisse (1985, 1990) she distinguished P1 from P2 postlexical rules. P1 rules are those postlexical rules that show sensitivity to morphosyntactic information, and P2 rules are those postlexical rules for which morphosyntactic representations are not available. They apply very late in the derivation, and can be sensitive to intonational and phrasal boundaries, as well as pauses. Nevertheless, our rule of VA cannot be identified as a P1 or P2 rule

either, since it shows properties of both. On the one hand, VA cannot be classified as a P2 rule because it has access to morphosyntactic information, as we have seen; and on the other hand, VA cannot be classified as a P1 rule either, because it has properties of P2 rules, namely, sensitivity to intonational boundaries and pauses. As it is shown in (9)-(10), VA cannot apply to a vowel which is located immediately preceding a pause or an intonational boundary:

(9) a. Neski-a etorri da ## -> neskii etorri da ##
girl-det.sg. come infl.
'The girl has come'
b. Etorri da neski-a ## -> *etorri da neskii ##
come infl. girl-det.sg.

(10) [Barristu egingo dabela plasan dagon
renovate do-fut infl-that square-in is-rel
etxia/*etxii] ## [esan ében]
house-det.sg. say infl.
'They said that they would renovate the house that is in the square'

It is important to note that the rule of Vowel Assimilation in Lekeitio Basque cannot be treated as a precompiled phonological rule in the sense of Hayes (1990) either. That is, it cannot be located in the lexicon, with a syntactic environment added as part of its structural description, as Hayes proposes for precompiled rules, since it is sensitive to intonational boundaries, and thus is clearly postlexical.

These facts suggest that some of the basic postulates of Classical Lexical Phonology and even modern Phrasal Phonology are mistaken. A way to solve this puzzle would be to avoid making a clear-cut distinction between syntax-sensitive and syntax-blind postlexical rules. Specifically, I would like to propose, as in Hualde & Elordieta (1992), that morphological and syntactic boundaries remain visible at all levels of a linguistic derivation, and that a rule may apply whenever its structural description is met.

The postlexical aspect of this rule of VA also posits a serious problem for other theories of Phrasal Phonology, such as the ones developed by Nespor & Vogel (1986) and Selkirk (1986). The main assumption in these theories is that the output of the syntactic component is subject to a set of phonological phrasing rules which rebracket and relabel the structure into phonological phrases, which exclude any reference to syntactic categorial information such as *noun*, or *verb*, or structural notions such as complement, specifier, or adjunct. Rather, we find prosodic constituents such as

the Phonological Word, the Clitic Group, or the Intonational Phrase, as in Nespor & Vogel (1986), or constituents whose boundaries are determined by category-neutral heads or maximal projections (i.e., X^0, XP), as in the End-Based Approach (Selkirk 1986, Hale & Selkirk 1987, among others). VA constitutes a problem for these postulates because it is sensitive to syntactic structures with categorial information: leaving apart non-derived domains such as (3)-(4), VA only occurs in nominal and verbal inflectional contexts.

Let us begin by discussing the predictions that the End-Based Approach makes for our rule of Vowel Assimilation. This model postulates that phonological domains for the application of postlexical rules are determined by creating boundaries to the left or right hand of syntactic heads or maximal projections. Adopting current notions in the syntactic theory of the Principles and Parameters framework, on which this approach is originally based, we assume that the verbal inflection is a syntactic head (i.e., I^0) occupying the head position of its own projection (i.e., IP), and governing the maximal projection VP which is its complement. With this in mind, the End-Based Approach appears unable to create the right domains for VA to occur, since positing boundaries to the left or to the right of heads or maximal projections would locate a lexical verb and its inflection in separate domains. In order to solve this problem, we would be forced to stipulate that boundaries are created to the left of lexical heads or their maximal projections, governed by a syntactic head, and propose that VA applies in the domain demarcated by those boundaries. This is illustrated in (11):

(11) a. [$_{X0}$ lora [$_{X0}$ ederra -> *lora adarra
flower beautiful
'beautiful flower'

b. [$_{X0}$ saldu eban -> saldu uban
sell infl
'(s)he sold it'

Apart from the stipulation we have had to introduce regarding the lexical nature of the syntactic element marking the boundary for the phonological domain, this analysis would also face the problem posed by adverbial complementizers and modal particles, which follow a lexical verb and never have its initial vowel assimilated to the verb's final vowel, as illustrated in (12)-(13):

(12) a. apurtu árren -> *apurtu úrren
break despite
'despite breaking'

b. ni etorri esik -> *ni etorri isik
I come unless
'unless I come'
c. su allaga esian -> *su allaga asian
you arrive if(neg.)
'If you don't come'

(13) aproba ete dábe -> *aproba ate dábe
pass modal infl
'Might they have passed?'

Under the End-Based Approach, we would be forced to consider complementizers and modal particles to be lexical heads, in order to account for the blocking of VA. However, this seems unorthodox, given that complementizers and modal particles have properties more like nonlexical categories.

Finally, similar results are obtained if we consider the Direct-Syntax Approach (Kaisse 1985). In this theory, the application of certain postlexical rules depends on the structural relationship of *c-command* existing between two elements *a* and *b*. Following the currently accepted assumption that the verbal inflection (i.e., I^0) c-commands the lexical verb (i.e., inside VP), one could say that our rule of VA applies to the initial vowel of an element *a* (i.e., verbal inflection) when it immediately follows the final vowel of an element *b*, c-commanded by *a* (i.e., lexical verb). Here too, as discussed for the End-Based Approach, one would have to add the stipulation that the element *a* has to be nonlexical, in order to predict correctly the absence of VA between two lexical elements, as illustrated in (8). However, this analysis must also be rejected, given the absence of VA between a lexical verb and a following complementizer or modal particle, which under current syntactic theory are assumed to c-command the lexical verb.

Similarly, it is clear that the domain of application of VA in LB cannot be reduced to any discrete prosodic constituent suggested by the Prosodic Hierarchy theory, as in Nespor & Vogel (1986). The domain of application exceeds the domain of a phonological word or clitic group as understood in Nespor & Vogel, because VA still applies in cases in which a lexical verb and its inflection carry their own accent, as we can see in (14):

(14) Emóngo ebésen -> emóngo obésen
give-fut infl
'They would give them'

The Phonological Phrase would also be excluded as a domain for VA, since a noun and a following adjective would be enclosed in the same phonological phrase, and

thus VA would be incorrectly predicted to occur.[5]

At this point, we seem to be at a loss, since most familiar theories of postlexical/phrasal phonology cannot account for the phenomenon of Vowel Assimilation in Lekeitio Basque. In the following section, however, we propose a solution to the problem which is based not on bare structural relations such as c-command, or left and right edges, but rather it is based on a consideration of the deeper syntactic relationships existing between the elements to which the rule applies.

3. A solution.

The basic claim on which we base our analysis is that verbal inflection in Basque is an element which needs to be syntactically licensed by another element, following an observation first made by Ortiz de Urbina (1993, 1994). This author notes that verbal inflection cannot appear by its own in a clause (cf. (15)), and it cannot appear in clause-initial position either (cf. (16)):[6]

(15) *d-it-u-t
3abs-abs.plur.-aux-1erg.sg.
'I have them'

(16) *da-tor etxe-ra gizona
3abs-come house-to man
'The man is coming home'

It is important to notice that the restriction on inflection holds of clause-initial positions, not of sentence or utterance-initial positions. A topicalised element preceding the verbal inflection does not prevent the derivation from being ungrammatical. We assume the commonly held view that topics are adjoined to the CP projection and do not occupy a clause-internal position:

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[5] Nespor & Vogel (1986:168) define the Phonological Phrase as a domain containing a lexical head X and all constituents on its nonrecursive side up to another maximal projection whose head is outside of the maximal projection of X. This would join into a phonological phrase a noun and a following adjective, since in Basque the nonrecursive side is the right side.

[6] There are a few verbs in Basque which can be amalgamated with inflectional morphemes, forming what have been named *synthetic verbs* in the Basque linguistic tradition. (24) contains an example of a synthetic verb.

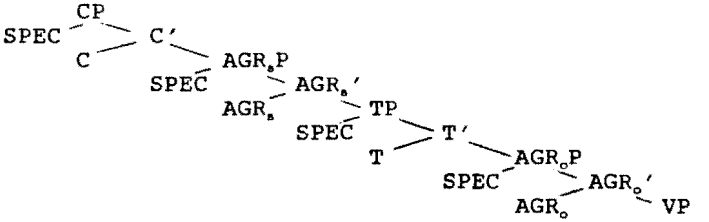
(17) *Gizona, dator etxera.
'As for the man, he is coming home'

In order for the derivations to be acceptable, insertion of the particle *ba-* is necessary, acting as a shield for inflection against the filter on clause-initial position:

(18) Baditut
(19) Badator etxera gizona
(20) Gizona, badator etxera.

Ortiz de Urbina finds an explanation to his observation in the minimalist program, the basic principles of which appear formulated in Chomsky (1992). In this approach to linguistic theory, inflectional morphemes are considered to be (bundles of) syntactic features (i.e., Φ-features, tense, aspect, mood, etc.), each of them located in the head of a different functional projection in the syntactic structure of a clause (cf. (21)). This means that the agreement and tense morphemes which appear in the verbal inflection in Basque (cf. 22) will be the heads of their own projections, i.e., $Agreement_{s(ubject)}Phrase$, $Agreement_{o(bject)}Phrase$, Tense Phrase (cf. Pollock 1989 for a primitive proposal along these lines):

(21)

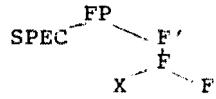


(22) Zu-k ni-ri liburua eman zen-i-da-n.
you-erg I-dat book give 2erg.sg.-aux-labs.sg.-past
'You gave me the book'

Chomsky suggests that the features located in these functional projections must be "checked" in the syntax by the elements which share these features or which are syntactically related to them. If the features match, the linguistic derivation will receive a coherent interpretation at the interface levels, the Phonetic Form and the Logical Form. If they do not match, the derivation does not "converge" at these levels and it "crashes". This process of feature-checking can be carried out by two different mechanisms: head-to-head incorporation or by a relation of Spec-head agreement. Thus, a lexical verb which is drawn inflected from the lexicon raises to the heads of the agreement and tense

projections, in order to check its features. On the other hand, the nominal phrases which share the Φ-features (i.e., agreement features) present in the verbal inflection raise to the specifier position of each agreement projection, to check their features with those located in the head of these projections. The elements in the specifier position of a functional projection and the lexical head incorporated onto the functional head in question conform what is called the *checking domain* of that functional head. This is illustrated in (23), where *F* and *FP* stand for a functional head and its maximal projection, respectively, and *X* stands for any head adjoined to *F* as a result of a process of incorporation:

(23)



Ortiz de Urbina (op. cit.) adopts the minimalist idea that all features must be checked or licensed somehow when he claims that the features in the verbal inflection must be licensed by a syntactic element in order for the derivation to converge at the levels of phonological and semantic interpretation. The lexical verb licenses the inflection by incorporating onto it in a head-to-head movement fashion[7,8]. The evidence for this incorporation process comes from the fact that a verb almost always appears adjacent to the inflection, even in those constructions in which there is movement of Infl to Comp, as in interrogative and focus constructions.[9]

With these theoretical assumptions in mind, the central point of my analysis is that the phenomenon of Vowel Assimilation in Lekeitio Basque is a phonological

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[7] To be exact, Ortiz de Urbina claims that it is the feature [Tense] that needs to be lexically licensed, but this point is not crucial to our discussion.

[8] An interesting point to discuss is why the lexical verb which appears fused in synthetic verbs cannot serve as a licenser (cf. (16), (17)). I will leave this matter open for further research. Also, for reasons of limit of space, I will not explain how the particle *ba-* or other particles (such as negation, i.e., *es*) and nominal phrases license Infl. I will simply refer the reader to Ortiz de Urbina's work.

[9] The only exception are negative clauses. For a discussion on this matter, see Ortiz de Urbina (op. cit.).

reflection of the syntactic relationship holding between a verbal inflection and the lexical verb which licenses it. In other words, I want to suggest that a phonological phenomenon of assimilation such as the one we are considering in this paper results from the degree of grammatical "closeness" existing between two elements, the idea being that the closer two elements are by virtue of their grammatical relationship (e.g., licensing, feature-checking), the easier it will be to observe phonological processes for which adjacency of some sort is required, such as assimilation, dissimilation, or deletion.

In fact, there is another phonological phenomenon in Lekeitio Basque which applies between a lexical verb and a following inflection which seems to support our argument: the deletion of the final *-n* of lexical verbs ending in this consonant when they are immediately followed by a vowel-initial inflection. This deletion process may feed VA:

(24) a. emon eban -> emo eban / emo oban
give infl
'(S)he gave it'
b. esan ebasan -> esa ebasan / esa abasan
say infl
'(S)he said them'

However, if a lexical verb ending in *-n* precedes another element apart from a verbal inflection, such as a causative verb, a modal particle, or a complementizer, no deletion occurs:

(25) a. emon eraiñ eutzan -> *emo eraiñ eutzan
give cause infl
'(S)he made him/her give it'
b. emon ete éban -> *emo ete éban
give modal infl
'Might (s)he have given it?
c. artun árren -> *artu árren
take despite
'Despite taking'

Interestingly enough, this correlates with the fact that no VA occurs between a lexical verb and these elements:

(26) a. Nok etorri eraiñ éutzan Mirenéri? (*etorri iraiñ)
who come cause infl Miren
'Who made Miren come?'
b. Prepara ete dau amak žatekúa? (*prepara ate)
prepare modal infl mother food
'Might mom have prepared the food?'

c. Suk amaitxu árren ... (*amaitxu úrren)
you finish despite
'Despite your finishing ...'

At this point, the parallelism with nominal contexts is revealing (cf. (1)), since VA also appears to apply between a lexical element (i.e., a noun or an adjective) and its inflection. Determiners in Basque bear the Φ-feature *number*, and morphemes marking *case* appear attached to it, as illustrated in (27):

(27) a. neska-ak*-k -> néskak 'the girls (erg.)'
girl-det.pl.-erg.
b. seme-a-ri -> semiari 'the son (dat.)'
son-det.sg.-dat.

Following current syntactic assumptions which conceive a determiner as a functional head with its own projection, like the different verbal inflectional categories (i.e., the Determiner Phrase; cf. Abney 1987), the generalization we obtain is that VA occurs between a functional category and a lexical element that it governs. If we assume that in Basque a lexical nominal head licenses the features in D^0 by raising to this head position (syntactically or phonologically), in a parallel fashion to a lexical verb incorporating to the inflectional heads, we observe that the domain of application of VA is precisely the checking domain of these functional heads (i.e., I^0 and D^0, cf. (23)).

Thus, the evidence presented from Lekeitio Basque suggests that in some languages a close morphosyntactic relationship holding between a lexical element and its governing functional category (e.g., feature-licensing or checking) has a reflection at the phonological level. In other words, the syntactic domain formed by these two elements can also constitute a domain at the Phonological Component, where certain phonological processes are observed to occur (e.g., Vowel Assimilation, *n*-deletion).

4. Conclusion.

In this paper we have discussed several possible ways to analyse the phonological process of Vowel Assimilation in Lekeitio Basque. The first observation we have obtained is that the basic postulates of Classical Lexical Phonology, and of some of its recent versions, are flawed, suggesting that morphosyntactic boundaries may remain visible at all levels of representation. We have also shown the inability of different theories of phrasal or postlexical phonology to account for the phenomenon presented, and we have provided a solution based on the observation that in order for the rule to apply between two elements there must be a syntactic

relation of licensing or feature-checking holding between them. Thus, our proposal argues against a conception of the Phonetic Form as "a representation in universal phonetics, with no indication of syntactic elements or relations among them" (Chomsky 1992:37).

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Auxiliary Selection in Greek Dialects

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1. Introduction*

In this paper I will consider some syntactic properties of perfect constructions in Cappadocian Greek. Cappadocian Greek is a dialect of Modern Greek spoken until 1922 in Eastern Turkey. Nowadays, speakers of this dialect are to be found in very diminished numbers in different regions of Greece, and some locations around the Black Sea. An interesting characteristic of this dialect, compared to other varieties of Greek is that in perfect tenses it invariably selects for the auxiliary *ine* 'be' with all kinds of verbs, instead of *eho* 'have' which is the auxiliary selected in almost all Greek dialects[1]. This feature of Cappadocian Greek, as well as other characteristics of perfect constructions in this dialect will be reviewed in section 2. In section 3, the essentials of Kayne's (1993) theory on Auxiliary Selection will be presented, as an introduction to sections 4 and 5, in which the facts presented in section 2 are analyzed along the lines of Kayne's approach. In section 6, some additional data, from a different dialect of Greek, Tsakonian, will be discussed. Our analysis of Tsakonian Greek will show that the basic assumptions involved in our description of Cappadocian Greek can be carried over to other Greek dialects. Finally, section 7 is devoted to the special problems related to tense in Cappadocian Greek perfect constructions. The analysis offered in this paper, if correct, provides evidence in favour of a bi-clausal treatment of auxiliary constructions, since it is shown that such treatment can deal with perfect constructions very different from the ones found in Romance or Germanic languages.

2. Perfect constructions in Cappadocian Greek.

In (1) some examples of sentences involving perfect tenses in Cappadocian Greek (henceforth CG) are presented along with their counterparts in Standard Modern Greek (henceforth SMG):

(1) Cappadocian Greek[2] — Standard Modern Greek

a. Ego psis dio avga iton
I bake-1st-sg-past-perf two eggs was
'I had baked two eggs'

Ego iha psisi dio avga
I had baked two eggs

b. *Ego psiniška dio avga iton
I bake-1st-sg-past-imp two eggs was

c. *Ego psino dio avga iton
I bake-1st-sg-pres two eggs was
'I have baked two eggs'

Ego eho psisi dio avga
I have baked two eggs

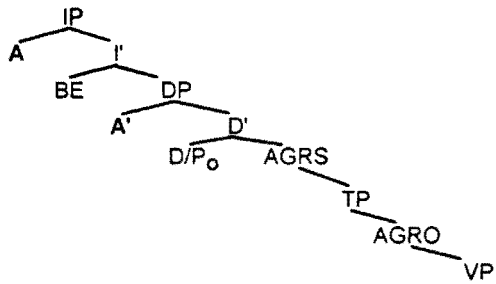
The first difference we note comparing CG and SMG perfect constructions is that of word order. Although both varieties are SVO, in CG, the auxiliary appears in sentence final position, while in SMG it always precedes the verb and its complements. Secondly, they select for different auxiliaries: SMG selects for *have*, and CG selects for *be* with all kinds of predicates. Third, in SMG the auxiliary *eho* 'have' shows number and person subject agreement, while in CG the auxiliary *ine* 'be' does not agree with the subject; it shows a default third person singular form in all occurrences. Instead of the auxiliary, it is the element corresponding to the English participle which agrees with the verb in person and number. Fourth, SMG and CG also differ in the form used in place of the English past participle. SMG uses an uninflected form[3], CG makes use of perfective inflected forms. The fifth characteristic distinguishing the two varieties of Greek is the defective nature of the perfect paradigm in CG. Although there is a form corresponding to the English or SMG past participle, CG lacks a present perfect form (cf. (1a) vs. (1c)). Perfects can be obtained not only in the past, but also in future or subjunctive. The relevant generalization seems to be that the form appearing in place of the English participle has to be a perfective verbal form, and perfective forms are only available for past and future/subjunctive.

In the following sections, I will analyze each one of the five points raised above. The theoretical approach to Auxiliary Selection I will assume is presented in Kayne (1993). It will be shown that CG perfect constructions are a possible output of the theory presented there, although Kayne does not treat any similar case in his comparative study of perfect constructions. There are, however, some properties of the construction under consideration (mainly related to tense) that don't follow directly from an analysis along the lines in Kayne (1993). I will propose independent explanatory devices based on a model of the syntax of tense developed in Zagona (1988, 1990) and Stowell (1993) in order to account for the defective nature of the perfect paradigm in CG.

3. Kayne's (1993) Theory of Auxiliary Selection

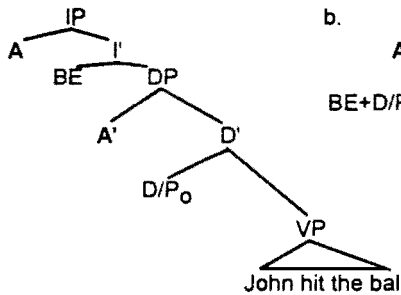
In this section I will consider some aspects of Kayne (1993) relevant to the data provided in section 2. Kayne (1993) postulates the existence of an underlying copula *be* in perfect constructions. Under his view, the copula *be* takes as complement a DP structure. This DP can in its turn contain a full sentential substructure with tense and agreement projections. The basic conceptual motivation for a DP projection is that a projection with AGRS as maximal node can never function as argument of a higher predicate without an additional projection, DP/CP. The crucial role in Auxiliary Selection phenomena is played by the DP projection roofing the participial clause. Spec DP is in principle an A' position, maintaining the parallelism of DP and CP, and movement from inside the participial clause to the specifier of DP, and finally to Spec IP, is ruled out as a case of improper movement in the state of affairs in (2):

(2)

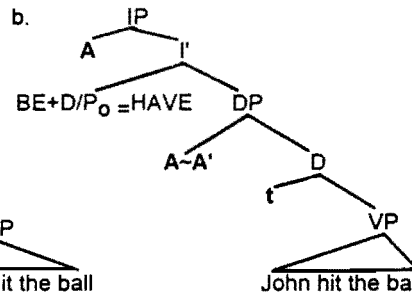


Certain languages like English and Modern Greek can raise their subjects to Spec IP by means of the process depicted in (3a, b, c):

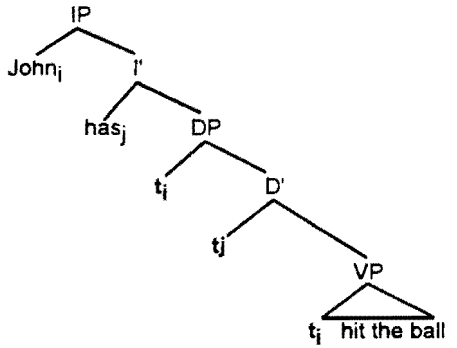
(3) a.



b.

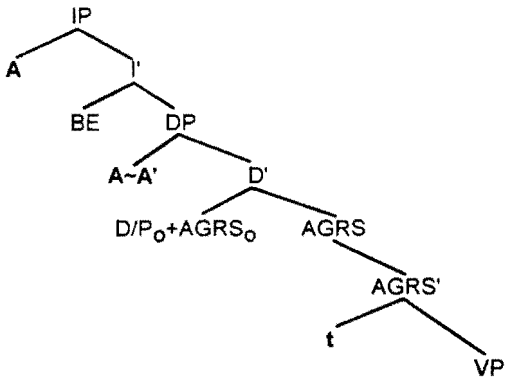


c.



The head of DP (a covert preposition) incorporates into *be*, forming a complex head BE + D/P_0 = HAVE, and switching the character of Spec DP from A' to A (3b). Thus, the NP subject can raise to Spec IP, (3c), and languages licensing the Spec IP position for the raising subject in this way show the surface form *have* as a result of the incorporation of the preposition heading DP into the copula *be*[4]. On the other hand, languages selecting *be* as auxiliary cab follow the way represented in (4):

(4)



A head from the lower sentential substructure, in this case $AGRS_0$, incorporates into the head of D/P, D/P_0, switching the character of the Spec DP position. In this case, the head D/P_0 does not incorporate into the copula (such incorporation is not needed in overt syntax, and by economy considerations we can assume that it does not take place), and the resulting auxiliary will be *be*. The derivation just described seems to

take place in certain Italian dialects in which 1st and 2nd but not 3rd person subjects can activate AGRS, when raising to Spec IP, yielding perfect constructions with *be* in 1st and 2nd persons, and *have* with 3rd person.

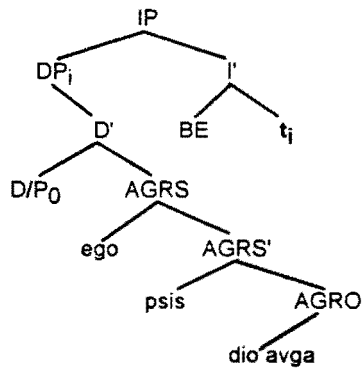
4. An account of CG perfects

The two cases described in the preceding section: incorporation of D/P_0 into *be*, and incorporation of $AGRS_0$ into D/P_0 are not the only possibilities. There is still more room for language variation in Kayne's (1993) framework. In the case of a language that, due to the lack of true participial forms, uses full inflected forms instead of participles, the different arguments, including the subject, would be licensed inside the participial DP. I will claim that CG is an example of such a situation. Consider the CG perfect sentence in (1), repeated here for convenience as (5):

(5) Ego psis dio avga iton
I bake-1st-sg-past-perf two eggs was
'I had baked two eggs'

Under the analysis in the previous paragraph, a structure like (6) is proposed for (5):

(6)



In (6) both arguments are licensed in the clausal structure contained in DP, and DP raises to fill the Spec IP position[5]. Assuming the structure in (6), most of the characteristics of CG perfects observed in section 2. follow in a straightforward manner:

a) word order facts: the auxiliary will appear in sentence final position, while the raised clausal DP will show the normal SVO order,

b) auxiliary selection: since nothing forces the change of Spec DP into an A' position, namely, there is no movement through this position, D/P_0 does not incorporate into *be*, and *be* is the auxiliary selected with all kinds of verbs,

c) agreement facts: auxiliaries will exclusively show third person singular agreement, since they agree with the DP raised to Spec IP.

5. Some additional evidence.

In section 2, I have listed the differences between perfect constructions in CG and SMG. I have attributed all these differences to the lack of a proper participial form in CG. If so, we would expect that CG has other constructions involving *be*, and showing similar syntactic behaviour. In fact, parallel constructions do exist. Consider, for instance, the example in (7):

(7) Kanis na ert de ne
Nobody subj. come-3rd-sg-pres not is
'Nobody is going to come'

illustrates a progressive construction with the same word order and agreement patterns as the perfect constructions examined above. The syntax of clitics in CG is also compatible with the analysis in section 4. Clitics appear normally to the right of the verb, (8a), except when the verb is negated or co-occurs with a modal particle (*na* for future/subjunctive); then, clitics appear to the left of the verb (8b):

(8) a. do neka t' hiorsen do do strata
the woman of-his saw CL-her in-the street
'He saw his wife in the street'

b. den do epe
not it said-he
'He didn't say it'

In perfect constructions, clitics don't climb up to the auxiliary, rather they are cliticized to the inflected verb, as it is shown in (9):

(9) a. To arni piasam do ton
the lamb catch-1st-plu-past-perf it was
'We had caught the lamb'

b. To arni na do piasum ton
the lamb subj. it catch-1st-plu-subj-perf was
'We should have caught the lamb'[6]

The behaviour of clitics indicates that the DP complement of *be* contains a fully inflected clausal structure, which bars the climbing of clitics up to the auxiliary. Finally, as it is shown in (7), NPIs can be licensed in the preposed DP, while the negation is attached to the auxiliary. This fact suggests that the raised DP is in a Spec-Head relation with the negative head (assuming the existence in Greek of a negative projection NEGP higher than AGRS, as in Agouraki (1992)). Or alternatively, if following Branigan (1993) we assume that the participial DP moves to an AGRCP projection located between C and AGRS in the matrix clause, in an instance of A' movement, then the NPI in the preverbal participial DP could be licensed through reconstruction.

6. Perfects in Tsakonian Greek.

The account I have offered for CG perfects relies on the existence of a clausal structure contained in DP. The role played by the different projections contained in DP, particularly AGRS, is also manifest in other dialects of Greek. I will consider briefly some data from Tsakonian Greek (henceforth TG, cf. fn 1). In TG, all imperfective indicative tenses are formed with the auxiliary *be* (*eni* and *eki* in (10)):

(10)

	Masc	Fem	Neut[7]
Present	eni oru	eni orua	eni orunta
	'he sees'	'she sees'	'it sees'
Past	eki oru	eki orua	eki orunta
	'he saw'	'she saw'	'it saw'

As shown in (10), the present participle of the verb *see* agrees in gender and number with the subject. Under Kayne (1993), *be* is the expected auxiliary, since AGRS is activated, as the agreement markers on the present participle prove. Perfect tenses in TG involve two auxiliaries:

(11) a. emi ehu ftate
am-I had-masc baked-masc
'I have baked'

b. emi eha ftate
am-I had-fem baked-masc

As illustrated in (11), the first one, *emi* 'I am', agrees with the subject in person and number. The second one is a past participle *ehu/eha* 'had' agreeing with the subject in number and gender. The second past participle, *ftate* 'baked', does not agree with the subject[8]. Again, the auxiliary surfacing as *be* precedes an agreeing participle, while *have* precedes a participle showing no agreement. These facts indicate that the activation of AGRS is related to the surfacing form of the auxiliary (cf. section 3). However, although TG data show clearly the relation between activation of AGRS inside DP and Auxiliary Selection, they also seem to pose a problem for the approach to Auxiliary Selection adopted here. Why is it precisely the first participle, *ehu/eha* 'had' in (11), the only one showing subject agreement, or put in other words, why is it the case that the main participle, *ftate* 'baked' in (11), doesn't show subject agreement? That past participles can agree with the subject in TG is shown in passives:

(12) a. eni ftate
is baked-masc
'He is baked'

b. eni ftata
is baked-fem
'She is baked'

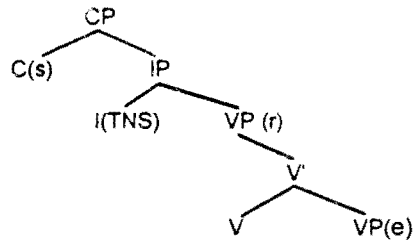
The answer to the above questions lies in the fact that the verb to *be* in TG, as in all dialects of Greek, is defective, lacking a past participle form (like *been*). Thus, the only possible derivation is the one in which the second auxiliary is *have*. In order to obtain *have* as the second auxiliary, the preposition in D/P_0 of the most embedded participle has to incorporate into the second auxiliary, and, as a consequence, the most embedded participle does not agree with the subject, given that such agreement would inhibit incorporation of D/P_0 into *be*.

7. Tense in CG perfects.

Finally, let us discuss the fifth property observed in section 2. CG does not have present perfect forms, while, as we have seen, perfect forms are available for future and past tenses. In some Italian dialects Auxiliary Selection is also conditioned by tense in a similar way: *have* is preferred in present perfect, and *be* in past, or future perfect. Kayne (1993) gives a tentative explanation to this sensitivity to tense parallel to the one proposed for the sensitivity to person (cf. section 3). The existence of a tense projection under DP is assumed; the head of this projection, T_0 , must raise into the matrix clause when the tense of the auxiliary is present, at least in some languages. This movement is potentially inhibited when D/P_0 has not incorporated to BE. Under the analysis developed here, in CG, no head raises from the DP up to the matrix clause. If raising of T_0 has to take place in present tense, there would be a way of explaining why there are no present perfect forms in CG. However, the reasons motivating the raising of T_0 up to the matrix clause, in general, and the obligatory raising of this head in present tense remain unclear.

I would like to relate the lack of present perfects in CG, to the fact that imperfective verbal forms are in general excluded from perfect constructions in CG (cf. (1)). CG has imperfective as well as perfective verbal forms for past, future and subjunctive. In present tense, only imperfective forms are available. Following Zagona (1988), I assume the predicative nature of tense, and the following argument structure for perfects:

(13)



Tense in I assigns an external *s* theta role (speech time), an *r* theta role (reference time) to the auxiliary VP, and indirectly an *e* theta role (event time to the participle VP. The relations among these temporal indices are ruled by general principles of binding theory. In terms of binding theory, perfective forms behave as r-expressions, while imperfective forms

behave as pronouns. The former cannot be bound by the speech time sitting in C, but the latter can, under certain configurations. Zagona (1990) shows the empirical consequences of the above distinction, comparing the readings that a present tense sentence can have in English and Spanish:

(14) a. Mary sings (only habitual reading)
[$_{CP}$ T_i [$_{IP}$ Mary [$_I$ (does)] [$_{VP}$ sing $*_{i/j}$]]

b. Maria canta (habitual and present moment reading)
[$_{CP}$ T_i [$_{IP}$ Maria [$_I$ canta$_i$] [$_{VP}$ e_i]]

The present moment reading is excluded in English because of the low position of the verb (it doesn't raise to I). T_i (the speech time) is outside the minimal governing category of VP, and T_i cannot A-bind the index inside the VP. On the other hand, in Spanish, verbs raise to I, and the minimal governing category for the chain is extended to CP, so V can be anaphoric to the temporal external argument, accounting for the present moment reading.

If the analysis developed here for CG perfects is correct, the situation concerning temporal indices has certain resemblances to the one in (14b). I have proposed that the whole DP raises to Spec IP in CG. Then, the configuration obtained is such that the event argument can be bound by the speech time if it is a pronoun, but not if it is an r-expression (perfective form), as it happens in (15):

(15) Ego psis dio avga iton
I bake-1st-sg-past-perf two eggs was
'I had baked two eggs'

[$_{CP}$ T_i [$_{IP}$ [$_{DP}$ ... psis $*_{i/j}$] [$_I$ iton] ...]

I tentatively propose that this is the reason why only perfective forms can appear in perfect constructions in CG. If we assume that the event argument cannot be bound by the external argument (speech time) in perfect tenses, the resulting configuration, after the movement of DP into Spec IP, is such that only r-expressions (perfective forms) are free with respect to the speech time. Being the only form available in present tense an imperfective one, presents will be excluded from configurations like the one in (15). This could explain the defective paradigm of perfects in CG.

8. Conclusion

I have shown that the syntax of perfect constructions in CG follows from a particular choice of lexical items; fully inflected verbal forms instead of participles. Both CG and TG show how Auxiliary Selection interacts with the activation of an AGRSP in the participial DP, giving support to the theoretical treatment of Auxiliary Selection in Kayne (1993). Moreover, the obligatory movement of the participial DP in CG indicates that the presence of a clausal subject is necessary for a phrase to converge at the PF interface (cf. Branigan (1993)). Finally, the defective character of perfects in CG (the lack of present perfect forms) has been derived from the distinct syntactic properties of perfective and imperfective forms.

NOTES

* I would like to thank Hilda Koopman, Anoop Mahajan, Dominique Sportiche and Tim Stowell for useful comments and discussion of the contents of this paper. I owe also thanks to the audience of WECOL XXIII for helpful suggestions and remarks. Of course, the usual disclaimers apply.

1. There are two interesting exceptions to this generalization. Greek dialects spoken in Southern Italy, as well as Tsakonian (dialect spoken nowadays in Eastern Peloponnesus) also select *be* in certain contexts. In section 6 of this paper, some aspects of the auxiliary system of the latter are examined.

2. CG data in this paper are from Dawkins (1916) and Kesisoglou (1951).

3. The grammatical status of *psisi* 'baked' in (1a, c) is unclear. SMG has no participles in passives, since verbs show passive inflection . On the other hand, participles usually found in adjectival passives like the one in (1):

(1) I patates ine psimenes
'the potatoes are baked'

are different from the forms used in perfects. Forms like *psisi* 'baked' are traditionally treated as infinitives for historical reasons. I will refer to them as infinitives. The exact status of these forms is not directly relevant to our discussion, and I will not consider it here.

4. Mahajan (1993) proposes an analysis of *have-be* selection as a subcase of split ergativity. Under his analysis, the source of the incorporating preposition is not D/P_0, but the raising subject itself. The preposition originates as a sister of the subject within the VP. This preposition can surface either incorporated into the auxiliary (*have* perfect constructions), incorporated into the participle (agreeing participles with *be*), or attached to the subject NP (Hindi ergatives in perfect constructions). My analysis of CG is neutral with respect to the two proposals about the origin of the incorporated preposition (Kayne

(1993) and Mahajan (1993)). In CG, the subject agrees with the main verb; thus, at some point of the derivation they fulfil the adjacency requirement on incorporation, necessary under Mahajan's proposal, and we can assume that the preposition sister of the subject NP has incorporated into the main verb, not into the auxiliary, yielding *be*. Note that under Mahajan's approach we are not lead to assume that Spec DP is an A' position.

5. Note that *ego* 'I' in (6) cannot raise further to Spec IP, because it has been assigned nominative case under AGRS. On the other hand, *pro* (CG is a *pro*-drop language) is excluded from Spec DP, since the subject *ego* 'I' cannot control *pro* in such a configuration.

6. (9a, b) are cases of Clitic Left Dislocation (CLLD). I am not going to consider here CLLD constructions in CG.

7. Tsakonian Greek data are from Aerts (1965) and Pernot (1934).

8. Although it can show optional object agreement, as in (1):

(1) a. emi ehu zeite/zeita tan eyiza
am have-past-part-sing-masc tie-past-part-sing-masc/fem the goat
'I have tied the goat'

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Case Spreading and Phrase Structure in Karitiana

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University of Pittsburgh

1. Introduction[1]

1.1. Objectives of this paper

In this paper I argue that case marking in Karitiana (K), an Amazonian language of Rondonia, Brazil (Arikem family, Tupi phylum) involves case *spreading*, a process first suggested in Yip, Maling, and Jackendoff (1987). I will argue that K case spreading cannot be accounted for by the traditional conceptions of case based on semantic roles, transitivity, ergativity, or argument structure. I also argue that K case spreading takes place at *Phonological Form* (PF; Chomsky 1981, 1992) in two environments: (i) between an overt host NP in the specifier position of the complementizer phrase (CP) and an AGR(eement) node cliticized to it and (ii) between an AGR node and a realis marker cliticized to that AGR. If this analysis is correct, then K case assignment cannot be accounted for by any current theory of case, because this case spreading is not related to semantic roles or grammatical relations. This analysis is important to theories of case for two reasons. The first reason is that it provides a new example of case marking extending the empirical scope of the optimal theory of case. Second, this analysis is important for a more theoretical reason: I will argue that case in K plays a role at the PF-interface (in the sense of Chomsky (1992), rather than merely at the semantic or LF (Logical Form) interface as is commonly assumed, at least in current Principles & Parameters theory (Chomsky 1986, 1991, 1992). Other contributions of this analysis to syntactic theory include the following: (i) it further supports the need to separate Case assignment from Case realization, as originally proposed by Chomsky (1986), in his theory of Case marking; (ii) it requires us to broaden our perspective on Case marking, to recognize that it may serve functions in addition to the commonly accepted one of rendering theta-roles visible at LF, namely, it may bear a *functional* role, helping speakers to keep track of the mood of utterances and of deviations from basic clausal constituent order via purely phonological form (PF) marking; (iii) it suggests that the autosegmental theory of Case marking developed in Yip, Maling, & Jackendoff (1987) might be understood as a mechanism of Case-realization rather than or in addition to Case-assignment.

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[1] This paper reports on work still in progress by the author. There is still much to learn about the facts of Karitiana Case assignment and I do not wish to appear here to be assuming that this analysis is final. The facts presented are, however, quite reliable, based on elicitation and natural, running texts, collected in corpora by David Landin, Rachel Landin, and Luciana Storto

1.2. Organization of paper

The exposition of these issues is preceded by first giving a brief overview of the Karitiana language and its surface syntax. This is followed by presentation of the Case Spreading and Case realization hypothesis. Some consideration of why this process should exist in K is given in this same section. Next, an alternative analysis of K surface Cases based exclusively on Chomsky's (1992) *Checking Theory* is considered and rejected, although it is noted that this theory might indeed work for Case assignment in K, if not for Case realization.

2. Karitiana surface syntax

2.1. Surface syntax[2]

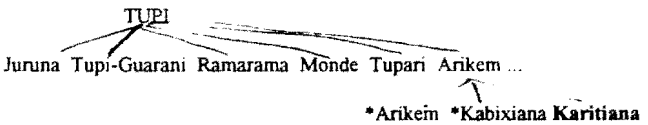
2.1.1. VP

According to R. Landin (1982), the most common and pragmatically unmarked word order in K texts (R. Landin (1982)) is SVO. If SVO also corresponds to the underlying order in the language, then VP is head-initial in Karitiana.

(1) sara ty naka -y -t taso aka
alligatory big realis -eat -tense man that
ERG
'The big alligator ate that man.'

(2) omaky na -oko -t moroja
jaguar realis -bite -tense snake
ERG
'The jaguar bit the snake.'

[2]Karitiana is a member of the Arikem family, Tupi stock:



There are approximately eighty speakers of K, living about fifteen minutes by single-engine aircraft from Porto Velho, Rondonia (approximately fifty miles), in northwestern Brazil. K has been studied by David & Rachel Landin of the Summer Institute of Linguistics and is currently the subject of dissertation research by Luciana Storto of Penn State University and the Museu Emilio Goeldi (Belem, Para, Brazil). The analysis presented in this paper is essentially a reanalysis of facts first discussed by David Landin in his M.A. thesis at University College London, under the direction of Geoffrey Pullum, although I have consulted Storto about the data. I have supplemented Landin's data with later data from texts collected and discussed by Rachel Landin.

These examples are unambigous and are much more common in texts than other word orders.[3] The most important fact here is the textual usage of this order as the unmarked order. The lack of ambiguity is itself not really an argument for basic or underlying word order since, as we see below, the correct interpretation is guaranteed by the ergative Case marking on the realis marker, **na-** (cf. the next section for a discussion of Case and the realis marker).

2.1.2. NPs and PPs

Both NPs and PPs are head-final:

NPs

(3) yjja naka -y -j [NP yj pikkom **pisyp**]
we realis -eat -tense [NP our monkey meat]
ERG
'We will eat our monkey meat.'

(4) opok na -tot -0 [NP i o]
Indian realis - remove -tense [NP 3SG head]
ERG
'The Indian removed his head.'

PPs

(5) owa na -ate -tysot pikkom
child realis -pull -aspect monkey
ERG
[pp i sypojo-**sok**]
[pp 3 tail -on]

---

[3] Storto (1993) disputes this, claiming that in her data SVO is one of the rarer orders. Storto lists the following frequencies for word orders for 62 sentences in natural occurring text which had overt nonpronominal subjects and objects:

VOS 27
OVS 13
SVO 9
VSO 9
SOV 2
OSV 2

Assuming that this is correct, it remains to sort out examples according to topicalization marking, WH-marking, other discourse functions, and stylistic factors. One can conclude from these facts, however, that word order in K is quite variable and that not all word orders which deviate from what Landin considers to be the basic word order (SVO) are simple topicalization structures.

'The child pulled the monkey by the tail.'

(6) 0 naka -tat -o [pp ga -p]
3 realis -go -tense [pp field -to]

'He went to the field.'[4]

2.2. Pronouns

K pronouns are listed in Table One.

TABLE ONE
Pronominal System of Karitiana
PREVERBAL FORMS:

	1S	2S	3S&P	1PIN	1PEX	2P
I. Subj./D. Obj	y	a	0	yj	yta	aj
T. Subj.	yn	an	i	yjja	yta	ajja

POSTVERBAL FORMS:

1S	2S	3S&P	1PIN	1PEX	2P
yn	an	i	yjja	yta	ajja

Notice that there are different forms of the pronouns for ergative vs. absolutive Case. These differences will be crucial for the remainder of this paper.

As indicated in TABLE ONE, pronouns may appear before and/or after the verb. The forms which appear after the verb are used for special emphasis. This pronoun doubling is referred to by Landin as *ambifixing*. According to Landin, in ambifixing, a pronominal which references the subject of the intransitive or the object of the transitive may be repeated immediately following the verb, for emphasis. As the examples below show, the Case of the postposed pronoun is always ergative, even though the Case of the coreferent pronoun which appears before the verb may be absolutive:

(7) Y taka -tar-i yn.
1SG realis-go -tense 1SG
ABS ERG

'I will go.'

[4] I realize that these 'postpositions' might be analyzed instead as Case suffixes on the noun. But since this is orthogonal to our present concerns, I will have nothing more to say about this possibility here.

(8) Yn a taka -mi -j an
1SG 2SG realis-hit-tense 2SG
ERG ABS ERG

'I will hit you.'

I will analyze these postposed pronouns as a case of FOCUS in the sense of Tuller (1992) (cf. also Horvath (1986) and Zubizarreta (1993)) in which the pronoun is generated in a preverbal FOCUS FC, with subsequent movement of the verb to a higher FC position.[5] This is not crucial to the present discussion and in fact it is difficult to test, since the phenomenon only occurs with pronouns. Apparently it is never possible to 'double' a full NP with a postposed, FOCUS pronominal. What is important here, however, is that the phenomenon of FOCUS or ambifixing indicates that ergative Case is the unmarked or default Case in the language, contrary to what is often though of with regard to ergative Case-marking systems. Further evidence for this assertion is found in the Case of the realis marker with a null, third person subject: as shown in the contrast between (9) and (10):

(9) Y ta -yry -t
1SG realis-arrive -tense
ABS
'I arrived.'

(10) 0 na -yry -t
3SG realis -arrive -tense
ERG
'He arrived.'

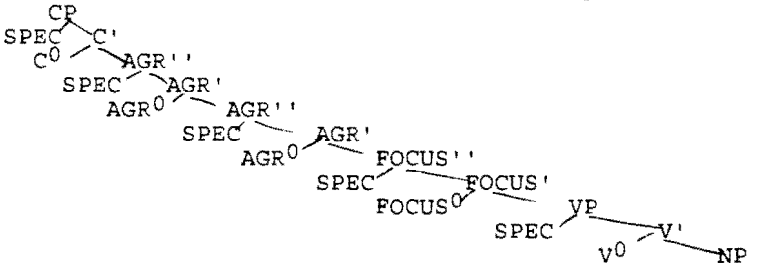
In (10), the realis marker **na-**, shows up in ergative Case because of the Case-Spreading rule to be discussed directly. **Na-** normally gets its Case from an overt, immediately preceding pronoun, as in (9). Since there is no such pronoun in (10), **na-** shows up in the default, ergative Case.

In addition to being able to appear in postverbal FOCUS position, pronouns differ from full NPs in at least two other ways: (i) only pronouns (and the realis prefix) show overt Case marking ; (ii) the position of pronouns in relation to the verb is fixed - they may only appear immediately before the verb in the order Subject-D.Object or immediately after the verb as just mentioned, the latter being

[5] The focused element must be immediately postverbal and is allowed to come between a verb and its object:
(i) yn naka -paka -j *yn* pykyp.
1SG realis-clean-tense 1SG clothes
'I will clean the clothes.'

possible only if there is a coreferent pronoun in the normal preverbal position. I take these facts to indicate that the pronouns are generated under AGR nodes, as a type of agreement, following Chomsky (1992) and Everett (to appear a & b). The sentential structure that I am assuming for K is that in (11):

(11) Karitiana sentence structure (simplified)



Pronominals are sets of *phi-features* stacked under FC positions, as argued in Everett (to appear a & b). As one hypothesis to account for the rigidity in word order, I will assume that pronominals are generated under the AGR nodes in (11).

If, however, the pronouns are in AGR positions, we might expect them to cooccur with NP arguments. The fact that they do not suggests that they are arguments, along the lines suggested in Everett (to appear b) or Jelinek (1984). Having outlined the basic facts of K phrase structure, I would like to turn now to consider the actual mechanisms of Case marking in this language.

2.3. Case marking

2.3.1. Case-assignment to NPs and pronominals

Following proposals in Everett (to appear b), I assume that absolutive Case in K will be assigned via coindexation of the internal theta-role and a *morphologically subcategorized* AGR position. Moreover, I will follow Chomsky (1992) in assuming that UG guarantees that the direct object will move into the lower AGR position and that the subject (SPEC of VP) will move into the upper AGR. The Cases that are licensed by this checking will be Absolutive and Ergative, respectively. This much is straightforward and is compatible with all of the data, modulo Case realization, which will be taken up directly.

Ceteris paribus, pronominals will surface with the Case associated with the AGR^0 position under which they are inserted. It only remains to discuss the Case marking of the realis marker and the rule of Case-Spreading.

2.3.2. Case of the realis marker

Case is assigned to the realis marker by an overt, phonologically adjacent pronominal or NP to its left. If there is no such nominal, the realis marker receives a default *ergative* Case. The realis marker is augmented by an additional syllable,

ka, just in case the verb root to which it is attached is stressed on its initial syllable. These possibilities are illustrated in (12):[5]

(12) iso naka -y -t saryt kerep Ohey.
fire realis -eat -tense hearsay long:ago Ohey
ERG
'The fire ate Ohey long ago.'

(13) yn na -oky -j soj̈a
1SG realis -kill -tense pig
ERG
'I will kill a pig.'

(14) y taka -tar -i
1SG realis -go -tense
ABS
'I will go.'

(15) a ta -oty -j
2SG realis -bathe -tense
ABS
'You will bathe.'

(16) ∅ na -oty -j
3SG realis -bathe -tense
ERG (default)
'He will bathe.'

Now we must ask an important question. If, as most principles & parameters theoreticians suppose, Case marking is motivated exclusively by the principle of *visibility*, why should a nonargumental, nonnominal, verbal prefix require Case? The answer I am going to suggest (howbeit speculatively at this point) is that Case may play a larger range of roles than previously imagined. In particular, I want to argue that in addition to its formal role in facilitating theta-role checking at LF, Case marking in K plays a redundant, functional role of showing two other facts about an utterance: (i) whether or not a predication has taken place and (ii) whether or not a CP-internal constituent has been fronted. I will address the relation of Case and realis marking first.

When the realis morpheme is present, it signals that a predication has occurred, i.e. that the action, process, modification, etc. of the predicate has been,

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This example indicates that Landin is mistaken, however, about the claim that ambifixing only affects objects or intransitive subjects.

[6] This example is interesting because it shows Case spreading from an NP, [sara ty] 'big alligator', to **naka** rather than merely from an adjacent N. This means that while Case spreading is phonological in some of its behavior, it is still crucially dependent on syntactic information

is being, or will be realized. When the realis prefix is missing, for example, tense marking is prohibited, except in yes/no interrogatives (see (29) & (30) below) and the interpretation of the sentence is usually negative:

(17) a. Ø na -oty -j
3SG realis -bathe -tense
ERG
'He will bathe.'

b. Ø oty
'He will not bathe.'

c. *Ø oty -j
d. *Ø na-oty

These examples show that the realis cannot occur without tense and tense cannot occur without the realis marker. The interpretation in (17b) is pragmatically induced, however, rather than being completely determined by the grammar per se. For example, in a few isolated examples in texts, one occasionally finds untensed, unmarked verbs with a positive reading:

(18) Mem 'He entered'

Moreover, K also possesses a negative morpheme, **ki**, which, according to Landin (1980, 23) is '... only attached to minimally expanded verb roots and to the conjunction **tykit** 'if'':

(19) a. a pyt'y tykit, y taka -tar -i
2SG eat if, I realis -go -tense
ABS ABS
'If you eat, I will go.'

b. a pyt'y **ki** tykit, y taka -tar -i
2SG eat **not** if, I realis -go -tense
ABS ABS
'If you do not eat, I will go.'

Without tense or realis marking the usual interpretation of a clause will be that the action represented by the verb never took place nor will take place nor is taking place. Examples like (18) are crucial in showing that this is largely a pragmatic fact. I want to claim that Case is marked on the realis morpheme merely to render it more perceptually salient. What such examples show us is that one of the roles of Case marking in K seems to be pragmatic. So if the realis marker indicates that a predication has occurred (or will occur or is occurring), then the Case marking of this marker redundantly specifies this.

To sum up: Case is marked on the realis morpheme. Since this morpheme does not bear a theta-role and since its Case is not therefore associated with any specific theta-role, Case-marking of this morpheme must be independent of theta-theory. Perhaps we might have some success in identifying the function of this unusual Case marking if we look at its effect. One effect is to render the realis morpheme more salient, i.e. easy to pick out from the rest of the (phonological at least) verb form. This salience could be useful since that morpheme is the interpretational nexus of the utterance.[7] Making it stand out more clearly better indicates whether or not a predication has taken place. By this analysis, Case would play a (redundant), *communicative*, non LF-related (and shallow) role, in addition to its normal role in theta-role checking at LF. Such redundancies are common in language, as in (20) and (21):

(20) Nos va-mos. (Portuguese)
1PL go-1PL
'We go.'

(21) That book of John's.

As further support for this proposal, consider data recently collected by Storto:

(22) taso na -oky -t ombaky
man irrealis-kill-nonfuture jaguar
ERG
'The man killed the jaguar.'

(23) taso ta-oky-t ombaky
irrealis
ABS
'The man killed the jaguar.'

These two examples are both grammatical. The second indicates a special focus on the event, e.g. if there were consequences of that event that might affect the hearer. Hence absolutive case may be used here as a form of admonition.

We now turn to consider additional evidence for the hypothesis that Case plays a functional role in Karitiana grammar, in conjunction with any formal role it might play.

[7] In future work I plan to explore the possibility that this might be an overt realization of the Predication Phrase suggested by Bowers (1993).

3. Topicalization and WH-movement

3.1 Topicalization

NP topicalization is marked syntactically, prosodically, and morphologically in K.[8] Syntactically, the topic phrase is placed at the very beginning of the sentence. Any other NP, such as the subject NP, must be place *after* the VP. Prosodically, the topic phrase is set off from the rest of the sentence by a clear pause and intonational break (cf. Storto, 1993). Morphologically, topicalized sentences replace the realis prefix on the verb with a **ti-** prefix (as do WH-movement phrases, cf. below). These facts are illustrated in (24) - (26) below:[9]

(24) mora, yjja **ti** -pyn
ball 1PL nondecl.-kick
'The ball, we kick.'

(25) seppa, yn **ti** -pa -tynh
basket 1SG nondecl.-weave-aspect
'A basket, I am weaving.'

(26) sosy, i **-ti** -oky porasi.
armadillo, 3SG-nondecl.-kill trap
'The trap killed the armadillo.'

What I am here calling the nondeclarative, **ti-**, can also be argued to mark the movement of material to the front of the clause I want to claim that this is indeed its principal function. If we assume that it marks the presence of material in the SPEC of CP, either a WH-word (cf. below) or a null operator, along lines

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[8] Landin (1980, 15) also discusses the topicalization of postpositional phrases, verbs, and embedded sentences, in addition to NP topicalization. Like NP topicalization, none of these other types affect the Case of the subject pronominal. Moreover, they all use **ti-**, and are set off prosodically just like NP topicalization.

[9] According to Landin (1980), this **ti-** topic marker is obligatory. However, Storto (1993) lists some examples in which the realis prefix occurs instead:

(i) Sal na -pitan ta'an opok.
salt realis-share evidential white man
ERG
'The white man shared the salt.'

However, it is not clear if these examples are truly topicalization or some other type of word-order alternation; as was noted earlier, K does have relatively free word order. Not all word-order permutations seem to fall under Topicalization or WH-movement and further study is needed.

suggested in Chomsky (1977) and much subsequent work. This would explain why only Topicalized and WH-movement sentences are so marked.

Note that the Case of the subject pronouns in these examples are all ergative, as would be expected, given their transitive readings. As we see in the next section, this is *not* the case for WH-movement sentences.

3.2. WH-movement

Like topicalization, WH-sentences are marked syntactically by placing the WH-element at the beginnning of the sentence and morphologically by **ti-**, although there is normally no pause inserted between the WH-word in sentence-initial position and the rest of the sentence. However, a very important difference between WH-movement and topicalization is that in the former, the Case of the subject pronoun is NOT preserved, if the WH-word binds an empty category in an argument position. These facts are illustrated in (27)-(30) below:

(27) moramon **a** **ti** -pa -tynh?
what 2SG nondecl.-weave-aspect
(**ABS**)

'What are you weaving?'

(28) moramon 0 **ti** -oky -tysyp?
what 3SG nondecl.-kill-aspect

'What is he killing?'

(29) morasog an **ti** -pa -tynh seppa?
why you nondecl.-weave-aspect basket
'Why are you weaving a basket?'

(30) morasog i **ti** -oky -tysyp sara?
why 3SG nondecl.-kill-aspect alligator
'Why is he killing the alligator?'

Evidence from yes/no questions also shows that the Case differences between WH-interrogatives and topicalization is not merely a fact about K moods:

(31) A tat-0 an ohy
2 go -tense 2SG question marker
'Did you go?'

(32) An 0 -oky -t sojja hy?
2SG it-kill -tense pig question marker
'Did you kill the pig?'

3.3. Analysis

Case is checked in Karitiana by the principle in (33):

(33) **K Case-checking**: The Case of an NP is checked in the syntax in SPEC of AGRP. Only Case-checked NPs have Case at LF.

I will also assume principle (34):

(34) **K Case-realization**: Case must be realized on all nominals and the realis marker by PF.

Notice that there is no provision for the assignment of Case to pronominals. If this is correct, then pronominals do not receive Case in the syntax. Therefore, assuming that these are indeed arguments as claimed above, we will assume that they satisfy visibility at LF via adjunction to V^0, as per Everett (1989; to appear b). But if Case on pronominals and the realis marker is not assigned/checked via SPEC of AGR position, some other mechanism must be responsible for the Case which is eventually realized on them. I want to claim here that this other mechanism is *autosegmental Case-spreading*, along lines suggested originally by Yip, Maling, & Jackendoff (1987):

(35) **Karitiana Case marking:**
(i) Check/assign Case as per (33) above.[10]
(ii) If any case is unassigned, assign it to AGRs from right to left (the order of Cases in
the 'Case melody' will always be ERG-ABS , following YM&J).
(iii) Spread Case from left to right to the realis marker from an overt nominal or to any pronominal from an overt NP.
(iv) Any designated item which fails to receive Case by assignment or Spreading receives a default Case.

Let's look again at some of the examples above to see how this works:

(36) [sara ty] naka -y -t [taso aka].
alligator big realis -eat -tense man that
ERG ABS

[10] These must apply in this order. One might explore the possibility that (33) above could be bypassed in favor of the simple statement: Assign Case to NPs, right to left. This latter statement would be more in the spirit of YM&J than the analysis of Case-checking, but it is not clear how that theory really accounts for the well-known facts about Case and NP movement that is captured by Chomsky's (1993) checking model. Therefore, I will continue to assume that Case-spreading properly applies only to Case-realization, not to Case-checking per se.

'The big alligator ate that man.'

(37) [omaky] na -oko -t [moroja]
jaguar realis -bite -tense snake
ERG ABS

'The jaguar bit the snake.'

(38) yjja naka -y -j [NP yj pikkom **pisyp**]
we realis -eat -tense [NP our monkey meat]
ERG ABS

'We will eat our monkey meat.'

(39) Ø naka -tat -o [PP ga -**p**]
3 realis -go -tense [PP field -to]
ERG (default)

'He went to the field.'

(40) ŷ taka -tar-i yn.
1SG realis-go -tense 1SG
ABS ERG (default)

'I will go.'

(41) Yn a taka -mi -j an
1SG 2SG realis-hit-tense 2SG
ERG ABS ERG (default)

'I will hit you.'

One might attempt an alternative analysis of these facts in terms of Case-checking/agreement, thus avoiding reference to the separate notions of Case-realization and Case-spreading (as one possible mechanism of Case-realization). However, this alternative will not work, as can be seen clearly via a consideration of examples like (27) & (32) above. In these examples, the elements 'agreeing' for Case bear different theta-roles (or one may not bear a theta-role while the other member of the pair does) and different speficifications for phi-features. The only

thing being shared by the relevant items is Case. They agree in nothing else. This alternative analysis also fails to account for the Case born by the realis marker or default Case. Since all of these phenomena are handled by Case-spreading and none by Case-checking, I will adopt the Case-checking analysis.

4. Conclusion:

4.1 The theoretical issue of Case/case[11]

Chomsky (1992) argues that the levels of *Phonetic Form* (PF) and *Logical Form* (LF) serve as interfaces between grammar and other cognitive systems. If we take this suggestion seriously, the question arises as to whether the principles which characterize PF and LF are disjoint or conjoint or even whether some components of grammar might have different functions at each of these interface levels.

For example, the phenomenon of Case/case, which has both syntactic and phonological properties, has long attracted attention from both formal and functionalist linguists.[12] Givon (1984) has referred to case as the 'heart of the grammar'. Chomsky has also attributed a great deal of importance to understanding the formal motivations and mechanisms of Case, although he has also argued that Case is required by and thus derivable from LF requirements on the checking of theta-roles. Assuming this latter view of Case to be correct, we are able to account for the role of Case at the LF interface level. However, it is not inappropriate to ask if this indeed exhausts the theory of Case. For example, could Case play a role at the PF interface level?

Consider what a positive answer to this latter question might mean. Among other things, it would have to mean that Case could add information irrelevant to LF interpretation. This is so PF is on the 'left side' of the grammar and LF cannot 'see' this side.[13] The information that might be provided by Case at PF could include rendering particular items or features more salient, enhancing the decodability of the message. That is, while the role of Case at LF would be strictly computational, providing nonredundant licensing of theta-Chains (cf. Chomsky

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[11] The differences in capitalization reflect theoretical conventions. The 'case' spelling refers to the traditional notion of morphological case endings, with some variations allowed. The 'Case' spelling refers to the abstract syntactic Case first proposed in GB theory in Chomsky (1981). However, these differences are not significant for the remarks I am making here, since these apply to either notion of C/case.

[12] Chomsky separates these phonological vs. syntactic properties in terms of Case-*realization vs.* Case-*assignment*, respectively.

[13] Where we are assuming something like the following:

(i)

(1992)), its role at PF might include communicative functions describable by the grammar but without a strictly grammatical/computational function. For example, it might add redundant information, mark items which do not need Case for LF purposes, or even obscure theta-role assignments, among other possible roles, in order to serve communicatively relevant functions.

While the above is largely speculative, the general line of investigation is suggested by the concept of *interface* given in Chomsky (1992).

4.2 Summary

In this paper, I have argued that Karitiana Case marking requires reference to both Case assignment/checking and Case-realization. I also argued that the mechanism for Case realization in this language is Case-spreading, along lines predicted by Yip, Maling, & Jackendoff (1987). What are the implications of this analysis, if correct? First, Case may be relevant at both the PF and LF levels, the 'interface' levels of Chomsky (1992). Second, if Case does hold at PF, it may indicate that PF can serve more than a merely interpretative role but also contribute directly to communicational needs, as opposed to purely computational requirements, by helping the hearer decode the utterance via redundant phonological information. This would be similar to cases of double Case marking or double agreement, as illustrated in (20) and (21) above. Finally, this analysis supports the contention that aspects of linguistic structure may function at both the computational and communicative levels simultaneously, in ways not previously recognized by formal grammars. Moreover, since this Case-spreading is a salient fact about K grammar, it cannot be avoided by formal theories but must be analyzed as formally specifiable, but not following from any exclusively compuational principle.

It is likely that this description does not cover the whole of Case in Karitiana, but it should serve as a starting point for further investigation and for more thinking about the possible functions of Case in grammar.

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Natural morphology, the bioprogram, and the origin of the article system

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1 Introduction

In earlier work (Faingold 1989, 1990, 1991, 1992a, 1992c, 1993c), I have studied natural phonological developments in child language, creolization, and history. This paper studies natural morphological processes (Mayerthaler 1981) in the emergence of the article system in these areas. It reveals possible correspondences in the acquisition (Bresson et al 1970, Brown 1973, Karmiloff-Smith 1979, Maratsos 1976, Warden 1976), creolization (Bickerton 1981, Faingold in press), and history (Faingold 1993, in press) of the definite and indefinite articles, with particular detail to Latin and certain Romance languages (e.g. Spanish, Portuguese, French, Rumanian), and their daughters (e.g. Haitian, Principe, Papiamentu, Palenquero creole, Judeo-Ibero-Romance, Fronterizo koine), English, English-based creoles (e.g. Hawaiian, Sranan), the classical languages (e.g. Latin, Greek, Hebrew, Arabic). These developments are explained by a universal hierarchy of markedness that reflects natural morphological processes.

2 Morphological markedness

2.1 A developmental model of markedness

This paper adopts Faingold's (1989, 1991, 1992a, 1992b, 1992c, 1993b, 1993c) model of markedness. The model is based on the theory of markedness elaborated by C. J. Bailey (1973, 1977a, 1977b, 1982, 1985, 1992) and his associates (Edmondson 1985, Mayerthaler 1981, Muhlhausler 1986) and aims to reveal universal mechanisms of language development as well as biological and sociocommunicational constraints on language variation and change. The approach takes into account child language, language history, pidgins & creoles, koines, etc. on the assumption that these are areas that closely reflect universals of markedness. This version of markedness theory explains possible changes as reflecting natural processes and is relevant for constructing implicational hierarchies (e.g. Bailey 1973, 1985, Keenan 1987). These hierarchies are used to test the hypothesis that less marked phonological (Bailey 1973, 1977a, 1985), as well as morphological (Mayerthaler 1981, Pishwa 1991), and syntactic structures (Hawkins 1988, Keenan 1987)

chronologically antecede or replace more marked structures. In certain cases, the directionality of change is reversed for sociocommunicational reasons (e.g. markedness-reversal, borrowing, etc.). In this framework assignment of markedness values is not arbitrary but the result of logically independent empirically based tests which capture significant relationships between phenomena which would be otherwise unrelated. I show that developments in the acquisition, creolization, and history of the article system are meaningfully accounted for by such model. Table 1 displays relevant areas and mechanisms of morphological markedness.

Table 1
A developmental model of morphological markedness
(Faingold 1992a)

(1)Identification of marked structures
(a)System-internal areas: first language acquisition
(b)System-external areas: (i)crossfield correspondences, (ii)frequency, (iii)neutralization, (iv)accessibility, (v)markeredness and constructional iconicity

(2)Mechanisms of morphological development
(a)Neurobiological mechanisms: (i)child's egocentrism, (ii)naturalness, (iii)grammaticalization
(b)Sociocommunicational mechanisms: (i)borrowing, (ii)decreolization

(1)Identification of marked structures
(a)System-internal areas: Language acquisition. This measure concerns the early availability of linguistic forms to the child. Markedness theory states that children select unmarked forms and omit or replace marked with unmarked structures. It assigns the feature marked to those structures that are acquired later by children such as indefinite articles corresponding to the first cardinal number, while the forms acquired earlier, such as definite articles corresponding to a demonstrative pronoun are unmarked, since English-, French-, and Hebrew-speaking children substitute the definite for the indefinite article to a very large extent (and not viceversa) (see Bresson et al 1970, Brown 1973, Karmiloff-Smith 1979, Maratsos 1976, Warden 1976, Zur 1983).

(b) System-external areas
(i) Crossfield correspondences: The study of language in all its aspects yields useful insights for an empirical definition of markedness as well as the identification of markedness values. If correspondences are found between implicational relationships and diverse linguistic fields, it makes sense to seek for a common explanation to account for developments in all domains. General principles are revealed in the search for crossfield correspondences; marked elements are less stable and usually change before unmarked ones; unmarked structures occur earlier in child language, creolization, and historical change. For example, as noted above, less marked zero indefinite articles occurs earlier in early child language, and creoles (e.g. Haitian, Principe - and, to a lesser extent, Sranan, Hawaiian, Papiamentu, and Palenquero [see Bickerton 1981, Bruyn 1993, Faingold in press]), as well as Classical Greek, Arabic, Hebrew, Rumanian, etc. than more marked indefinite articles corresponding to the first cardinal number in e.g., older children and adults, as well as modern English, French, Spanish, Portuguese, and Spanish/Portuguese koines (Judeo-Ibero-Romance, Fronterizo [see Faingold 1989, 1992b, in press]).

(ii) Frequency: Statistics are used as a discovery procedure, rather than as a conclusive test of markedness values. Unmarked forms are in many instances more widely distributed or frequent than marked terms both within and across languages. Yet, the form regarded as marked can, in certain cases, be more usual than the unmarked form, e.g. in the Russian word for 'wheel' the number of forms taking the singular and plural oblique cases exceeds the number of singular non-oblique cases (Bailey 1982). Statistics can conflict with markedness values (see, further, Faingold 1992a).

(iii) Neutralization: A distinction can be lost in a particular environment; the unmarked form survives, e.g. children neutralize the distinction between definite and indefinite article: The least marked definite article, as we have seen, survives.

(iv) Accessibility: Grammatical processes such as relativization apply first to less marked environments (e.g Subject NPs). The application of grammatical processes to a more marked environment (e.g Direct Object NPs) implies the application of the same processes to

less marked environments, and not viceversa (Keenan 1987).

(v)Markedness and constructional iconicity: An overt additional form is present. The more marked non-zero indefinite article is markered in English, Spanish, French, older children and adults by a form resembling the first cardinal number, while other less marked systems such as Rumanian, Hebrew, Arabic, Classical Greek, early child language have zero forms. These are instances of Mayerthaler's (1981) principle of constructional iconicity, that is, the addition of a mark-bearing element to the simpler form. The more marked form bears the marker and is said to be markered. But notice that markeredness and markedness are not synonymous; a structure can be marked but fail to be markered (e.g. English more marked plural **mice** vs. less marked singular **mouse** [both equally (un-)markered]).

(2)Mechanisms of morphological development
(a)Neurobiological mechanisms
(i)Child's egocentrism: Young three- and four-year olds fail to take into account the cognitive needs of the listener; they speak from their own point of view, showing a strong bias towards less marked definite articles (see Brown 1973, Karmiloff-Smith 1979, Piaget 1953).

(ii)Naturalness: Structures are considered more natural if they are less marked, and converesely less natural if they are more marked. The concept of markedness is formalized by Bailey (1982) as in (1) below:

(1)a >m ------> <m (the more marked changes to less marked)

(1)b >m >> <m (the presence of the more marked implicates the presence of the less marked)

Principle (1)a predicts that if X changes to Y, X is more marked than Y and Y is less marked than X. Principle (1)b defines the natural implicational patterns of the system. Principles such as (1) can be overruled under certain sociocommunicational circumstances, e.g. borrowing.

(iii)Grammaticalization: More marked new functions can be assigned to less marked old forms. A structure is

reanalyzed to cover a function lacking in the linguistic system. Thus demonstrative pronouns are firstly and universally grammaticalized into definite articles in, e.g., Vulgar Latin and spoken Finnish, as well as in in creoles. The first cardinal number is grammaticalized into an indefinite article only after the appearance of the definite article; in this sense, the grammaticalization of the indefinite article implies that of the definite article (see Faingold 1993).

(b) Sociocommunicational mechanisms
(i) Borrowing: Prestigious elements are borrowed in language history. These can be more, as well as less, marked (see Faingold 1992a, in press).

(ii) In decreolization, a creole borrows and integrates elements from its lexifier languages. For example, in Palenquero and Hawaiian, decreolization processes might have recently changed zero non-specific indefinite article into a more European-like nonspecific article corresponding to the first cardinal number (see Faingold in press).

2.2 The grammatical system

Bailey (1992) offers a systematic method for listing, classifying, and analysing linguistic data in terms of naturalness, yielding phonological, as well as morphological and syntactic hierarchies of markedness. Table 2 (next page) delineates Bailey's (1992) method for the study of grammatical systems.

Table 2 displays (1) a map of the data, (2) a list of the data, and (3) a classification of the data, yielding (4) an analysis of the data in terms of naturalness, i.e. a hierarchy of markedness.

2.3 The article system in developmental morphology

I apply further the model of morphological markedness discussed earlier to account for the development of the article system in child language, creolization, and history. I reveal a hierarchy of markedness that explains the development of the definite-non-definite, as well as the specific-non-specific, distinctions in terms of morphological naturalness, as well as biological and sociocommunicational mechanisms of development. Table 3 (next page) displays the article systems in child language, creolization, and historical change considered in this study (see references in Section 2.1).

Table 2
Listing, classifying, analysing, and system
(Bailey 1992)

(1) Data map

1: abce 5: abcd 8: a

2: a 6: ab 9: abcd

3: abc 7: abce 10: abc

4: ab

Data: a, b, c, d, e

(2) List

System 1 has abce
System 2 has a
System 3 has abc
System 4 has ab
System 5 has abcd
System 6 has ab
System 7 has abce
System 8 has a
System 9 has abcd
System 10 has abc

(3) Classification

	with e	without e
a		2, 8
ab		4, 6
abc	1, 7	3, 10
abcd		5, 9

(4) Analysis: The grammatical system

e/d >> c >> b >> a

(Notations: / "and/or"; >> "implies")

Table 3
The article system in child language, creolization, and history

	(dem)def	(0)indef	(card)indef	(0)nonsp	(card)nonsp	(0)def
(i)Child Language						
Stage 1	+	+	-	+	-	-
Stage 2	+	-	+	-	+	-
(ii)Creolization						
Haitian	+	+	-	+	-	-
Hawaiian	+	-	+	+	-	-
Palenquero	+	-	+	+	-	+
Papiamentu	+	-	+	+	-	-
Principe	+	+	-	+	-	-
Sranan	+	+	+	+	-	+
(iii)History						
Arabic	+	+	-	+	-	-
English	+	-	+	-	+	-
French	+	-	+	-	+	-
Fronterizo	+	-	+	-	+	-
Greek	+	+	-	+	-	-
Hebrew	+	+	-	+	-	-
J-I-R	+	-	+	-	+	-
V. Latin	+	-	+	-	+	-
Portuguese	+	-	+	-	+	-
Rumanian	+	+	-	+	-	-
Spanish	+	-	+	-	+	-

(Notations: + means that source is grammaticalized as definite/indefinite, specific/non-specific; - means it is not.

Table 4
A typology of article systems

	(dem)def	(0)indef	(card)indef	(0)nonsp	(card)nonsp	(0)def
(i)Child Language						
(1)Stage 1	+	+	-	+	-	-
(2)Stage 2	+	-	+	-	+	-
(ii)Creolization						
(3)Hawaiian	+	-	+	+	-	-
Papiamentu	+	-	+	+	-	-
(4)Sranan	+	+	+	+	-	+
(5)Haitian	+	+	-	+	-	-
Principe	+	+	-	+	-	-
(6)Palenquero	+	-	+	+	-	+
(iii)History						
(7)Stage 1						
Arabic	+	+	-	+	-	-
Greek	+	+	-	+	-	-
Hebrew	+	+	-	+	-	-
Rumanian	+	+	-	+	-	-
(8)Stage 2						
English	+	-	+	-	+	-
French	+	-	+	-	+	-
Fronterizo	+	-	+	-	+	-
J-I-R	+	-	+	-	+	-
V. Latin	+	-	+	-	+	-
Portuguese	+	-	+	-	+	-
Spanish	+	-	+	-	+	-

(Notations: + means that source is grammaticalized as definite/indefinite, specific/non-specific; - means it is not.)

Table 3 lists definite and indefinite (specific and non-specific) articles including (i) two child language systems, (Stages 1 and 2 respectively), (ii) creoles, and (iii) history. A close look at table 3 further suggests a typology of article systems in terms of the presence and/or absence of grammatical features such as (dem)def (definite article corresponding to a demonstrative pronoun), (0)indef (zero indefinite article), (card)indef, (an indefinite article corresponding to the first cardinal number), (0)nonsp (zero non-specific), (card)nonsp (non-specific article corresponding to the first cardinal number), and (0)def (zero definite article). Table 4 (next page) classifies the data in Table 3 in terms of a typology of article systems.

Table 4 displays eight article systems, including (i)two stages in children's development ((1) and (2)), four different types of creole systems ((3) to (6)), and two different stages of development in language history ((7) and (8)). The eight systems displayed in Table 4 can be further reduced into five linguistic systems, since (1) shares the features (dem)def, (0)indef, and (0)nonsp with (5) and (7), and (2) shares the features (dem)def, (card)indef, and (card)nonsp with (8). Table 5 displays a revised typology of article systems.

Table 5
A list of systems

System 1 ((1), (5), (7) in Table 15)
(dem)def (0)indef (0)nonsp

System 2 ((3) in Table 15)
(dem)def (card)indef (0)nonsp

System 3 ((6) in Table 15)
(dem)def/(0)def (card)indef (0)nonsp

System 4 ((4) in Table 15)
(dem)def/(0)def (card)indef/(0)indef (0)nonsp

System 5 ((2), (8) in Table 15)
(dem)def (card)indef (card)nonsp

Table 6 (next page) presents a hierarchy of markednes to account for the development of the article systems listed in Table 5.

Table 6
A hierarchy of systems

5 >> 4 >> 3 >> 2 >> 1

1 <m 2 <m 3 <m 4 <m 5

>> = implies
<m = less marked

The ranking in the hierarchy of markedness in Table 6 follows from the criteria for identifying marked structures and mechanisms of development in table 1. Table 7 displays the selected criteria for the ranking of the article systems.

Table 7
Markedness criteria

System 1
(i)First language acquisition
(ii)Frequency
(iii)Crossfield correspondences
(iv)Neutralization
(v)Constructional iconicity

Systems 2 to 4
(i)Constructional iconicity

System 5
(i)First language acquisition
(ii)Crossfield correspondences
(iii)Neutralization
(iv)Constructional iconicity

System 1 ((dem)def, (0)indef, (0)nonsp) is the least marked of all systems; the reason is that it complies with five criteria in Table 7 (see also Table 1):
(i)First language acquisition: System 1 is the first system acquired by children.
(ii)Frequency: this system contains the most intra- as well as inter- and cross-linguistic widespread structures ((dem)def, (0)indef).
(iii)Cross-field correspondences: The development of System 1 in history and creolization mirrors the early

acquistion of the same system in child language.
(iv)Neutralization: Children neutralize the indefinite (vs. the definite) article; the least marked definite form ((dem)def) survives.
(v)Constructional iconicity: This system is the least marked as well as the least markered of all article system, since it bears less markers than any other system in this study.

Systems 2 ((dem)def, (card)indef, (0)nonsp), 3 ((dem)def/(0)def, (card)indef, (0)nonsp), and 4 ((dem)def/(0)def, (card)indef/(0)indef, (0)nonsp), are ranked in this order according to the principle of constructional iconicity. System 2 is less markered than Systems 3 and 4, and System 3 is less markered than System 4. System 2 shows one more added marker than System 1 ((card)indef); System 3 shows yet one more added marker than System 2 ((0)def); and System 4 presents yet one more added marker than System 3 ((0)indef).

System 5 ((dem)def, (card)indef, (card)nonsp) is the more marked of all systems. The reason is that it complies with four criteria in table 7 (see also Table 1):
(i)First language acquisition: This is the last system acquired by children.
(ii)Cross-field correspondences: The development of System 5 in history mirrors the acquisition of this system by children.
(iii)Neutralization: Children neutralize the definite (vs. the indefinite) article; the more marked (card)indef dies out.
(iv)Constructional iconicity: System 5 is the more markered of all article systems, since it bears more markers than all the other esystems in this study.

System 5, however, fails the frequency test, since it is crosslinguistically very widespead (particularly in modern European languages). As I have shown earlier this is not a crucial test of markedness values. The reason is that sociocommunicational factors such as borrowing can interfere with the natural distribution of markedness values, yielding more, rather than less, marked structures.

3 Summary and conclusions

I have studied natural morphological processes in the development of the article system in child, language, creolization, and history. The study presented a deliberately integrative perspective, taking into account

seemingly disparate linguistic areas with the purpose of revealing universals of markedness. A model of morphological markedness has been proposed, one closely aligned with C. - J. Bailey's and W. Mayerthaler's theoretical views, as well as with Faingold's (1992a) study of emergent systems of phonology. This model relies on psycholinguistic studies of first language acquisition, as well as on work on language typology, variation, and change in creolization and history.

Biological mechanisms such as children's egocentrism, naturalness, grammaticalization, etc. support the hypothesis that less marked forms occur early, are less markered, are more resistant to change (e.g. neutralization), and are more natural. In contrast, in sociocommunicational mechanisms such as borrowing and decreolization, unmarked patterns can be reversed to form a less natural system. In certain cases, substratum and superstratum influences may tamper with the unidirectionality predicted by biological mechanisms of development; e.g. more marked acrolectal forms appear in Hawaiian and Palenquero creole; In other instances, sociocommunicational mechanisms yield less marked systems, e.g. Yoruba zero indefinite article in Haitian and Principe creole (see Holm 1988, Faingold in press).

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The Role of Semantic Argument Structure in Turkish Causativization

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It has been noted in literature on Turkish causativization (Zimmer 1976, Erguvanli 1979, Dede 1981, Knecht 1982) that certain predicates cannot be fully accounted for by the demotional hierarchy proposed by Comrie (1976). Comrie's approach is built on the assumption that causativization is a strictly syntactic process in which the subject of the base predicate (causee) is demoted to the highest-ranking available slot on the universal hierarchy subject > direct object > indirect object > oblique object > genitive. Turkish causatives indeed appear to follow this prediction with rewarding regularity. There are two common causative patterns, each with a characteristic expression of the causee. The 'intransitive' formula marks the causee with the accusative (1) and applies to predicates which do not have any argument expressed by an accusative NP.[1]

(1) Misafirleri çok bekletme![2]
guest-Pl-Acc much wait-C-Neg.Imp
'Don't make/let the guests wait too long!

The most salient feature of the other pattern, which I will call 'transitive', is that it puts the causee in the dative (2b) and the hierarchy tells us that it is the expected outcome for predicates which in the non-causative form (2a) have an argument marked by the accusative:

(2) a. Ersin mektubu yazdı.
Ersin-Nom letter-Acc write-Pst.3sg
'Ersin wrote the letter.'

b. Ersine mektubu yazdırdım.
Ersin-Dat letter-Acc write-C-Pst-1sg
'I had Ersin write the letter.'

The problematic cases concern multi-valent predicates with non-accusative arguments. According to the hierarchy, their subjects should surface in the accusative but these predicates show several causative patterns, only one of which conforms to the hierarchy. The following examples illustrate the range of case assignment possibilities which are in violation of the hierarchy. These involve dative-taking verbs such as *bak-* 'take care of' (3) or *telefon et-* 'call' (4), ablative-taking verbs such as *özür dil-* 'apologize' (5), and ditransitives (6):

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1 Unless specifically acknowledged otherwise, the data in this paper were elicited from three native speakers of Turkish from Istanbul, two female and one male.

2 Turkish has an array of causative morphemes (-DIr-, -t-, -Ir-, -Er-, -It-) and the selection of a particular form is determined by the morphology of the verb stem

(3) a. Anneme bebeğimi baktırdım.
mother-Poss-Dat baby-Poss-Acc take.care-Pst-1sg
'I had my mother take care of my baby.'

b. *Annemi bebeğime baktırdım.
mother-Poss-Acc baby-Poss-Dat take.care-Pst-1sg
I had my mother take care of my baby.'

(4) Ali'ye arkadaşıma telefon ettirdim.
Ali-Dat friend-Poss-Dat telephone do-C-Pst-1sg
'I had Ali call my friend.'

(5) Anne çocuğa öğretmenden özür diletti.
mother-Nom child-Dat teacher-Abl apologize-C-Pst.3sg
'The mother had the child apologize to the teacher.'

(6) Hasan'a suyu çorbaya kattırdım.
Hasan-Dat water-Acc soup-Dat add-C-Pst-1sg
'I had Hasan add water to the stew.'

The example in (3a) violates the demotional hierarchy in that both arguments of the base verb change their form, while the expected demotion of the base subject into the accusative is ungrammatical (3b). The dative-taking verb in (4) and the ablative-taking verb in (5) also skip the available accusative and select the dative instead (an instance of 'extended demotion', listed by Comrie as one of the exceptions to the hierarchy), but leave the second argument intact. Furthermore, the extended demotion in (4) results in the so-called 'doubling' on the dative (another acknowledged exception). Doubling also shows in (6), where both the causee and one of the non-subject arguments of the ditransitive base verb are in the dative.

Focusing on the dative-taking verbs, I will examine the deviant patterns and develop an analysis that will not need to treat them as unmotivated exceptions. The analysis will be based on the hypothesis that causativization cannot be a purely formal process, contrary to Comrie's assertion that 'there are languages like Turkish where semantic factors seem completely irrelevant to the expression of the causee' (1981:176). Comrie's exclusion of semantic factors is justified to the extent that they are understood as 'the degree of control' retained by the causee. This criterion indeed seems to be of little value in Turkish. It has been shown, however, that the semantic considerations relevant to causative processes in many languages have to do more with the semantic argument structure of the base predicates (Alsina & Joshi 1991, Fried 1992, Achard 1993) than with the admittedly rather vague notion of causee control, and I will show that this is true for Turkish as well. Specifically, I will argue that the selection of a particular surface case pattern is sensitive to the semantic role associated with the second argument of the base verb and that the dative expression of the causee is motivated by the semantics of the causative construction regardless of the case form of the second argument.

We find three patterns in the causativization of the dative-taking verbs: the intransitive formula with the causee in the accusative (7a), doubling on the dative (7b), and the transitive formula, which changes the form of both base arguments (7c):

(7)		**Non-causative:**		**Causative:**
	a.	Nom - Dat	->	Acc_{causee} - Dat
	b.	Nom - Dat	->	Dat_{causee} - Dat
	c.	Nom - Dat	->	Dat_{causee} - Acc

When we pair the causative patterns with particular predicates, we get roughly the following classes (the items in parentheses represent rather marginal occurrences not acceptable to all speakers; the list in (8a) is by no means exhaustive):

(8) a. **Acc - Dat**

bin-	'get on'	*yardım et-*	'give help to'
tırman-	'climb onto'	*telefon et*	'telephone'
hohla-	'blow air at'	*inan-*	'believe'
yaklaş-	'approach'	*bak-*	'look at'
pişman et-	'have regrets toward'	*başla-*	'start with/at'

b. **Dat - Dat**

vur-	'hit'
(*telefon et-*	'telephone')

c. **Dat - Acc**

bak-	'take care of'
başla-	'start'
(*inan-*	'believe')

Since all these predicates follow the same case assignment pattern in their non-causative form, their causative behavior raises two main questions: (i) why do some of them select the intransitive formula (8a), while others use some version of the transitive one with the causee in the dative (8b,c), and (ii), as a broader question concerning the application of the transitive strategy, why is the causee marked with the dative, even when it results in violating the formal hierarchy?[3] In answering the first question, I will consider the role of the semantic argument structure of the base predicate. With respect to the second question, I will appeal to the notion of causative construction as an idiosyncratic linguistic unit whose semantic and pragmatic requirements interact in specific ways with the semantics of the base predicate. This approach will help shed some light on the otherwise puzzling observations about the deviant patterns as well as provide a more complete picture of the regular cases.

As the lists in (8) show, the majority of dative-taking predicates follow the intransitive pattern. This behavior is predicted by the hierarchy but it can be justified on semantic grounds as well. Although the valence of the items in (8a) indisputably requires two arguments, their causativization is no different from verbs which only optionally take a second argument, such as *gül-* 'laugh (at)', *otur-* 'sit (onto)', *bagır-*

3 It is beyond the scope of this study to discuss case assignment in the non-causative forms, and it is not crucial to accounting for the causative data.

`shout (at)', *gir-* `enter (into)', etc. The latter all express a motion or action directed toward a goal, which is a role that Turkish regularly marks with the dative.[4] The optional goal of course does not interfere with the essentially intransitive nature of these verbs and therefore the causee surfaces in the same form (the accusative) as with truly one-place intransitive verbs:

(9) Bu misafirleri (birinci sıraya) oturmalıyız.
this guest-Pl-Acc (first row-Dat) sit-Mod-1pl
`We should have these guests seated (in the first row).'

The meanings of the predicates in (8a) point to the same configuration of semantic roles (<Agt, Go>), only the second argument is obligatory. In most cases the goal is interpreted in its literal locative sense (*bin-, hohla-, bak-*), and many predicates expressing certain mental attitudes (*inan-, pişman et-*) are also conceptualized as directed toward a target/recipient. As a result, these predicates can follow naturally the intransitive formula:

(10) Kocamı kediyi kurtarmak için bu ağaca
husband-Poss-Acc cat-Acc rescue-Inf for this tree-Dat
tırmandırdım.
climb-C-Pst-1sg
`I had my husband climb up this tree to rescue the cat.'

In contrast, the semantics of *vur-* `hit' in (8b) represents a different sort of relationship between its two arguments. It depicts a scene in which an agent not only directs its action toward a target but also has a definite effect on it, thus resembling semantically transitive predicates, which are associated with the argument structure <Agt, Pat>. Acting on this information (rather than simply on the surface form of the second argument), the causativization process then selects the transitive pattern, coding the causee in the dative:

(11) Ali'ye Hasan'a vurdurdum.
Ali-Dat Hasan-Dat hit-C-Pst-1sg
`I had Ali hit Hasan./ I had Ali hit by Hasan.'

The dative on the second argument is explained by the polysemy of the verb *vur-* which also means `shoot' in addition to `hit'. This difference in meaning is consistently marked by assigning the dative to the patient argument of `hit', including the passive (12b) as compared to the passive of `shoot' (12a):

4 The Turkish dative shows a familiar syncretism: goals , recipients, purpose, and relational entities in general (`with respect to', `in relation to'). The latter are characteristic especially of the targets of psychological states, attitudes, or judgment (cf. Dede 1981, Underhill 1990).

(12) a. Hasan vuruldu.
Hasan-Nom shoot-Pass-Pst.3sg
'Hasan was shot/*hit.'

b. Hasan'a vuruldu.
Hasan-Dat hit-Pass-Pst.3sg
'Hasan was hit/*shot.'

The distinction must be maintained in the causative as well, as illustrated by the comparison between (11) above and (13) below,

(13) Hasan'ı Ali'ye vurdurdum.
Hasan-Acc Ali-Dat shoot-C-Pst-1sg
'I had Hasan shot by Ali./ *I had Hasan hit by Ali./ *I had Hasan hit Ali.'

regardless of the fact that the causativization of *vur-* 'hit' inevitably results in two dative NPs and consequently also in relatively severe ambiguity noted in the English translation of (11).[5] If *vur-* 'hit' were to mechanically obey the demotional hierarchy, i.e., to code the causee in the accusative, the result would be intolerable homonymy between 'hit' and 'shoot' in their causative forms. The unexpected causative behavior of *vur-* 'hit' is thus due to maintaining the lexical meaning of the base verb and need not be regarded as an unmotivated exception. The dative form of the patient argument is simply part of the lexical entry for *vur-* 'hit' and cannot be tempered with. (I will return to the more problematic behavior of *telefon et-* 'telephone' as a marginal example of the double dative pattern after the predicates in (8c) have been discussed.)

The items in (8c) present a more puzzling case in that the forms assigned to the two base arguments seem in fact reversed. As far as the formal demotional analysis is concerned, the problem is that a verb which does not assign the accusative to any of its arguments follows the causative strategy normally found with nominative-accusative verbs. In order to at least describe the facts, the strictly syntactic approach would have to stipulate that the original dative must be first changed into the accusative and then the demotion may proceed as with regular transitive verbs. But there is no hope of explaining *why* the recoding of the second argument for the purpose of causativization should be necessary or even possible, especially since the same process does not apply to other dative-taking verbs. For a purely formal approach, the matter is further complicated by the fact that the two verbs in question (*bak-*, *başla-*) are actually associated with two different causative patterns - notice that these predicates figure both in (8a) and (8c).

In order to sort out these facts, we must start with the observation that each of the two verbs can be used in two different senses. Consider the following examples involving *bak-*:

(14) a. Resimlerine yarın bakacağım.
picture-Pl-Poss-Dat tomorrow look-Fut-1sg
'I'll look at your pictures tomorrow.'

5 The ambiguity in fact makes (11) only marginally acceptable. Not surprisingly, speakers prefer to use formally non-causative alternatives, such as directives with the verbs of speaking or ordering.

b. Yarın bebeğime annem bakacak.
tomorrow baby-Poss-Dat mother-Poss.Nom take.care-Fut.3sg
'Tomorrow MY MOTHER will take care of my baby.'

As already discussed, *bak-*$_1$ 'look at' in (14a) belongs to the <Agt, Go> class of predicates in (8a), expressing an action directed toward an unaffected target. The act of taking care, on the other hand, implies a certain degree of manipulation or direct control exercised by the agent over another entity which is thus presented as being more of an affected participant. The argument structure of *bak-*$_2$ 'take care of' (14b) is then more appropriately specified as <Agt, Pat>. Although the case assignment rule operating in non-causative sentences does not act on the difference in meaning (both senses of *bak-* mark the second argument in the dative), the causativization process seems to be sensitive to the subtle shift in meaning from 'look at' to 'look in order to take care of/examine' and applies a different formula to each sense:

(15) a. Çocuğu hizmetciye baktırdım.
child-Acc maid-Dat **look**-C-Pst-1sg
'I had the child look at the maid.'/*'I had the maid take care of the child.'

b. Hizmetciye çocuk baktırdım.
maid-Dat child-Acc **take.care**-C-Pst-1sg
'I had the maid take care of the child.'/*'I had the maid look at the child.'

(15a) follows the intransitive formula, as also predicted by the demotional hierarchy, whereas (15b) shows the typical transitive pattern exemplified in (2b) above; the pairings of *bak-*$_1$ or *bak-*$_2$ and a particular causative form are mutually exclusive, as indicated by the English translations. The differences in mapping between the available configurations of semantic roles for each meaning and the corresponding case forms in the causative sentences are shown below:

(16) a. *bak-*$_1$ 'look at' <Agt, Go> b. *bak-*$_2$ 'take care of/examine' <Agt, Pat>
| | | |
Acc Dat Dat Acc

An early attempt to approach these data on non-syntactic grounds is found in Erguvanlı (1979). While acknowledging that the difference in a particular causative strategy is necessary in order to maintain the semantic distinction between *bak-*$_1$ and *bak-*$_2$, her analysis rests on the assumption that semantic interpretation is determined by the discourse categories topic and focus. In order to explain the facts in (17) below, she explicitly associates topic with the accusative form,[6] and then any shift in topic

6 This assumption alone is enough to invalidate her analysis. In a typical Turkish sentence, the topic is sentence-initial and the focus occupies the immediately preverbal position. Neither position is inherently associated with any case form or functional category. The basic sentence structure of Turkish can thus be best formalized in terms of its discourse configuration: [[Topic] (...) [Focus] [Verb]]$_S$.

results in a different semantic interpretation of the NPs involved:

(17) a. *Onu dişlerime bakturdım. (p.93)
he-Acc tooth-Pl-Poss-Dat **take.care**-C-Pst-1sg
'I had him examine my teeth.'

b. *Kitaplarını bana bakturmadı. (p.95)
book-Pl-Poss-Acc I-Dat **look**-C-Neg-Pst.3sg
'He didn't let me look at his books.'

The non-occurrence of (17b) is thus attributed to the extremely low topic-worthiness of *kitaplarını* 'his books-Acc'. However, the sentence is odd semantically: if the verb is used in the meaning 'look at' (Erguvanlı's translation), the case assignment is in conflict with the mapping reserved for this sense of *bak-* (16a), forcing the following mapping instead (Erguvanlı thus contradicts her own assertion that each causative pattern is associated with only one meaning of *bak-*):

(18) *bak-*$_1$ 'look at' <Agt, Goal>
| |
Dat Acc

In order to make the distribution of case forms in (17b) work, the verb would have to be glossed 'take care of/examine'. We can of course question to what extent one is likely to utter such a sentence ('He didn't let his books to be taken care of/examined by me') but that is a matter of contextual plausibility, not a consequence of the inherent semantics of *bak-*$_2$ or discourse structuring.[7]

Even more significantly, Erguvanlı does not (and cannot) invoke the discourse-related explanation in accounting for the unacceptability of (17a). It would be difficult to argue that *onu* (or, for that matter, a full NP, such as *doktoru* 'doctor-Acc') cannot be a felicitous topic. Consequently, only the semantic criterion is supposed to apply in (17a), which should (and does) become perfectly acceptable if *bak-* is glossed 'look at' rather than 'examine/take care of'. The actual use of such a sentence is then again subject to contextual plausibility only.

A similar analysis applies to the different uses of *başla-* 'start'. It seems that the basic distinction in the conceptualization of the second argument observed with *bak-* is at work here as well. The far more common reading (*başla-*$_1$) can be glossed as

7 Speakers do differ in how much freedom they allow in ordering these NPs and thus the discourse structure is not entirely irrelevant. But it is not the primary factor in interpreting those sentences. While all my informants agree that the difference in meaning between causativized *bak-*$_1$ and *bak-*$_2$ is necessarily marked by the different mapping between the arguments of the base verb and the cases assigned by the causative construction, one informant (dialect B) seems to also prefer associating the causee with topicality by placing it sentence-initially, thus allowing only the order Causee-Patient (15b). Another speaker (dialect A), however, takes the difference in case assignment as sufficient and allows both the order in (15b) and its reverse (3a), with the causee in focus.

`start with/at' or `start V-ing' (8a); it presents the second argument as an unaffected target toward which the agent sets out to act. The significantly more restricted use (*başla-*$_2$) can be described as an extension of *başla-*$_1$ such that the target is directly manipulated and thus affected by the agent; I will gloss this meaning simply as 'start' (semantically transitive). When causativized, *başla-*$_1$ and *başla-*$_2$ follow the same mapping, respectively, as *bak-*$_1$ and *bak-*$_2$ shown in (16) above.

Unlike with *bak-*, however, where certain lexical items may be pragmatically implausible as a second argument with a given reading of the verb, as in the examples in (16), the issue of compatibility seems to be more directly connected with the inherent meaning of *başla-*$_1$ vs. *başla-*$_2$. Consider the following pairs of sentences:

(19) a. Coçuklarını okula başlattılar.
child-Pl-Poss-Acc school-Dat **start.with**-C-Pst-3pl
`They had their children start school.'

b. *Okulu coçuklarına başlattılar.
school-Acc child-Pl-Poss-Dat **start**-C-Pst-3pl
`They had their children start school.'

(20) a. Anneme sueteri başlattım.
mother-Poss-Dat sweater-Acc **start**-C-Pst-1sg
`I had my mother start the sweater.'

b. *Annemi suetere başlattım.
mother-Poss-Acc sweater-Dat **start.with**-C-Pst-1sg
`I had my mother start the sweater.'

Attributing the differences in acceptability simply to the distribution of topic and focus would again fail to capture the true nature of the problem. *Okula* in (19a) could be placed into the sentence-initial position without any change in case marking, thus becoming the topic (*Okula coçuklarını başlattılar*. `They had THEIR CHILDREN start school.'). It follows that (19b) is unacceptable not because *okul* `school' cannot be the topic but because the causative pattern forces the transitive reading of *başla-*. (19b) could only mean that the children were put in charge of making school start and not that they were made to start attending school. And yet, what we generally mean by `starting school' corresponds to the latter, not to the former interpretation.

The situation in (20) is slightly less clear-cut, which is reflected in less uniform speakers' judgments. The speakers of Dialect A (cf. Fn 7), represented by the facts in (20), make a solid distinction between starting school and starting something like a sweater. They quite clearly conceptualize the latter as a patient, an entity that is directly manipulated and affected by the causee (cf. also Dede 1981:44), thus necessarily treating *başla-* as semantically transitive in this context. For these speakers, the unacceptability of (20b) has nothing to do with discourse structure (*anne* is the topic in both (a) and (b)) or even contextual plausibility, but represents a clash between what it means to start making a sweater as a manipulative event and

what the form of the causative sentence suggests. Nevertheless, the shift from interpreting the second argument as a goal to interpreting it as a patient does not take place for all speakers. In Dialect B, (20a) is rejected in favor of (20b), thus keeping the causativization of both uses of *başla-* uniform (i.e. intransitive).[8] The shift in Dialect A, however, is not entirely arbitrary. It has some independent support in the behavior of the nouns in question with the genuinely one-place version of *başla-* `start':

(21) a. Okul dün başladı.[9]
school-Nom yesterday start-Pst.3sg
`School started yesterday.'

b. *Bu sueter dün başladı.
this sweater-Nom yesterday start-Pst.3sg
`This sweater started yesterday.'

While school, as an institution which operates according to its own internal rules, can be conceptualized as capable of starting on its own, things such as sweaters apparently cannot be attributed the same degree of independence. Instead, they require an agentive participant to bring them into existence, which is a property that makes them candidates for patienthood in a two-participant event.

It seems that a similar variability in conceptualizing the second argument could be responsible for the behavior of *telefon et-* (8b) and *inan-* (8c), especially since the differences in speakers' judgment are consistent with the general characteristics of the two dialects described in this paper. While both verbs are more commonly attested with the intransitive formula, Dialect A speakers, who show more sensitivity to the subtle semantic differences in the second arguments, also allow both verbs to be reanalyzed as semantically transitive in that the causee receives the dative. However, the reanalysis is not necessarily reflected in the case form of the second argument. While *telefon et-* preserves the dative on the second argument, as shown in (4) above, we find the typical transitive pattern with some uses of *inan-* (22a):

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8 Recall that it is also in Dialect B that the semantic manifestation of the distinction between *bak-*$_1$ and *bak-*$_2$ (cf. Fn 7) must be reinforced by a fixed discourse structure, whereas Dialect A speakers take the difference in the argument structure as sufficient. We can conclude, that Dialect B may have a stronger general tendency toward neutralizing subtle semantic differences between arguments in favor of applying more uniform, formally motivated surface patterns.

9 The causative form of this sentence may superficially resemble (19b):
(i) Okulu çocuklarına/çocukları için başlattık.
`We started school for their children./*We had their children start [attending] school.'
However, (i) represents a different argument structure, where the accusative marks the causee, as expected with one-place predicates, and the dative is an optional beneficiary. Consequently, the dative can be substituted by an *için*-phrase in (i) but not in the attempted transitive reading in (19b) above.

(22) a. Sözümü Ali'ye inandıramadım. (Erguvanlı 1979:94)
word-Poss-Acc Ali-Dat believe-C-Neg.Mod-Pst-1sg
'I couldn't get ALI to believe my word.'

b. *Allah'ı Ali'ye inandıramadım. (Erguvanlı 1979:97)
Allah-Acc Ali-Dat believe-C-Neg.Mod-Pst-1sg
'I couldn't have Ali believe in God.'

Erguvanlı attributes the contrast in (22) to the implausibility of Allah being the topic, but it is more likely that we are again dealing with a rather fine semantic distinction between different senses of the base verb: 'believe something' (a story, a promise, etc.) vs. 'believe *in* something' (God, power, etc.).

Erguvanlı's intuition that the choice of a particular causative pattern in the exceptional cases is motivated semantically is correct, but this motivation cannot be described in terms of discourse structuring. The basic premise of her analysis (the association of the topic with the accusative) is faulty, since topics in Turkish are associated with a position, and this association holds throughout the language. And her analysis cannot be extended to the problems of ditransitives, which also violate the formal hierarchy. I will argue that both the cases discussed above and the ditransitives can be accounted for by appealing to the same causativization mechanism.

Since ditransitives contain both an accusative and a dative NP in their non-causative form, the causee should be expressed by the oblique *tarafından*-phrase, in order to avoid any doubling. But it has been noted in literature (Comrie 1976, Zimmer 1976) and my corpus confirms it as well that sentences such as (23) are marginal at best (some speakers reject them outright),

(23) ?Hasan'a mektubu Ayşe tarafından gönderttim.
Hasan-Dat letter-Acc Ayşe by send-C-Pst-1sg
'I had the letter sent to Hasan by Ayşe.'

while speakers do produce and accept sentences with the causee in the dative:

(24) Ayşe'ye mektubu Hasan'a gönderttim.
Ayşe-Dat letter-Acc Hasan-Dat send-C-Pst-1sg
'I had Ayşe send the letter to Hasan.'

The two alternatives show in fact a certain regularity. First, it is important to note that the only interpretation available for (24) is one in which Ayşe is the causee and Hasan the recipient, not the other way around. Furthermore, given the role of word order in the distribution of discourse functions in the Turkish sentence, the difference between (23) and (24) seems to be related to the discourse status of the causee. The mapping patterns observed in the two sentences can be schematically summarized as follows:

(23') Topic Focus

<Rec, Pat, Agt>

Dat Acc *tarafından*

(24') Topic Focus

<Agt, Pat, Rec>

Dat Acc Dat

The immediately preverbal placement of the oblique phrase in (23) makes the causee the focus of the sentence. In contrast, when the causee is the sentence-initial topic, it must be marked by the dative (24).[10] The demotional hierarchy has of course nothing to say about these facts and yet they can be motivated quite easily if we consider the character of causativization itself.

This finally brings us to the broader question posed at the beginning, namely the interaction between the base predicate and the causative construction as a whole. The constructional analysis is based on the observation that within the *transitive* formula, we can identify two basic kinds of causative situations, depending on how the external causer effects the caused event (Shibatani 1976, Alsina & Joshi 1991, Fried 1992). I will refer to them as the Agentive Causative Construction (ACC), exemplified in (26), and Non-agentive Causative Construction (NCC), shown in (26):

(25) Ali Ahmed'e pencereleri açtırdı.
Ali-Nom Ahmet-Dat window-Pl-Acc open-C-Pst.3sg
'Ali had Ahmet open the windows.'

(26) Ali pencereleri açtırdı.
Ali-Nom window-Pl-Acc open-C-Pst.3sg
'Ali had the windows opened.'

Depending on which of the two base arguments (agent vs. patient) is given prominence in a given situation, one or the other causative construction is used: ACC centers on the intermediate agent that is the target of the external instigator's directive and that simultaneously carries out the directive. This pragmatic characteristic translates into the requirement that ACC has minimally an agent (the causer), supplied by the causative morpheme, and a recipient/target of the causer's directive. In contrast, NCC expresses a more direct relationship between an external causer and the ultimate undergoer of the caused event, thus making the intermediate agent less prominent and as such even dispensable. The linguistic form of NCC thus requires that there be at least an agent (the external causer) and a patient, i.e., the entity affected by the causer's intentions (notice the absence of any intermediate agent in (26) above).[11] The information about the minimal number and type of required

10 The order of the remaining arguments is flexible in either case and thus we could also get the order Pat/Acc - Rec/Dat - Agt/*tarafından* in (23) and Agt/Dat - Rec/Dat - Pat/Acc in (24).

11 The relative prominence of the object in sentences such as (26) as compared to (25) inspired the so-called passive analysis (Comrie 1976), roughly covering the data attributed here to NCC. However, the standard passive analysis assumes a formal relationship between

participants for each construction can be specified as the constructional valence, shown in (27) below. The prefix C- is to be read as 'constructional' and distinguishes the roles required by the constructions themselves from those associated with the causative and base predicates; the presence and form of any additional arguments depends on the argument structure of the base predicate and therefore is not part of the constructional valence:

(27) a. AC valence: <Agent, C-Recipient> b. NC valence: <Agent, C-Patient>

Each of the C-roles maps onto one of the arguments supplied by the base predicate, following mapping principles which are motivated by the semantics and pragmatics of each construction. The mapping rules can be summarized as follows:

(28) a. C-Recipient maps onto an agentive argument.
b. C-Patient maps onto a patient; the base agent becomes optional.

In order to satisfy the C-recipient requirement of ACC (28a), the base agent must be in the dative, regardless of the fact that the causativization of ditransitives results in doubling on the dative (24). On the other hand, the irrelevance of the base agent in ACC is usually indicated by coding it in a special form reserved for demoted agents, used both in the passive and NCC (e.g. the by-phrase in English, the par-phrase in French, the instrumental case in Kannada), or it remains unexpressed. Turkish overwhelmingly prefers the latter option, again both in the passive and NCC. The use of the tarafından-phrase, roughly equivalent to the English by-phrase, is rejected by speakers as very awkward, and for a good reason: the *tarafından*-phrase can only appear in the preverbal, focus position and yet, it is one of the defining properties of NCC that the base agent is irrelevant. The result is a clash between the semantics of NCC and the high-profile discourse function of the postpositional phrase.

The selection of a causative pattern with the dative-taking verbs is motivated by the interaction between a particular causative construction and the semantic argument structure of the base predicate, roughly along the parameter transitive/ intransitive. The semantically intransitive verbs (*bin-* 'get on', *yaklaş-* 'approach') simply use the intransitive formula with the causee in the accusative. However, predicates which show some degree of semantic transitivity (*bak-* 'take care of', *başla-* 'start') use the transitive formula, specifically ACC, which necessarily marks the causee by the dative, and often also adjusts the case marking on the second argument, analogically to the behavior of typically transitive verbs such as *aç-* 'open', *gönder-* 'send', etc. The distribution of the causative patterns found with multi-valent

passives and causatives and this assumption has been repeatedly attacked for a number of obvious weaknesses, which the constructional approach avoids: the causative shows no passive morphology, not all verbs that can causativize can form an independent passive, some languages express the demoted subject differently in each construction, etc. (Comrie 1976, Zimmer 1976, Alsina 1992).

predicates is summarized in the following table:

(29)

	transitive formula (ACC) (Dat-causee)	intransitive formula (Acc-causee)
high transitivity	√	--
lower transitivity	more likely	less likely
intransitivity	--	√

The analysis offered in this paper allows a more coherent view of Turkish causativization, incorporating naturally the forms that the strictly syntactic view must leave out as unmotivated exceptions. It is also superior to Erguvanlı's (1979) discourse-based treatment of the problematic data since it does not require any stipulation about the distribution of discourse functions. Finally, it contributes to our understanding of causativization as a more complex process than a simple demotion of the base subject.

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Nonstandard Chains and Principle B*

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1. Introduction

In this paper I want to demonstrate that both subjacency and proper head-government are relevant for the determination of disjointness domains for pronominal binding. I furthermore argue that these findings which are unexpected under classical binding theory can be accommodated if principle B of binding theory is replaced by a mechanism of maximal chain formation incorporating a proper head-government requirement. Locally bound pronouns lead to the formation of ill-formed chains, violating a condition on A-chains that disallows referential elements in non-head positions of a chain. This proposal is similar to one made in Reuland and Reinhart 1992, 1993. It differs crucially, however, in two respects: first, the claim that Principle B can be replaced by the mechanism proposed here, and second, that proper head-government of elements in the tail of a chain is required in chain formation.

I will show that this approach has both a larger empirical coverage and some conceptual advantages over a standard Principle B account.

In the first part of this paper I present data indicating that subjacency is relevant for the determination of disjointness domains and I will briefly introduce a nonstandard chain approach to principle B effects as suggested in Reuland and Reinhart 1992, 1993 which can account for these facts. The second part deals with evidence for the relevance of the notion of proper head-government for pronominal binding. The nonstandard chain approach is revised in this section, and includes a proper head-government requirement for elements in the tail of a chain. In the third section of this paper I present arguments against Reuland and Reinhart's 1993 claim that principle B is indispensable in grammar. I will conclude with some remarks on conceptual advantages of the approach presented here.

1. Subjacency and disjointness domains for pronouns

In classical Binding Theory the disjointness requirement for pronouns is captured in Principle B as in (1).

(1) "Classical" Binding Theory:
B: A pronoun is free in its governing category

The domain in which pronouns have to be A-free is defined along the lines of (2).

(2) Governing Category (Chomsky and Lasnik 1991)
The governing category for a is the minimal CFC which contains a, a governor for a and in which a's binding condition could, in principle, be satisfied.

In this approach the notion of Complete Functional Complex is at the core of what constitutes the domain in which pronouns have to be free. Closer examination of the relevant data, however, reveals a number of instances where other factors enter the determination of disjointness domains.

Consider first the case of adjunct PPs versus nonlocative and nontemporal complement PPs as in (3) and (4):

(3) (a) John$_i$ sees a snake near him$_i$
(b) *What$_i$ did John see a snake near t_i?
(4) (a) *John$_i$ turns a gun against him$_i$
(b) Who$_i$ did John turn a gun against t_i?

In (3a) the pronoun is contained in an adjunct PP, in (4a) it is contained in a complement PP. The former case is much more acceptable than the latter under binding of the pronoun by the subject. Note now the correlation between impossibility of wh-extraction from the adjunct PP in (3b) due to subjacency, and the possibility of pronouns and vice versa.

Specificity contexts illustrate a similar effect. As pointed out in Fiengo and Higginbotham 1981, specificity is relevant for both wh-extraction and pronominal binding. This is shown in examples (5) and (6)[1]

(5) (a) *John$_i$ read a book about him$_i$
(b) who$_i$ did you read a book about t_i?
(6) (a) John$_i$ read the book about him$_i$
(b) *who$_i$ did you read the book about t_i?

The nonspecific NP in (5) does not create a binding domain for the pronoun, therefore binding from the subject position of the pronoun in the NP is unacceptable. Wh-extraction from the NP is possible. In (6) the specific NP allows for binding of the pronoun by the subject, but it disallows for wh-extraction.

As in the previous examples, the generalization holds that impossibility of wh-extraction correlates with the acceptability of bound pronouns.

Diesing 1992 offers an account of specificity effects on wh-extraction in terms of subjacency. In her analysis, specific NPs carry presuppositional force. Presuppositional NPs have to undergo Quantifier Raising in order to be mapped into the restrictive clause of a tripartite quantificational structure. Quantifier-raised NPs are then taken to be islands for wh-chain-formation. Nonspecific NPs, on the other hand, can have either a presuppositional or nonpresuppositional reading, depending in part on properties of the selecting verb.

Again, there is a correlation between subjacency domains and the possibility of bound pronouns[2].

(7) (a)? John$_i$ saw many pictures of him$_i$
(b) Who$_i$ did you see many pictures of t_i?
(8) (a) ?John$_i$ saw three pictures of him$_i$
(b) Who$_i$ did you see three pictures of t_i?
(9) (a) John$_i$ saw every picture of him$_i$
(b) *? Who$_i$ did you see every picture of t_i?
(10) (a) John$_i$ saw each picture of him$_i$
(b) *? Who$_i$ did you see each picture of t_i?

In (7) and (8) NPs with weak determiners under a nonpresuppositional reading allow for wh-extraction and render binding of the pronoun by the subject less accceptable. In (9) and (10), the NPs under investigation have strong determiners, and the mirror-image situation obtains: wh-extraction is blocked, and binding of the pronoun by the subject is fine.

Diesing also discusses the influence of verb-classes on the presuppositional or nonpresuppositional reading of object NPs with weak determiners.

Consider verbs of creation first. They are incompatible with a preexistence presupposition for their objects because creation involves the bringing into existence of these objects. Therefore the NPs involved do not undergo Quantifier Raising and wh-extraction is possible since no subjacency violation arises[3]:

(11) What$_i$ do you usually write a book about t_i?
cf.: ??John$_i$ usually writes a book about him$_i$
(12) Who$_i$ do you usually draw a picture of t_i?
cf.: ??John$_i$ usually draws a picture of him$_i$
(13) Who$_i$ do you usually paint a picture of t_i??
cf.: ??John$_i$ usually paints a picture of him$_i$

In (11)-(13) wh-extraction is acceptable as in (7) and (8) above, and pronominal binding is illicit.

A contrasting class of examples is shown in (14) - (16), involving experiencer verbs. These verbs, according to Diesing, have the property of selecting for a presuppositional reading if an adverb of quantification is present. In other words, their objects have to undergo Quantifier Raising, and wh-extraction is therefore bad:

(14) *Who$_i$ do you usually like a picture of t_i?
cf.: John$_i$ usually likes a picture of him$_i$
(15) *Who$_i$ do you generally loathe a story about t_i
cf.: John$_i$ generally loathes a story about him$_i$
(16) *Who$_i$ do you usually appreciate a good joke about t_i?
cf.: John$_i$ usually appreciates a good joke about him$_i$

As expected by now, the corresponding cases with pronominal binding are acceptable.

Note finally that negation influences binding options of pronouns at least for some speakers as pointed out in Freidin 1986 (grammaticality judgements are his)[4]:

(17) *John$_i$ reads books about him$_i$.
(18) John$_i$ doesn't read books about him$_i$.

To summarize at this point, the generalization emerges that subjacency is relevant for disjointness domains and that wh-extractability and impossibility of locally bound pronouns correlate in a range of constructions. This is completely unexpected under the approach to disjointness in Binding Theory. It would merely be a stipulation to claim that specific NPs constitute Complete Functional Complexes, while nonspecific NPs don't. Furthermore, a stipulation like this would fail to account for the correlation between non-extractability of wh-elements and the possibility of bound pronouns.

Consider now an analysis involving a mechanism of maximal chain formation[5]. Reuland and Reinhart 1992, 1993 suggest that a mechanism of maximal chain formation which incorporates locality conditions will form chains containing a pronoun and its antecedent provided no barrier intervenes between the two. A chain containing a pronoun in its tail will then violate a wellformedness condition on A-

chains. This opens the possibility for a principled approach to the facts mentioned above.

I will assume that the relevant notion of locality is the one proposed in Rizzi 1990, namely Relativized Minimality. The definition of (maximal) chain formation to be used in this paper is given in (19) below[6]:

(19) Chain Formation: (to be revised)
C = (a_1 ....a_n) is an X-chain, where X = A or A' iff
(i) for $1 \leq i < n$, a_i is the local X-binder of a_{i+1}, and
(ii) for $1 \leq i < n$, no barrier intervenes between a_i and a_{i+1}, and
(iii) C is maximal

Condition on A-chains (Reuland and Reinhart 1992):
(20) An A-chain is headed by a unique referentially independent NP

The joint effect of (19) and (20) is that pronouns and their local binders which are not separated by an adjunct or minimality barrier will form an A-chain that violates condition (20), resulting in ungrammaticality. Nonlocal binders, that is binders that occur outside of syntactic islands will not be integrated in one chain with the bound pronoun, due to the condition (ii) in the definition of chain formation. I propose that a revised version of (19) in conjunction with (20) can in fact replace principle B of the Binding Theory.

Consider how this works in examples (3a) and (4a).

(3a) contains a pronoun inside of an adjunct PP. Chain-formation can not form a chain containing both the pronoun and its antecedent because an adjunct-barrier intervenes between them. Both the pronoun and the antecedent end up in independent A-chains, and the structure is wellformed.

In (4a), on the other hand, the pronoun is contained in a complement PP. No barrier intervenes between the pronoun and its antecedent. Since they are coindexed, chain-formation builds a maximal chain containing both the pronoun and its antecedent. This chain is in violation of the Condition on A-chains in (20), since the pronoun as a referential element ends up in the tail position of the chain.

With respect to the specificity effects under Diesing's analysis, there are a number of nontrivial questions to address. Since LF-raising creates the subjacency domains, chain formation will have to be restricted to LF, otherwise it would create illformed chains at S-structure, where the relevant NPs are still in situ. Furthermore the exact nature of the LF representation has to be worked out, a task that goes beyond the scope of this paper.

One remark is in order at this point, however: note that one could argue that due to raising of the definite NPs containing the pronoun to a VP-external position, the pronoun might simply be outside of the scope of the subject NP (if e.g. adjoined to IP). This seems to be perfectly compatible with a standard principle B approach. There are immediate problems with this assumption, however: pronouns, as definite expressions, presumably have to raise to VP-external position as well (Diesing and Jelinek (work in progress)). In the LF-representation of a sentence such as (21) below, the pronoun will be IP-adjoined then, and therefore is also outside of the scope of the subject NP:

(21) *John$_i$ likes him$_i$

Note also that the ungrammaticality of (21) cannot be attributed to the fact that the proper name is bound by the pronoun at LF where the IP-adjoined pronoun c-commands the subject because then ungrammaticality should also arise in (22):

(22) John$_i$'s father likes him$_i$

While I am not able to solve these issues here, the claim that I want to defend is that if Diesing is right in attributing the wh-extraction contrasts to subjacency, the mirror image data with pronominal binding are unlikely to be caused by an independent factor.

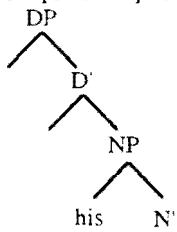
To summarize, I have pointed out that subjacency enters the determination of disjointness domains for pronouns. This is unexpected under a standard concept of Binding Theory, but it can be explained under chain formation in conjunction with a wellformedness-condition on A-chains as proposed in Reuland and Reinhart.

2. The relevance of head-government for disjointness domains

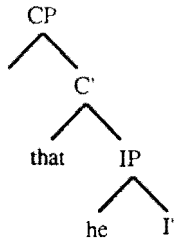
Consider now the case of possessive pronouns and pronouns in the subject position of a tensed complement clause as in (23) and (24).

For the sake of concreteness, I adopt the structural representations shown next to these examples[7].

(23) John$_i$ likes his$_i$ book



(24) John$_i$ thinks that he$_i$ is smart



Nothing in the analysis proposed above predicts the acceptability of these examples: the pronoun in both cases is not separated from its antecedent by syntactic barriers and it should therefore end up in an illformed chain with its antecedent.

Note now that what these two structures have in common is that the pronoun is not properly head-governed in these two structures. Neither I nor N can serve as proper head-governors for the specifiers of their projections. The functional heads D and C respectively are not proper head-governors either. I will therefore assume that it is exactly this lack of proper head-government which blocks the application of chain-formation in these examples.

With this fact in mind, consider the locative PP-complements in (25) and (26):

(25) (a) John$_i$ put a book behind him$_i$
(b) ??who$_i$ did John put a book behind t$_i$?
(26) (a) ??John$_i$ put a scarf around him$_i$
(b) who$_i$ did John put a scarf around t$_i$?

Contrary to the claim in Hestvik 1991, pronouns in locative PP-complements do not seem to behave uniformly. There seems to be a contrast in the two examples in (25a) and (26a). Interestingly, this contrast again is mirrored by wh-extraction data in (25b) and (26b). If this contrast is real, it cannot be attributed to any property of the PP-projection. In both cases the locative PP is a complement, and nothing indicates any possibility of differences in barrierhood of this PP or differences in semantic content of the prepositions involved. If, on the other hand, lexical items within one lexical class can vary with respect to their capability of proper head-government, and if proper head-government of a pronoun determines whether chain formation can integrate it into a chain with its antecedent, the data in (25) and (26) are less mysterious.

A stronger point can be made on the basis of cross-linguistic variation. Zribi-Hertz 1980 has observed that French pronouns within prepositional phrases can be bound by the subject of the clause - contrary to predictions made by the Binding Theory.

(27) Victor$_i$ croit en lui$_i$
Victor$_i$ believes in him$_i$
"Victor believes in himself"
(28) Victor$_i$ est pour lui$_i$
Victor$_i$ is for him$_i$
"Victor is for him"
(29) Victor$_i$ est fier de lui$_i$
Victor$_i$ is proud of him$_i$
"Victor is proud of himself"
(30) Victor$_i$ met le livre devant lui$_i$
Victor$_i$ put the book before him$_i$
"Victor put the book in front of him"
(31) Marie a parlé à Victor$_i$ de lui$_i$
Marie has talked to Victor$_i$ of him$_i$
"Marie has talked to Victor about him"

Note in particular that this holds for locative and nonlocative complement PPs, as well as adjunct PPs. These facts are hard to capture under an analysis such as that of Hestvik 1991 which makes a fundamental distinction between PPs of independently theta-assigning prepositions and those of non-independently theta-assigning

prepositions. In Hestvik's analysis PPs headed by independently theta-assigning preposistions are Complete Functional Complexes; in other words these PPs act as disjointness domains for pronouns. In the French examples (27), (29), and (31), however, the preposition is clearly not an independent theta-assigner since it is selected by the verb. Nevertheless the pronoun in French can be bound by the subject of the clause in these examples. If the plausible assumption is made that French prepositions in general cannot function as proper head-governors, the facts follow without unwarranted stipulations[8].

Consider now a final version of chain formation which incorporates a requirement of proper head-government for non-heads of chains.

(32) Chain Formation
C = (a_1 ....a_n) is an X-chain, where X = A or A' iff
(i) for $1 \leq i < n$, a_i is the local X-binder of a_{i+1}, and
(ii) for $1 \leq i < n$, no barrier intervenes between a_i and a_{i+1}, and
(iii) every a, $a \neq a_1$ is properly head-governed, and
(iv) C is maximal

To see how this final version works, take examples (24), (27), and (29) and the A-chains formed there by chain-formation.

In (24) the pronoun is the subject of a complementizer-introduced finite clause. Therefore it is not properly head-governed by either I or C. As a result, it can not be integrated into an A-chain with its antecedent. Two independent A-chains are formed, and the structure is grammatical.

In (27) the possessive pronoun is not properly head-governed by the determiner, and therefore it cannot be the tail of a chain, hence it can freely be bound by the subject.

The same basic situation obtains in the French example (29). Under the hypothesis that French prepositions are not proper head-governors the pronoun in (29) will not be incorporated in the same chain with its antecedent, resulting in acceptability of the seeming "local" binding relation.

Consider a pronoun in the subject position of an ECM-construction next:

(33) *John$_i$ believes him$_i$ to be smart

The pronominal ECM subject in (33) is properly head governed by the matrix verb. No barrier intervenes between it and its antecedent, so an illformed A-chain including the pronoun and its antecedent is formed, resulting in ungrammaticality.

Note also that those instances where the correlation between wh-extractability and impossibility of locally bound pronouns breaks down, namely in extraction from subject position as in (34) below, can be attributed now to differences in head-government:

(34) a.) Who$_i$ do you think [t'$_i$ [t$_i$ saw this movie]]?
b.) John$_i$ thinks [[he$_i$ saw this movie]]

In (34a), under Rizzi's 1990 analysis, the functional head C is turned into a proper head-governor under Spec-head agreement with the intermediate trace of the wh-movement. This option is, of course, not available in (34b), where no such intermediate trace in the specifier position of CP exists. Consequently, both (34a)

and (34b) are wellformed: (34a) because wh-extraction creates the configuration in which proper head-government of the subject trace obtains, and (34b) because the pronominal subject is not properly head-governed.

3. Is there independent evidence for principle B? Reuland and Reinhart's 1993 arguments

Reuland and Reinhart 1993 argue that while principle B and their nonstandard chain approach to pronominal binding overlap in their effects in some cases, there still is a need for principle B as an independent condition of grammar. In this section I summarize their arguments, and I suggest that, contrary to their claim, principle B is redundant as far as pronominal binding is concerned, given the formulation of chain formation proposed here.

Consider first the binding principles as formulated in Reuland and Reinhart 1993:

(35) A: A reflexive-marked syntactic predicate is reflexive
B: A reflexive semantic predicate is reflexive-marked

Their definitions of reflexive-marked, reflexive, syntactic predicate, and semantic predicate are given below:

(36) A predicate is reflexive iff two of its arguments are coindexed.
(37) A predicate P is reflexive-marked iff either P is lexically reflexive or one of P's arguments is a SELF-anaphor.
(38) The syntactic predicate of (a head) P is P, all its syntactic arguments and an external argument of P (subject).
The syntactic arguments of P are the projections assigned Theta-role or Case by P.
The semantic predicate of P is P and all its arguments at the relevant semantic level.

Reuland and Reinhart list a number of cases that are excluded by either their nonstandard chain approach or their version of principle B in (35), but not by both. These cases provide evidence for the independence and non-redundancy of the two grammatical devices. Since I will try to show that principle B is redundant under the formulation of chain formation proposed here, only the examples that are claimed to be excluded by principle B in (35) but not by a nonstandard chain approach are relevant.

Consider first the anaphor zich in Dutch. Reuland and Reinhart classify zich as a referentially dependent element without a reflexivizing function. In other words, not being a SELF-anaphor, zich cannot reflexive-mark a reflexive predicate as required by principle B in (35). Consequently, zich can only appear in the object position of inherently reflexive predicates and in positions where it does not constitute a coargument of a semantic predicate. In the former position its inability to reflexive-mark the predicate is irrelevant because an inherently reflexive predicate is already intrinsically reflexive-marked according to (37), and therefore principle B is satisfied. In the latter positions principle B cannot apply to zich since its application domain is restricted to semantic predicates and their arguments. Note now that because of its referential dependency zich is not affected by the wellformedness condition on chains (20). Therefore, the distribution of zich is solely a matter of

principle B in (35) which forces a reflexive semantic predicate to be reflexively-marked.

Reuland and Reinhart's argument based on the distribution of zich clearly indicates the need for a condition to cover the distribution of zich-type anaphors versus SELF-anaphors. It is - considering only this one argument for the moment - less clear, however, that this condition should be related to pronominal binding facts. To put it differently: only if it can be demonstrated that Reuland and Reinhart's version of principle B in (35) is also relevant for the distribution of pronouns can the claim be maintained that it is a grammatical condition with some generality outside of the empirical domain of the distribution of anaphoric elements. In the remainder of this section I will examine Reuland and Reinhart's claims to the effect that pronominal binding effects cannot be completely derived from chain formation and the wellformedness condition on A-chains in (20).

Reuland and Reinhart point out that where semantic predicates and syntactic predicates do not correspond to each other, principle B applies to semantic predicates whereas nonstandard chains are formed on the basis of syntactic predicates. As a result, semantic predicates which do not correspond to syntactic predicates are the exclusive domain of principle B. Two examples provided by Reuland and Reinhart are the "picture noun" cases in (39), and the sentences in (40) involving prepositional phrases[9]:

(39) a.)Lucie$_i$ saw a picture of her$_i$
b.) *Lucie$_i$ took a picture of her$_i$
(40) a.) Max$_i$ rolled the carpet [over him$_i$]
b.) *Max rolled the carpet$_i$ [over it$_i$]

Rejecting an analysis involving an NP-internal PRO in (39), Reuland and Reinhart suggest that the ungrammaticality of (39b) results from the fact that the agent role of picture is controlled by the subject of the sentence. Although this agent role is not expressed syntactically, it is present on the relevant semantic level. Therefore the noun picture is reflexive at that level, Pbut in violation of principle B not reflexive-marked. Reuland and Reinhart also claim that no chain can be formed between the antecedent and the pronoun in (39b).

While a complete treatment of picture-noun examples is beyond the scope of this paper, note that (39) could also be analyzed along the lines suggested by Diesing 1992. The indefinite picture-NP allows for both a presuppositional and a nonpresuppositional reading. A perception verb like see allows for both these readings, while a verb of creation like take a picture is incompatible with the presuppositional reading, precluding LF-raising of its object. Therefore only the former (marginally) allows for binding of a pronoun in the NP, and this marginality disappears if a definite NP is used which mandatorily undergoes LF-raising:

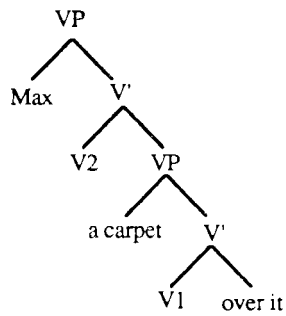
(41) Lucie$_i$ saw the picture of her$_i$

Consider now the examples involving prepositional phrases in (40) above. According to Reuland and Reinhart, these examples do not involve a small clause structure, and the reason for the ungrammaticality of (40b) is that an implicit argument of the preposition over is controlled by its antecedent. As a consequence the preposition in (40b) forms a reflexive semantic predicate, which is not licensed by a

reflexive-marker. Again, they assume that no chain can be formed between the pronoun and its antecedent in the ungrammatical cases.

While I cannot offer a complete alternative, I would like to point out that examples like this could be subjected to a Larson-style analysis. If Larson 1988 is right, an example like (40b) involves an empty VP-shell, and the arguments are arranged as in (42) below, with the verb having raised from V_1 to V_2.

(42)



Note now that in this structure chain formation will result in a chain <a carpet, it> (provided the preposition in this structure is a proper head-governor, which is likely because the NP-complement of the preposition can be wh-extracted). This chain violates the wellformedness condition on A-chains. Chain formation between the subject and a pronoun in the prepositional phrase is blocked, however, because of the intervening A-specifier the carpet.

Another example where Reuland and Reinhart claim that due to a mismatch between syntactic and semantic predicates only principle B is applicable involves conjoined and plural NPs as in (43)

(43) a.) *Max$_i$ criticized Lucie and him$_i$
b.) *We voted for me

Reuland and Reinhart's claim is that here chain formation is inapplicable, because the conjoined NP in (43a) and the plural NP in (43b) do not bear the index of the pronoun. Chain formation in (43a) can not integrate Max and him into a chain, and in (43b) chain formation cannot access the subject we since we and me do not bear identical indices. While this is certainly true under a standard notion of chain, a different picture emerges once the findings of Baker 1992 are taken into account. Baker argues that overlap in reference is not a purely semantic relationship, but that it needs to be represented in syntax. He adduces evidence from Mohawk, where chains can be formed on the basis of overlap of reference, and not - as in standard cases - identity of reference. If this analysis is adopted, the syntax-semantics mismatch which motivated the nonapplicability of chain formation in sentences as (43a) and (43b) above disappears, and these sentences can be analyzed as involving chain formation with overlapping plural indices.

Finally, Reuland and Reinhart claim that there is a distinction between the degree of deviance induced by a violation of their principle B and a violation of the wellformedness condition on A-chains. Generally, they argue, principle B causes

weaker violations than the wellformedness condition on A-chains. It seems, however, that this statement is undermined by a number of counterexamples to the extent that it loses its validity as an argument in a fundamental issue such as the distinctness of two grammatical conditions. Consider the following examples involving overlap in reference which - according to Reuland and Reinhart - can only be explained on the basis of principle B:

(44) *They$_{i,j,k,l}$ saw him$_i$
(45) *Bill$_i$ and Mary like him$_i$

It seems that the degree of deviance of these examples perfectly matches the degree of deviance of examples where both Reuland and Reinhart's principle B and the wellformedness condition on A-chains are relevant such as (46) below:

(46) *Bill$_i$ likes him$_i$

Similar observations can be obtained from example (40b), repeated below:

(40b) *Max rolled the carpet$_i$ [over it$_i$]

Again, the strong unacceptability of this example is unexpected, because it is only a principle B violation under Reuland and Reinhart's analysis.

To conclude this section, I have shown that there is no compelling reason to assume that principle B exists as an independent and nonredundant principle, and I suggested that alternative analyses of the "pure" principle B effects can be pursued. The remaining argument for the independence of principle B provided by Reuland and Reinhart is the one regarding the distribution of the anaphor zich in comparison to the distribution of SELF-anaphors. Hence it seems safe to conclude that whatever the condition is which is relevant for this difference in distribution, it need not be linked to the distribution of pronouns.

4. Summary and Conclusion

To summarize, I have proposed a notion of chain-formation that incorporates both a locality requirement and a requirement on proper head-government of non-heads in a chain. This general chain-formation mechanism in conjunction with a general wellformedness constraint on A-chains as proposed in Reuland and Reinhart 1992, 1993 allows to cover disjointness domains for pronouns that were unexpected under a standard formulation of principle B in Binding Theory. I have also argued that this nonstandard chain approach can replace principle B entirely.

Finally, I would like to point out two additional advantages of this approach.

First: with the elimination of principle B grammar does not contain any "anti-locality" conditions any more. In other words, grammatical principles and constraints uniformly determine local relations, and not anti-local ones.

Second: the relative uniformity of principle B effects across languages is expected under the analysis suggested here. Variation is expected to be limited to differences in proper head-government and subjacency domains.

* I am very grateful for valuable comments I received from Heles Contreras, James Lyle, the participants at a University of Washington syntax seminar and the WECOL conference audience. Errors are my own.

1 The judgements are from Freidin and Higginbotham. My informants judged sentences such as (5a) as marginal, but not as downright unacceptable.

2 The judgements here are Diesing's. My informants had consistently stronger judgments; for them (7a) and (8a) are worse than indicated by Diesing.

3 The judgement of the pronominal binding data in examples (11)-(16) is by my informants. Diesing 1992 does not consider the binding facts reported here.

4 In these cases parallel wh-extraction cases cannot be constructed, because it is typically adjunct-extraction which is affected by "weak" negation islands, and adjunct extraction from NPs is bad for independent reasons.

5 Chain formation is, of course, not a new concept. Similar proposals can be found (among others) in Chomsky 1981, 1986 and Rizzi 1986. For an analysis of properties of parasitic gap constructions under maximal chain formation see Gamon 1991.

6 I chose this formulation from Gamon 1991 because it is more explicit than the one employed by Reuland and Reinhart 1992, 1993. Empirically, however, there are no differences as far as I can tell.

7 I follow Giorgi and Longobardi 1991 with respect to the structure of the object NP in (23). Note that even if one assumes with Abney 1987 and Stowell 1989 that the possessor is in SpecDP, a chain formation analysis can be maintained: whatever factor is held responsible for the nonextractability of possessors in English can also be held responsible for the failure of chain formation between a possessive pronoun and its antecedent. Stowell 1989, for example, suggests that a referential projection (DP) is a barrier to antecedent-government of its specifier position. The same barrier would then block chain formation involving the possessive pronoun in SpecDP.

8 For an argument against an alternative solution where French lui is taken to be ambiguous between an anaphoric and a pronominal reading see Zribi-Hertz 1982.

9 The judgements here are Reuland and Reinhart's, but note that (39a) is standardly judged to be quite marginal (see section 1).

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Mapping Halkomelem Causatives

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1. Causatives[1]

In morphological causative constructions in Halkomelem, a Salish language of southwestern British Columbia, the causative suffix can be added to a verb base to yield a causative form, as in (1).

(1) ʔiməš-stəxʷ 'make (s.o.) walk', nəʔém-əstəxʷ 'make (s.o.) go; take', ʔəmət-stəxʷ 'have (s.o.) sit down', ʔəmʔí-stəxʷ 'make (s.o.) come; bring', qaʔqaʔ-stəxʷ 'have (s.o.) drink'

The verb bases in (1) are intransitive, and thus are used in clauses with one argument, such as (2):

(2) ni ʔiməš tθə swiwʔləs
aux walk det boy
'The boy walked.'

The causative form commonly appears in a transitive sentence, where the causer is the first argument and the causee is the second argument, as in (3) and (4).

(3). ʔi cən ʔiməš-stəxʷ tθə swiwʔləs
aux 1sub walk-cs+tr+3obj det boy
'I made the boy walk.'

(4) ʔi ʔəmʔi-sθámʔš-əs θə sɬéniʔ
aux come-cs+tr+1obj-3erg det woman
'The woman made me come.'/'The woman brought me.'

As in many languages, the Halkomelem causative is severely constrained as to what other types of morphology can appear inside and outside it. In the discussion below, I give data showing the distribution in (5):

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[1]Thanks to Cliff Burgess and Charles Ulrich for comments on a draft of this paper. This research was supported by a SSHRC grant.

The Halkomelem data are from the late Arnold Guerin, a speaker of the Island dialect. My fieldwork on Halkomelem was supported by the Canadian Consulate, the Jacobs Research Fund, the Phillips Fund, and the National Museum of Man. The data are presented in standard Northwest orthography. I do not mark stress when it falls on the first syllable of a word. The following abbreviations are used in glossing the data: *aux* auxiliary, *ben* benefactive, *cs* causative, *det* determiner, *erg* ergative, *intr* intransitive, *l.c.* limited control, *obj* object, *obl* oblique, *ref* reflexive, *sub* subject, *tr* transitive, *1* first person, *2* second person, *3* third person.

(5)

	Inside Causative	Outside Causative
Transitive	no	yes
Passive	no	yes
Antipassive	yes	no
Reflexive	yes	yes
Applicative	no	no

If a theory of morphosyntax seeks to account for Halkomelem and other languages with a similar pattern of causatives, the challenge is not only to provide an analysis of the basic causative construction, but also to make correct predictions concerning the range of morphology with which the causative co-occurs.

This paper treats Halkomelem causatives from the point of view of Mapping Theory (Gerdts 1992, 1993). This theory gives an analysis of clause structure centered on the concept of morphosyntactically-licensed argument positions, henceforth MAPs. Under my analysis, the causee nominal plays a dual role in the relational structure: it is both the 2 of the causative and the 1 of the verb base. Furthermore, I claim that, in Halkomelem, this nominal must be mapped (i.e. must be a core argument). This requirement, together with the claim that Halkomelem is a two-MAP language and the analyses for passives, antipassives, reflexives, and applicatives already proposed for Halkomelem in Gerdts (1993), predicts the distribution of causative structures in (5).

The crux of this analysis is the condition on Halkomelem causatives that the causee must be mapped. I claim that this is not a universal restriction but rather is parameterized. I briefly contrast Halkomelem with another two-MAP language, Ilokano. Ilokano lacks the condition on mapping the causee, and consequently has a very different pattern of causatives.

Finally, I briefly contrast the Mapping Theory analysis of Halkomelem causatives with two other relational analyses. The other treatments are unable to account for the full range of data without resorting to ad hoc stipulations. Therefore, I conclude that the Mapping Theory view of causatives is an improvement over previous analyses.

2. Mapping Theory

Originally conceived as a morphological component to augment Relational Grammar, Mapping Theory provides an alternative means for stating generalizations that would refer to the concept of final level in RG. Mapping Theory consists of several modules and rules for relating one module to another. Four

perspectives on a nominal are encoded. First is its thematic relation. Second is its grammatical relation, corresponding to its initial grammatical relation in RG. The relations are ordered according to the standard RG hierarchy of 1 > 2 > 3 > oblique. Third is its MAP. Nominals associated with a MAP are direct arguments. They get core morphosyntactic marking: that is, they determine agreement, license structural case, or appear in a configurationally determined word order. MAPs are hierarchically arranged according to a case/agreement hierarchy. Fourth is its morphosyntactic presentation.

The Halkomelem transitive clause in (6) is given the representation in (7).

(6) ni q'ʷaqʷ-ət-əs tθə swəyʔqeʔ tθə speʔəθ
aux club-tr-3erg det man det bear
'The man clubbed the bear.'

(7)

thematic relations:	agent	theme
grammatical relations:	1	2
	|	|
MAPs:	A	B
presentation:	3erg/no case	no case

There are two lexically subcategorized nominals in (6)—the agent and the theme. Each bears a term grammatical relation in initial structure and is linked to a MAP. MAPs are ordered positions (represented here as A, B) linked to morphological presentational statements. For example, some of the presentation rules for Halkomelem are given in (8).[2]

(8) agreement: A = subject pronominals, e.g. cən '1st person clitic'
-əs '3rd person suffix' (iff B)
B = object suffixes, e.g. -sámʔš '1st person suffix'
nominals: A and B = no marking; others = preposition ʔə

In any given clause, we assign the number of MAPs based on three things: the lexical semantic valence of the verb, MAP-reducing or -building morphology, and the MAP thresholds set for the language (that is, the maximum and minimum number of MAPs allowed). Halkomelem, as claimed in Gerdts (1992, to appear), is a two-MAP language, and thus only A and B are available for linking.

[2]See Gerdts (1988) for details of the presentation structure of Halkomelem. The presentation level will also involve co-occurence restrictions, which may refer to the semantic and grammatical properties of the mapped elements. For example, Halkomelem has the following constraint: *A = 3rd person, B = 2nd person.

The universal principles for linking GRs to MAPs are given in (9).

(9) Saturation Principle: every MAP must be linked to a GR or cancelled.
Biuniqueness Principle: (except in cases of coreference) a MAP is linked to at most one GR and every GR is linked to at most one MAP.
No Delinking Principle: there are no "delinkings".

Two types of associations are recognized in the theory. Unmarked associations proceed in a vertical, non-crossing, left-to-right fashion. Marked associations, however, may involve non-vertical linkings, the linking of an "extra" nominal not lexically subcategorized by the verb, the non-linking of a nominal, or a special stipulation concerning a linked nominal. Marked associations are generally correlated with specific morphological forms. A statement of the conditions on these forms and their effect on argument structure is the biggest task of a mapping grammar.[3]

2.1. Mapping Causatives

Mapping Theory has only one level of relational structure at its disposal. Thus, causatives present a special challenge, since most theories analyse them as multi-level structures in order to accommodate the arguments of both the causative and the base predicate. I will assume, following Alsina (1992) and others, that a lexical rule is responsible for morphological causatives of the type found in Halkomelem, where there is no evidence that the causative morpheme is a higher verb. This rule will provide for the concatenation of the arguments of the causative and base predicate. The core claim of this rule is that one of the nominals has a double function, bearing a grammatical relation with respect to each predicate. A single nominal is both the causee and the agent of the base predicate.[4] Within Mapping Theory, this can be captured by assigning this nominal a dual grammatical relation, even though it is linked to only one MAP. Thus, a causative such as (10) based on an intransitive stem—see (11a)—is represented as in (11b).

(10) ni nə?ém-əstəx^{w}-əs k^{w}θə swəy?qe? k^{w}θə swiw?ləs
aux go-cs+tr+3obj-3erg det man det boy
'The man made the boy go.'/'The man took the boy there.'

---

[3]Henceforth I give simplified representations showing only the linking of GRs to MAPs.

[4]Since "agent" is specifically mentioned here, causatives on unaccusatives, which do not have an agent nominal, are ruled out. This is the correct prediction for Halkomelem, as Gerdts (1991) discusses.

(11a)	agent	(11b)	causer	causee/agent
	1		1	2=1
	|		|	|
	A		A	B

The relations assigned to these arguments will form a single row in the mapping analysis, and thus the GR level will be monostratal . The Mapping Theory equivalent of the traditional notion of embedded clause is the reuse of core GRs (1, 2, 3) after an equal sign. Thus, there are two 1s in (11b).[5] I will refer to elements before the equal sign and the morphology associated with them as "outside" the causative and I will refer to elements after the equal sign and the morphology associated with them as "inside" the causative.[6]

It should be noted that the analysis for causatives represented in (11b) is appropriate for those languages referred to as two-MAP languages in Gerdts (1992) (see 12a); three-MAP languages (12b) may use (11b) for causatives of intransitives but use another pattern, not discussed here, for causatives of transitives.

(12) a. Two-MAP languages (A, B): causee of transitive causative mapped to B.
Arabic, Blackfoot, Chamorro, Halkomelem, Ilokano, Nubian, Tzotzil
b. Three-MAP languages (A, B, C): causee of a transitive causative mapped to C.
Albanian, Georgian, Polish, Southern Tiwa, Turkish, Warlpiri

Furthermore, I claim that many two-MAP languages, including Halkomelem, have the following condition on causative structures:

(13) **Mapped Causee Condition:**
The 2=1 nominal must be mapped.

This condition requires that the causee be mapped, i.e. be assigned a MAP in the causative construction.

The Mapped Causee Condition, taken together with the claim that Halkomelem is a two-MAP language, accounts for the prohibition of causatives formed on transitives, as in (*14):

---

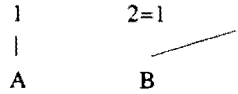
[5]The Stratal Uniqueness Law (SUL) of Relational Grammar can be said to apply to the level of GRs in Mapping Theory. In causatives and other structures with relationally embedded clauses, each equal sign will introduce a new domain for the application of the SUL.

[6]The terms inside and outside are used since the order of the morphology conforms to the Satellite Principle (Gerdts 1988), the relational equivalent of the Mirror Principle (Baker 1985).

(14) *ni cən q'ʷə́l-ət-stəxʷ kʷθə səplíl ʔə ɬə sɬéniʔ
aux 1sub bake-tr-cs+tr+3obj det bread obl det woman
'I had the woman bake the bread.'

As seen in the analysis for (14) given in (15), there are three nominals competing for two MAPs.

(15)

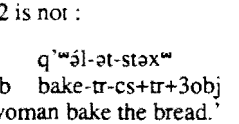


If the theme is assigned the B MAP and the causer the A MAP, then the causee will fail to map, given the biuniqueness principle in (9). The structure in (15) violates the Mapped Causee Condition (13).[7]

Causatives of transitives are also ungrammatical in Halkomelem if the causee is mapped and the 2 is not :

(16) *ni cən q'ʷə́l-ət-stəxʷ ɬə sɬéniʔ ʔə kʷθə səplíl
aux 1sub bake-tr-cs+tr+3obj det woman obl det bread
'I had the woman bake the bread.'

(17)



Such data are ruled out because, as Gerdts (1993) discusses, the transitive marker *-t* signals that the 2 is linked. Since *-t* appears inside the causative, the inside 2 must be linked. It is not, so the form is ungrammatical.

In summary, we see a difference between intransitives and transitives inside causatives. This difference is explored further in the following sections.

2.2 Passives and Causatives

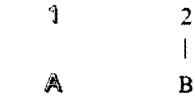
The crux of a universal rule for passives (Gerdts 1993) is that the first GR, typically a 1, is not linked. In addition, one or more MAPs may be cancelled, as specified in the grammars of individual languages. In Halkomelem, an A MAP is generally cancelled:

(18) **Passive:** do not link the 1, and, in Halkomelem, cancel an A MAP under the 1, if there is one.

[7]Structure (18) will, however, be possible in languages without the Mapped Causee Condition, provided that the language has some means for licensing a 2=1 that is not linked.

Thus, in the Halkomelem passive, the sole argument is linked to the B MAP, as represented in (19); GRs that are not linked and MAPs that are cancelled are in shadow style.

(19)



For example, (20) shows a transitive clause with the 2nd person theme as an objective suffix, and (21) shows its passive.

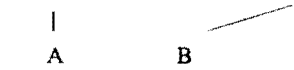
(20) ni cən ləm-əθamə
aux 1-sub look-tr+2obj
'I looked at you.'

(21) ni ləm-əθa·m ʔə tə sɬeniʔ
aux look-tr+2obj+intr obl det woman
'You were looked at by the woman.'

In the passive in (21), the 2nd person theme, which tests to be the sole direct argument of the clause, likewise appears as an objective suffix. This fact is accommodated by the structure in (19).

This analysis of the passive, together with the analysis for the causative given above, would yield a structure for a passive inside a causative as in (22).

(22)



The inside 1 is not linked. No MAPs are cancelled, however, since there is no A MAP under the inside 1. The 2 links to B and the causer links to the A MAP, as expected. The structure in (22), however, does not obey the Mapped Causee Condition, and, as (23) shows, therefore is not allowed in Halkomelem.

(23) *ni cən q'ʷəl-ət-əm-stəxʷ tθə səplil ʔə θə sɬéniʔ
aux 1sub bake-tr-intr-cs+tr+3obj det bread obl det woman
'I made the bread be baked by the woman.'

In contrast, it is possible to have a passive outside of a causative, as in (24).

(24) ʔi ʔəmʔí-st-əm tθə swiwʔləs
aux come-cs+tr-intr det boy
'The boy was made to come.'

As seen in the representation in (25), the outside 1 is not linked and the A MAP below it is cancelled.

(25)

causative + passive

The causee is free to link to the B MAP, thus satisfying the Mapped Causee Condition.

2.3 Antipassives and Causatives

The effects of antipassive can be seen by comparing the transitive clause in (6) with the antipassive in (26).

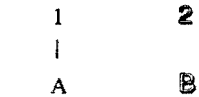
(26) ni q'ʷəl-əm θə sɬeniʔ ʔə tθə sceɬtən
aux cook-intr det woman obl det salmon
'The woman cooked the salmon.'

The transitive clause in (6) has transitive marking on the verb, ergative agreement, and two plain nominals. The antipassive in (26) has intransitive morphology, no ergative agreement, and the patient nominal is presented with a preposition.

The Mapping Theory rule for antipassive is given in (27), and (26) is represented as in (28).

(27) **Antipassive**: do not link the 2, and, in Halkomelem, cancel the MAP below the 2, if there is one.

(28)



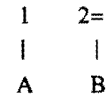
We see in the structure for the antipassive in (28) that the 2 is not linked and that furthermore the B MAP is cancelled .

In (29), we see data involving antipassive inside causative in Halkomelem.

(29) ni cən q'ʷəl-əm-stəxʷ θə sɬéniʔ ʔə tθə səplíl
aux 1sub bake-intr-cs+tr+3obj det woman obl det bread
'I made the woman bake the bread.'

As can be seen in the structure in (30), the inside 2 is not linked, as required by the antipassive rule.

(30)



antipassive + causative

Since there is no MAP under this GR, no cancellation is necessary. Other linkings proceed in the expected fashion, and, crucially, the causee is linked to a MAP. Thus the structure satifies the Mapped Causee Condition and the sentence in (29) is correctly predicted to be grammatical.

In contrast, sentences like (31), which involve an antipassive outside causative, are ungrammatical in Halkomelem.

(31) *ʔi cən ʔiməš-s(t)-əm ʔə tθə swiwʔləs
aux 1sub walk-cs(+tr)-intr obl det boy
'I made the boy walk.'

This is expected given the Mapped Causee Condition and the rule of antipassive. The former requires the mapping of the causee, but the latter requires that the causee, since it is the outside 2, not be linked, as in (32).

(32)

causative + antipassive

Both requirements cannot be simultaneously satisfied by the same nominal.

2.4 Reflexives and Causatives

In Halkomelem, as in many languages, reflexives show detransitivization effects (Gerdts 1989). For example, there is no ergative agreement in a reflexive clause like (33).

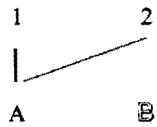
(33) ni k'ʷələš-θət tə Mary
aux shoot-tr+ref det M.
'Mary shot herself.'

To account for the semantic transitivity of (33), we posit two GRs—1 and 2. To account for its intransitive final structure, we posit multiattachment (following Rosen 1988): the 1 and 2 both link to the A slot. In addition, the B-slot is cancelled.

(34) **Reflexive**: link both a 1 and a 2 to the same MAP and, in Halkomelem, cancel the MAP below the 2, if there is one.

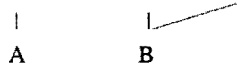
Thus, (33) would be represented as in (35).

(35)



This analysis of reflexives, together with the analysis proposed for causatives, predicts that reflexives inside causatives should be possible. The inside 2 and the inside 1 link to the same MAP—the B MAP:

(36)



reflexive + causative

The causee is linked and therefore the Mapped Causee Condition is satisfied. The grammatical data in (37) show the correctness of this prediciton.

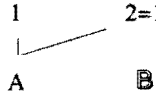
(37) ni cən k'ʷələš-θət-stəxʷ ɬə Mary
aux 1sub shoot-tr+ref-cs+tr+3obj det M.
'I made Mary shoot herself.'

Furthermore, reflexive outside causative is also possible, as (38) shows:

(38) ni cən ʔitət-stənámət
aux 1sub sleep-cs+l.c.tr+refl
'I managed to make myself sleep.'/'I pretended to sleep.'

Here the causer and the causee are coreferent and are linked to the same MAP—the A MAP—and the B MAP is cancelled:

(39)



causative + reflexive

The Mapped Causee Condition is satisfied since the causee is linked to some MAP.

2.5 Applicatives and Causatives

Gerdts (1993) suggests the following universal linking rule for applicatives:

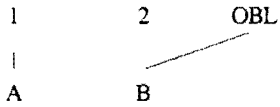
(40) **Applicative**: add a MAP (up to threshold) and link the 3 or oblique to the lowest MAP.

Take the Halkomelem example in (41), which involves a benefactive applicative.

(41) ni? q'ʷəl-əɬc-θám?š-əs ?ə kʷθə sceɬtən
aux bake-ben-tr+1obj-3erg obl det salmon
'He baked the salmon for me.'

Since (41) is lexically transitive and Halkomelem is a two-MAP language, MAPs A and B are available for linking. The applicative cannot add a MAP, since the threshold in Halkomelem is two. Nonetheless, the oblique links to the lowest MAP, i.e. B, as (42) shows.

(42)

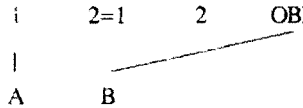


In sum, the crucial feature of an applicative is that some oblique nominal will be mapped. Given this, we do not expect causative and applicative to be compatible in a language like Halkomelem, which requires the causee to be mapped, since three nominals—the causer, the causee, and the oblique—would be competing for two MAPs. Sentences such as (43) are, in fact, ungrammatical.

(43) *ni? q'ʷəl-əɬc-stám?š-əs ɬə Mary ?ə kʷθə sceɬtən
aux bake-ben-cs+tr+1obj-3erg det M. obl det salmon
'He made Mary bake the salmon for me.'

Since the rule for applicative requires the oblique to be mapped, as in (44), the causee will fail to link, in accordance with biuniqueness (9), and the Mapped Causee Condition will be violated.

(44)

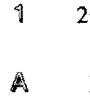


applicative + causative

2.6 Other Combinations

Of course, other rule combinations will satisfy the requirements of more than one marked association without violating the linking principles of (9) or the Mapped Causee Condition. These are too numerous to detail here, but, to give two examples, (45) involves antipassive, causative, and passive, as represented in (46), and (47) involves antipassive, causative, and reflexive, as represented in (48).

(45) ni q'ʷəl-əm-st-əm θə sɬeni? ʔə tθə səplil
aux bake-intr-cs+tr-intr det woman obl det bread
'The woman was made to bake the bread.'

(46) 

antipassive + causative + passive

(47) ni cən qaʔ-stənámət ʔə kʷθə qaʔ
aux 1sub drink(intr)-cs+1.c.tr+refl obl det water
'I managed to make myself drink the water.'
/'I pretended to drink the water.'

(48)

antipassive + causative + reflexive

In (46), the 2 is not linked, as required by antipassive, and the 1 is not linked, as required by passive. Furthermore, as appropriate for Halkomelem, the A MAP cancels and the causee links to the B MAP. In (48), the 2 is not linked, as required by antipassive, and the outside 1 and 2 are multiattached to the A MAP, as required by reflexive. In these examples, all of the appropriate conditions for marked associations—antipassive, passive, or reflexive—as well as the Mapped Causee Condition are satisfied.

In sum, the Mapping Theory account of Halkomelem causatives not only accommodates the basic data but also correctly predicts the range of co-occurrence of the causative and other marked associations of the language.

3. The Mapped Causee Parameter

Given the Mapping Theory rules for marked association in Halkomelem, interactions of causatives with passives, antipassives, reflexives, and applicatives were predicted by means of two key devices. First, I have claimed that Halkomelem

is a two-MAP language. This claim is quite independent of the present discussion on causatives. Halkomelem has the inflectional features, accessibility to rules, and marked associations that typify a two-MAP language (cf. Gerdts 1992). Because only two MAPs are available in causative structures, structures that require the linking of several nominals will necessarily be prohibited from being expressed as causatives.

Second, I have claimed that Halkomelem is subject to the Mapped Causee Condition: one MAP in a causative is necessarily assigned to the causee. Thus, the various marked associations that require that other nominals must be linked to a MAP or that the causee must not be linked will be blocked from co-occurring with the causative.

The effect of this condition is best illustrated by comparing the pattern of causatives found in Halkomelem with those found in another two-MAP language, Ilokano, which is not subject to the Mapped Causee Condition. Of course, it is outside the scope of the present paper to give a full Mapping Theory analysis of Ilokano (see Gerdts 1987, in prep.). However, it can be mentioned that the rules of passive, antipassive, and applicative in Ilokano are essentially identical to those of Halkomelem, since they are both two-MAP languages. In (49), I summarize the interaction of causatives and marked associations in Ilokano and Halkomelem.

(49)	Halkomelem	Ilokano
a. transitive/passive inside causative	no	yes
b. passive outside causative	yes	yes
c. antipassive inside causative	yes	yes
d. antipassive outside causative	no	yes
e. applicative and causative	no	yes
f. double causatives	no	yes

Ilokano data corresponding to (49) are given in (50).

(50) a. P-in-a-basa ni Juan ti historia kaniak [8]
cs-pst-read det John det story 1OBL
'John let me read the story.' (lit: 'John let the story be read by me.')
b. Na-pa-birok ti ubing.
pst+**pas**-**cs**-look det child
'The child was made to look.'

[8]The passive *-ma* does not appear inside the causative *pa-* for morphological reasons.

c. P-in-ag-basa nak ni Juan i-ti historia.
cs-pst-**intr**-read 3GEN+1NOM det John obl-det story
'John let me read the story.'

d. N-ag-pa-basa ni Juan kaniak i-diay historia.
pst-**intr**-**cs**-read det John 1OBL obl-det story
'John let me read the story.'

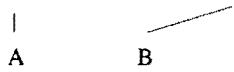
e. Pa-basa-an ti babai i-ti libro ken-ni Juan ti lalaki.
cs-read-**appl** det woman obl-det book obl-det John det man
'The woman had John read the book to the man.'

f. P-in-a-pa-turog ko diay ubing i-ti daydiay taraken.
cs-pst-**cs**-sleep 1GEN child obl-det det maid
'I had the maid put the child to sleep.'

What is notable about Ilokano causatives is that all combinations of marked associations and causatives are allowed, as seen in the chart in (40). Reviewing the relevant analyses above, we find that all are well-formed according to the general mapping principles in (9). Those that were ruled out for Halkomelem were violations of the Mapped Causee Condition. By proposing that Ilokano is not subject to this condition, we correctly predict that data corresponding to these structures will be allowed.

Furthermore, double causatives, as in (50f), are also possible. These are represented as in (51).

(51)



causative + causative

Since at most one of the 2=1 nominals is mapped in a double causative, corresponding Halkomelem data (*52) are correctly predicted to be impossible:

(52) *ni cən nə?ém-stə-stəxʷ ɬə Mary (?ə) kʷθə púkʷ-s
aux 1sub go-cs+tr-cs+tr+3obj det M. obl det book-3pos
'I had Mary take her book.'

We see then that the Mapped Causee Condition should be parameterized across languages. Halkomelem is subject to this condition but Ilokano is not.

4. Previous treatments

Having laid out a Mapping Theory treatment of Halkomelem causatives, I will briefly compare this treatment to previous relationally-based analyses. In the standard RG account of Halkomelem causatives proposed in Gerdts (1988), no

single condition can rule out all the unacceptable combinations in (49). For example, Gerdts (1988) proposed that causatives can only be built on intransitive forms. Thus antipassive and reflexive morphology can appear inside causative, but transitive and applicative morphology cannot. Furthermore, double causatives are predicted to be impossible. However, the transitivity restriction does not explain why passives cannot appear inside causative. Thus, Gerdts (1988) also posits a downstairs freeze in Halkomelem causatives: the final downstairs 1 must also be the downstairs initial 1. A further restriction is necessary, however, to rule out antipassive outside causative. Thus, three restrictions are required to accommodate the range of data given in (49). Since each of these constraints is stipulated and does not follow from any general properties of languages like Halkomelem, the Relational Grammar treatment misses generalizations available in the Mapping Theory treatment.

A lexicalist account of Halkomelem is also possible (see especially Farrell 1992). We might posit a division of the rules of Halkomelem into two types—lexical and syntactic. Derivational rules such as antipassive would be regarded as lexical, while inflectional rules such as passive would be taken as syntactic. This would allow the statement of a restriction that only lexical rules can appear before causative and only syntactic rules can appear after it. However, this would not account for reflexive (since it can appear either before or after causative) nor for the incompatibility of applicative and causative. Thus, further ad hoc stipulations would be necessary to account for the data. These stipulations would basically amount to a list of forms that can and cannot combine.

I conclude that the Mapping Theory account, which makes crucial reference to the available inflectional positions in Halkomelem—the MAPs—and to the Mapped Causee Condition, provides an insightful analysis of causatives. Futhermore, in keeping with the spirit of Mapping Theory, my analysis of causatives involves only one level of grammatical relations. The GRs are mapped to a single level of argument structure. The combinations of causative with passive, antipassive, reflexive, and antipassive are also analysed with only two levels of structure. Therefore, I have provided an essentially bistratal account of structures that would involve three or more strata under a standard Relational Grammar treatment.

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Verb Inflections in Sediq: Feature Geometry vs. Multiplanar Representation

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0. **Introduction.** This paper deals with verb inflections in Sediq. The main theme is to present a synchronic analysis of three phenomena, including vowel movement, trans-laryngeal harmony, and the OCP on labial consonants. I show how models of feature geometry, such as Sagey (1986), Steriade (1987), and Clements (1991), fail, and argue that the Morphemic Plane Hypothesis (McCarthy, 1989) together with Plane Conflation account for the data.

This paper is organized as follows. Section 1 presents the data and the generalizations. Section 2 examines three models of feature geometry. Section 3 demonstrates how the Morphemic Plane Hypothesis and Plane Conflation explain the data. My conclusion is given in section 4.

1. **Data and Analysis.** Sediq is an Austronesian language spoken in Central Taiwan. All the data in this paper are based on Yang (1976). Some alleged "recalcitrant" data remain unsolved since the publication of Yang's paper. Li (1991) claims that the data present problems for a synchronic analysis and appeals to a diachronic or comparative explanation. I will argue for the generalization that, in some imperative verbs, the quality of the stressed vowel remains unchanged after stress shift triggered by suffixation regardless of intervening consonants.

1.1 **Background Information**[1]. Sediq has sixteen consonants: p, t, k, q, b, d, g, s, x, h, c (alveolar affricate), m, n, N (velar nasal), l, r , two glides: y and w, and five vowels: i, e, a, o, u. Stress falls on the penultimate syllable. Syllable structure shows (C)V everywhere, except the world-final position.

In Sediq, future tense is derived by prefixing mu- to the base, and imperative form, by suffixing -i. Iya is put before the verb to indicate negation. Consider the paradigms in (1):

(1)	Future	Imperative	Negative	Base	Gloss
	muqeraq	quraqi	iya qeraq	/qeraq/	`catch'
	mukari	kurii	iya kari	/kari/	`dig'
	mukulah	kulahi	iya kulah	/kulah/	`weed'
	mutuqiri	tuqurii	iya tuqiri	/tVqiri/	`turn'

[1] This section is based on Yang (1976) and Li (1991).

From (1), we see that there exists a common denominator among vowels before the stressed syllable: all the vowels in this position are reduced to [u].[2] The phenomenon suggests that the vowel in the future tense affix may not be realized until the application of vowel reduction.

Let us turn to the present tense, which is derived by prefixing um- to the base. For verbs beginning with a vowel, u in the prefix is deleted to observe the canonical syllable structure CVCV... Vowel deletion also applies in the imperative forms. Notice that the deletion rule does not affect words smaller than two syllables. Thus, iya surfaces.

(2)	Present	Imperative	Negative	Base	Gloss
	meyah	yahi	iya eyah	/eyah/	`come'
	mimah	mahi	iya imah	/imah/	`drink'
	maNan	Nali	iya aNan	/aNan/	`take'
	mutaq	taqi	iya utaq	/utaq/	`vomit'

For verbs with a word-initial labial consonant, the Obligatory Contour Principle (OCP), which prohibits identical adjacent melodic elements, triggers deletion of the stem-initial consonant, followed by deletion of the word-initial vowel. Consider examples in (3), and their derivations are illustrated in (4).

(3)	Present	Future	Imperative	Base	Gloss
	metaq	mubetaq	butaqi	/betaq/	`stab'
	muNu	mupuNu	puNui	/puNu/	`tie'

(4)

```
um - betaq   OCP          V-del
 |    |     =====> umetaq =====> metaq
[lab][lab]

um - puNu   OCP         V-del
 |    |    =====> umuNu =====> muNu
[lab][lab]
```

For verbs with other word-initial consonants, metathesis operates to maintain maximal CV syllable. Examples are given in (5). Traditional prefixes or suffixes always appear strictly at their corresponding edges. However, if the prefix in Sediq occurs before the stem, it results in -CC- which violates the canonical syllable pattern.

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[2] According to Li (1991: 164), depending on the dialect or speaker, vowels before the stressed syllable may be reduced to a schwa. This vowel reduction accounts for the reason why in some cases we set up a V, an indeterminable underlying vowel in the base.

(5)	Present	Base	Gloss
	qumeraq	/qeraq/	`catch'
	kumari	/kari/	`dig'
	kumulah	/kulah/	`weed'
	tumuqiri	/tVqiri/	`turn'

Before I end this subsection, one more point needs to be mentioned. In Sediq, there is an assimilation rule in which an antepenultimate vowel becomes identical with the stressed vowel, as shown in (6).

(6)	Future	Base	Gloss
	meeyah	/eyah/	`come'
	miimah	/imah/	`drink'
	maaNan	/aNan/	`take'
	muutaq	/utaq/	`vomit'

In fact, an intervening pharyngeal fricative /h/ is the only consonant which is transparent to the assimilation rule. As shown in the following comparison, all other consonants block the rule.

(7a)	iya cehebuy `not drip'	iya pihido `not dry'
	iya cuhuNi `not forget'	sulahayi `Learn!'
(7b)	iya tupakun `not squat'	iya ruberuk `not broil'
	iya pusutotuy `not raise'	iya sudariN `not moan'
	iya pukepak `not grope'	iya tugakac `not kneel'
	iya turugeraq `not lie'	iya pusuciyuk `not turn'
	iya tulima `not wash'	iya surebu `not urinate'
	tukumaxi `Blink!'	iya sunegun `not follow'
	iya puluNeluN `not think'	puyasi `Sing!'
	luwahi `Open!'	

The data in (7a) and (7b) indicate that assimilation is actually a rule of trans-laryngeal harmony which is blocked by supralaryngeal consonants. Notice that, given the same environment, the assimilation rule overrides the reduction rule, which in turn reduces all the vowels before the stressed position to [u]. Furthermore, disyllabic verbs are excluded by the assimilation rule, as exemplified in (8).

(8)	reus `bury'	taus `beckon'
	dehuq `arrive'	bohi `Bake!'

From (8), we can draw the conclusion that stem vowels in the right-most foot, that is, the two vowels from the right edge, are fully specified, and hence are out of the realm of the assimilation rule. The facts that vowel reduction reduces all the vowels before the stressed position to [u] and vowel deletion does not apply to the penult vowel also support the claim that vowels in the right-most foot are fully specified.

1.2 **Some Recalcitrant Data.** This section discusses some imperative verbs for which both Yang (1976) and Li (1991) do not offer an adequate explanation. I find out the generalization that, in some cases, the quality of the stressed vowel, which is supposed to change after stress shift triggered by suffixation, remains unchanged regardless of intervening consonants. This dichotomy in imperative verbs can be illuminated by the comparison in (9).

(9a)	Imperative	Negative	Base	Gloss
	quraqi	iya qeraq	/qeraq/	`catch'
	kurii	iya kari	/kari/	`dig'
	qutai	iya qita	/qita/	`see'

(9b)	Imperative	Negative	Gloss
	qupei	iya qepu	`distill'
	subeti	iya sebu	`thresh'
	buteli	iya betun	`kick'
	bukeyi	iya bekuy	`tie'
	gusugesi	iya gusegus	`scrub'
	ruqeni	iya regun	`swallow'
	tuleNi	iya teluN	`touch'
	suresi	iya serus	`wipe'
	numei	iya nemu	`grind'
	sukunexi	iya sukenux	`smell'
	huyegi	iya heyu	`stand'
	tuduroyi	iya tudoruy	`roll down'
	bohi	iya obuh	`bake'

The imperative verbs in (9a) pose no problem for Yang (1976) and Li (1991). After stress shift, the reduction rule operates and vowels before the stressed position are reduced to [u]. In contrast, the imperative verbs in (9b) are problematic. Both Yang and Li set up the base for (9b) as in (10) and propose the rule in (11) to account for the vowel alternation.

(10) Base (Yang & Li)

/qepe/, /sebet/, /betel/, /bekey/, /gVseges/, /reqen/, /teleN/, /seres/, /neme/, /sVkenex/, /heye/, /tVdoroy/, /oboh/

(11) {e, o} --> u / ___(C)#

So far, this analysis does a perfect job to link up verb inflections and the vowel reduction rule. However, there are other data which (11) does not account for, as in (12).

(12)	Imperative	Negative	Gloss	Base (Yang & Li)
	rehepi	iya rehak	`to sow'	/rehep/[3]
	cehepi	iya cehak	`to lick'	/cehep/
	reheqi	iya rehaq	`to remove'	/reheq/

As seen, [e] becomes [a], in contrast to the previous rule stated in (11). In order to solve the dilemma between (9b) and (12), both Yang (1976) and Li (1991) posit another rule.

(13) e --> a / ___ (c)#

A serious problem arises. The comparison between (11) and (13) shows clearly that, given an input ə, we cannot predict which output will surface.

Li (1991) suggests an alternative for (12): First, [a] is treated as underlying in the second syllable of the base, as shown in (14).

(14) Base

/rehap/, /cehap/, /rehaq/

Second, [e] is treated as derived in the suffixed forms which is attributed to the process of assimilation with the preceding vowel. Thus there will be no exceptions. As Li (1991: 166) himself notices, "the main problem with this solution is: how can we account for the fact that the stressed vowel gets assimilated to the preceding unstressed vowel only in these imperative forms? In all the other cases, the stressed vowel retains its full vowel value and is not affected by its adjacent segments. Moreover, all other instances show that it is the vowel in the antepenultimate syllable that gets assimilated to the following stressed vowel."

Finally, Li (1991: 167-168) appeals to a diachronic explanation, which is far-fetched. As a matter of fact, there exists a common denominator between (9b) and (12): just like cases in other verbs, the bases of (9b) and (12) are simply the negative forms without the negative marker. After stress shift which is triggered by suffixation, the quality of the stressed vowel remains unchanged regardless of intervening consonants. The mere difference between (9b) and (12) lies in that the imperative verbs in (9b) are derived from vowel movement followed by vowel reduction or vowel deletion, whereas those in (12) are derived from vowel movement followed by trans-laryngeal harmony, as illustrated in (15). (Key: VM = vowel movement, VR = vowel reduction, VD = vowel deletion, and VH = vowel harmony)

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[3] The morphophonemic rule p --> k / ___# is not our concern.

(15) a. sVkenux + i ==VM==> sVkVnex + i ==VR==> sukunexi

b. obuh + i ==VM==> Vboh + i ==VD==> bohi

c. rehaq + i ==VM==> rVheq + i ==VH==> reheqi

The peculiar phenomenon of vowel movement across intervening consonants gains further support from (16).

(16)

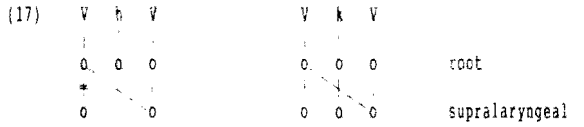
Imperative	Negative	Base	Gloss
putasi	iya patis	/patis/	`write'

There is no need to posit a rule, say, i ---> a / ____C# for (16). In fact, like (9b) and (12), (16) also exhibits vowel movement.

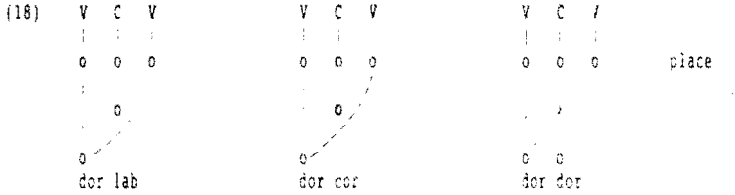
A question arises: How can we predict the occurrence of vowel movement? In fact, only verbs with a non-high stressed vowel /e, o, a/ undergo this operation. Interestingly, among verbs with vowel movement, over 80 percent have e and u, o and u, and a and u (in the temporal order) as the two underlyingly specified vowels. If vowel movement does not apply, the stressed vowel would surface as u. Recall that all pretonic vowels are reduced to [u] in Sediq. It is very much likely that this language shows aversion to having u as the stressed vowel. Likewise, we never see an English word with a stressed schwa. As argued in section 1.1, stem vowels in the right-most foot, that is, the two vowels from the right edge, are fully specified. There is a tendency that the stressed vowel in the imperative form is chosen between the two underlyingly fully specified vowels. The more salient a vowel is, the more likely it is realized. The Stressed Vowel Preference, namely e, o >> a >> i, u, evaluates the two underlyingly specified stem vowels, as evidenced by the empirical data.

2. **Feature Geometry.** This section presents three models of feature geometry, including Sagey (1986), Steriade (1987), and Clements (1991). I argue that the data concerning translaryngeal harmony, vowel movement, and the OCP on labial consonants, constitute a challenge to all three models.

2.1 **Sagey's Model.** Sagey (1986) explains translaryngeal harmony at no cost since /h/ has no supralaryngeal node to block spreading of a vowel's supralaryngeal node, as illustrated by the following charts.

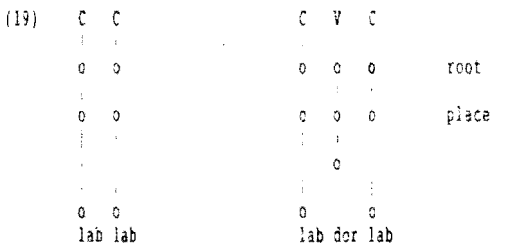


Since under Sagey's model both velar consonants as well as vowels are represented under the Dorsal Node, velar consonants block trans-laryngeal harmony.



The prediction is not borne out in Sediq. As shown in (9b), vowel movement occurs even if the intervening consonant is dorsal.

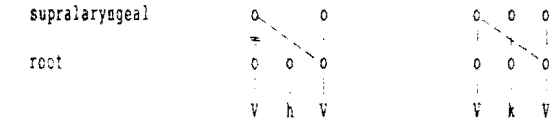
Furthermore, Sagey's model has difficulty explaining the distinction between present tense and future tense of verbs with a labial initial, with respect to the OCP effect, for instance, metaq and mubetaq in (3), which are derived from um-betaq and mu-betaq respectively. Notice that the OCP operates in the present tense, but not in the future tense. Since vowel features are dominated by dorsal node in Sagey's model, an intervening vowel does not change the fact that two labial features are adjacent. Therefore, this model fails to capture the distinction between metaq and mubetaq.



Content words in Sediq obey the Minimality Constraint (McCarthy & Prince 1990) which requires them to be minimally disyllabic. Thus, the affixal vowel in the future tense, where the OCP is relevant, is pretonic, and is realized as [u] by the vowel reduction rule. If one argues that features of the intervening vowel are unspecified at the time when the OCP applies, the problem remains. The two labial features are still adjacent. One way of solving this problem is to stipulate that the OCP on labial consonants requires root adjacency.

2.2 **Steriade's Model.** Steriade (1987) evaluates two hypotheses, namely the Disjoint Tier Hypothesis and the Overlapping Tier Hypothesis. It is argued that the Overlapping Tier Hypothesis makes correct predictions in non-local rules such as root-level rules and translaryngeal harmony. The Overlapping Tier Hypothesis accounts for translaryngeal harmony at no cost since /h/ has no supralaryngeal node to block spreading of a vowel's supra-laryngeal node.

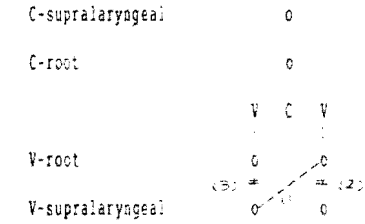
(20) Overlapping Tier Hypothesis: translaryngeal harmony



Under the Disjoint Tier Hypothesis, specific mention of the intervening consonant is necessary in cases of translaryngeal harmony since consonants and vowels are specified on separate tiers.

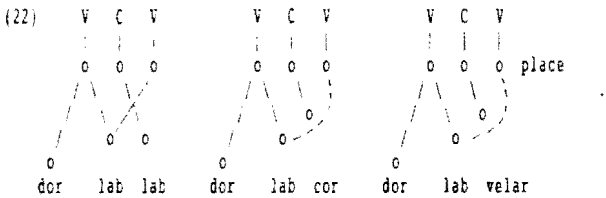
In contrast, the Disjoint Tier Hypothesis predicts that vowel features can spread across all consonants, which is exactly what happens in Sediq vowel movement.

(21) Disjoint Tier Hypothesis: vowel movement



The Overlapping Tier Hypothesis predicts that vowel features dominated by dorsal and labial tiers can spread across all consonants except for labials.

(22)



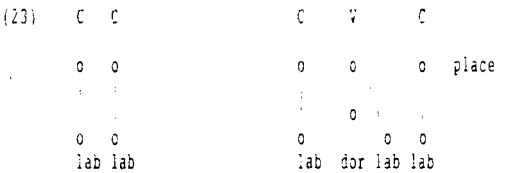
This prediction is not borne out, as evidenced by (9b). Vowel movement occurs even if the intervening consonant is labial. Notice that there is

a velar tier in this model, and hence velars, which are equivalent to dorsal consonants in Sagey's model, do not block vowel movement.

Interestingly, translaryngeal harmony and vowel movement reveal a paradox for Steriade (1987). On the hand, the Overlapping Tier Hypothesis wins out, while on the other, the Disjoint Tier Hypothesis makes correct prediction.

Now let's turn to the OCP case. Under the Disjoint Tier Hypothesis, vowels and consonants are specified on separate tiers, thus an intervening vowel will not prevent the OCP from applying. There is no way to explain a future tense like mubetaq. Under the Overlapping Tier Hypothesis, vowel features are dominated by dorsal and labial tiers, and hence OCP applies in any case.

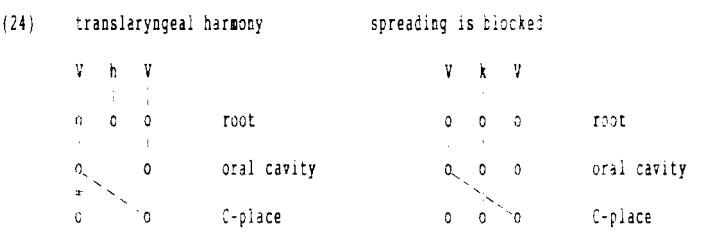
(23)



Again, the stipulation of root adjacency is necessary to deal with the OCP case. So far, I have shown that neither Sagey's model nor Steriade's model can account for the data nicely.

2.3 **Clements's Model.** Two significant proposals in Clements (1991) are: (i) a single set of features characterizes place of articulation in both consonants and vowels, and (ii) place features of vocoids (vowels and glides) are split from those of consonants in that they are assigned to different planes in phonological representation. We will see how these two proposals pin down vowel movement which Sagey and Steriade are unable to account for. We start from translaryngeal harmony. Translaryngeal harmony follows under the assumption that laryngeals are not characterized by the supralaryngeal node and they are transparent to rules which spread the oral cavity node or lower node, such as the C-place node.

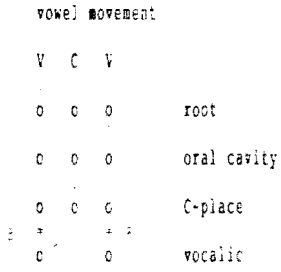
(24)



Clements (1991) explains translaryngeal harmony without any

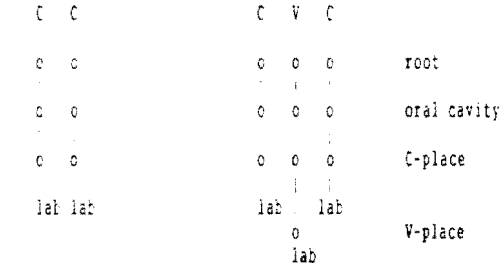
difficulty. What is more, this model also allows vowel movement in Sediq. Since the consonant is not characterized by a vocalic node of its own, vowel movement across any intervening consonant can be treated as vocalic node spreading, and the No Crossing Constraint is not violated, as shown in (25).

(25) vowel movement



At this point, Clements' model makes more correct predictions than other models. Unfortunately, like Sagey (1986) and Steriade (1987), it cannot account for the OCP case. Under this model, a place feature characterizing a consonant will dissimilate from the same feature characterizing a vocoid, or vice versa.

(26)



If one argues that features of the intervening vowel are unspecified at the time when the OCP applies, two labial features are still adjacent on the C-Place tier. Again, Clements (1991) cannot solve the problem without stipulating that root adjacency is required for the OCP.

Though the OCP case beats models of feature geometry, it follows under the assumption of the Morphemic Plane Hypothesis, as we shall see in section 3.

3. **Morphemic Plane Hypothesis and Plane Conflation.** This section presents an analysis based on the Morphemic Plane Hypothesis and Plane Conflation. In addition to the OCP case, trans-laryngeal harmony and vowel movement are explainable under the assumption of multiplanar representation.

In Sediq there is no evidence for morphological distinctions between vowels and consonants or templatic morphology. However, syllable structure is predictable as (C)V. In fact, two pieces of internal evidence support our using the Morphemic Plane Hypothesis. The first piece of evidence comes form the phenomenon that all the vowels before the stressed syllable become a phonetic [u], which can be represented by spreading if vowel melody itself occupies a plane. Since the phenomenon that all pretonic vowels are realized as [u] can also be dealt with by default, this piece of evidence is not forcible. The second, and more convincing, piece of evidence lies in the distinction between present tense and future tense of verbs with a labial initial concerning the OCP effect, which constitutes a challenge to all three models of feature geometry as argued in section 2. Let us consider matis and mupatis, the present tense and future tense for patis `to write'. According to the Morphemic Plane Hypothesis, affixes are projected onto different planes, and hence the labials in um-patis and mu-patis are not adjacent. The OCP cannot apply at this stage of derivation. After Plane Conflation which folds all the vowels and consonants onto a single plane, mupatis does not violate the OCP and therefore is surfaced. By contrast, the labials in umpatis become adjacent, and the OCP comes into force. Then, umatis becomes matis through the application of vowel deletion. Since the Morphemic Plane Hypothesis together with Plane Conflation solves the OCP case, a natural question arises: Are trans-laryngeal harmony, vowel movement, and other phenomena in Sediq accounted for as well? The answer is positive.

Recall that the "recalcitrant" data in section 1.2 involve four major rules, namely vowel movement, vowel reduction, translaryngeal harmony and vowel deletion. If we adopt the Morphemic Plane Hypothesis, vowel movement and vowel reduction must take place before Plane Conflation, which folds vowels and consonants together onto a single plane somewhere in the derivation, in order to prevent association line crossing. In contrast, trans-laryngeal harmony must operate after Plane Conflation, otherwise we cannot explain why assimilation is blocked by supralaryngeal consonants. Vowel deletion also comes into play after Plane Conflation whereby the well-formedness of syllable structure can be examined. With the option of V/C segregation and Plane Conflation in hand, the alleged "recalcitrant" data become tractable.

Now let us go back to the imperative verbs in (9b), (12) and (16) and see how they can be accounted for by the Morphemic Plane Hypothesis. Due to space limit, I will just take sukunexi in (9b), and reheqi in (12) for example, as repeated in (27).

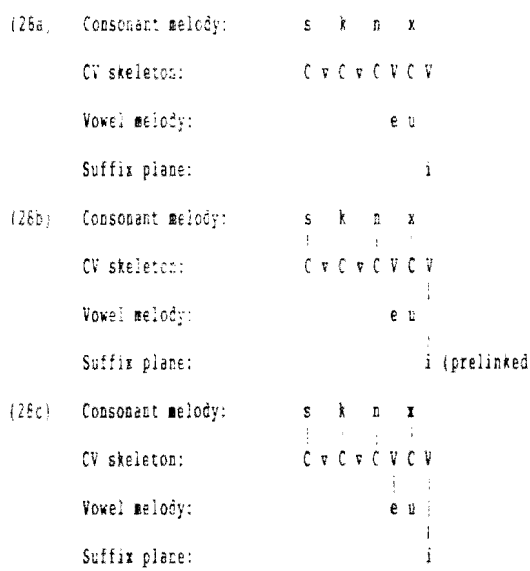
(27)

Imperative	Base	Gloss
sukunexi	/sVkenux/	`to smell'
reheqi	/rehaq/	`to remove'

Following the Morphemic Plane Hypothesis, we claim that there are four

planes in Sediq: consonant melody, vowel melody, C-V skeleton, and the suffix plane. Derivation of the imperative verbs proceeds basically step by step as follows: First, apart from the suffix -i, stem vowels in the right-most foot are fully specified underlyingly. A distinction of v and V is marked in the skeleton to ensure that underlyingly specified vowels are associated to the right position. Notice that this distinction is also motivated by the fact that all pretonic vowels are reduced to [u]. Second, the suffix vowel gets priority to be linked to the final V slot since it is prespecified. Consonants are linked to the C slots one by one from left to right. Third, the Stressed Vowel Preference, namely e, o >> a >> i, u, evaluates the two underlyingly specified stem vowels. Thus, the vowel that is higher in the hierarchy gets linked to the leftover V slot. The fourth step is that all the vowels before the stressed syllable are presented by spreading [u] by default. Association applies in accordance with principles in the autosegmental phonology, and unassociated element gets deleted due to Stray Erasure. Finally, Plane Conflation (PC) folds vowels and consonants onto a single plane. Rules which must apply after Plane Conflation now come into play.

Now let us begin with the derivation of sukunexi.



(28d) Consonant melody: s k c x

CV skeleton: C v C v C V C V

Vowel melody: [u] e u

Suffix plane: i

(28e) Consonant melody: s k n x

PC

CV skeleton: C v C v C V C V ====> sukunex

Vowel melody: [u] e u

Suffix plane: i

* (Stray Erasure)

Consider how <u>rehegi</u> is derived.

(29a) Consonant melody: r h g

CV skeleton: C v C V C V

Vowel melody: e a

Suffix plane: i

(29b) Consonant melody: r h g

CV skeleton: C v C V C V

Vowel melody: e a

Suffix plane: i (prelinked)

(29c) Consonant melody: r h g

CV skeleton: C v C V C V

Vowel melody: e a

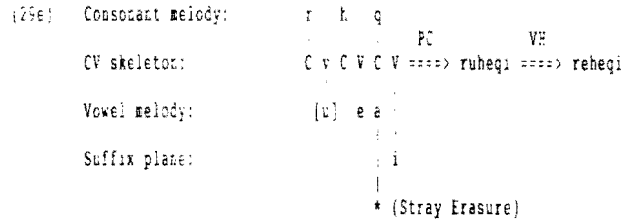
Suffix plane: i

(29d) Consonant melody: r h g

CV skeleton: C v C V C V

Vowel melody: [u] e a

Suffix plane: i



4. **Conclusion.** In this paper three models of feature geometry, including Sagey (1986), Steriade (1987), and Clements (1991), have been shown untenable. Translaryngeal harmony constitutes no problem for all three models. Sagey (1986) and Steriade (1987) do not account for vowel movement while Clements (1991) does. However, all three models cannot solve the OCP case without stipulating root adjacency. I have also presented an analysis under the Morphemic Plane Hypothesis and Plane Conflation. The multiplanar representation explains the OCP case as well as translaryngeal harmony and vowel movement.

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Nasalization in Guaraní and Terena

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1. Introduction

In this paper I will discuss the nature and the structural position of the feature [nasal]. In spite of the growing amount of literature on this feature, e.g. van der Hulst & Smith (1982), Trigo (1988), Piggott (1988, 1992), Avery & Rice (1989, 1991), Steriade (1992), to mention but a few, so far no agreement has been reached on its position in structural representations of segments.

The languages to be discussed here, Guaraní and Terena, have appeared prominently in the literature on nasality (e.g. Poser 1982, Kiparsky 1985), instantiating two outstanding examples of the conspicuous and diverse behavior this feature may display.

In the light of the present tendency to derive phonological surface forms with as few rules as possible, if any, and, instead, to make use of general and language-specific constraints, I would like to argue that the structural position of a feature may well be expected to carry the major part of the burden of explaining its behavior. Consequently, determining the structural position of [nasal] remains an extremely important issue in segmental phonology till the problem is resolved, which I attempt in the present paper.

2. Framework and Theoretical Assumptions

The structural representations for segments that I will propose here have been developed on the basis of analyses of segmental behavior in assimilation processes. In this paper we will limit ourselves to nasals and their structures, though for a lucid presentation I will briefly discuss the main theoretical considerations and structures that form the basis of this proposal. For a more extensive discussion I refer the reader to Humbert (1994).

In my view, structural representations of segments should be able to cover the following points:

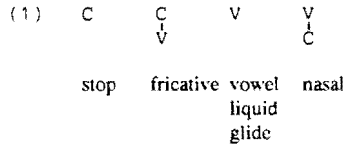
1. The more phonemes are alike phonetically and in their phonological behavior, the more alike their representations should be.
2. In order to constrain the possible size and shape of inventories and in order to constrain the nature of phonological operations manipulating segmental structures, the representations themselves should consist of as few ingredients as possible.
3. The structure of representations must be constrained and express meaningful relationships between the ingredients of the representation in order to
   - reduce the number of rules and stipulations required
   - limit the possible size of inventories
   - express natural groups of features
   - express rare processes in a more complex way than common ones

- express relative rareness or markedness of phonemes by means of increasingly complex representations.

The structural representations I have developed on the basis of analyses of assimilation processes have a strong affinity with the representations familiar from Dependency Phonology (Anderson & Ewen (1987)) and other Dependency-based approaches, such as those presented in van der Hulst & Ewen (1992), Smith (1989), Smith et al. (1992), van der Hulst (1992), to name but a few. The phonetic interpretation of the three basic components of segmental structure is in accordance with Catford (1977).

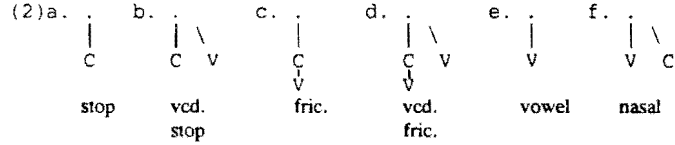
We distinguish in all segments a manner component separating obstruents from sonorants as illustrated in (1). Obstruents are characterized by complete closure represented by C, while sonorants are spontaneously voiced, represented by V. The manner component is the head of the structure, since the information it represents is relevant to syllable structure. Consonants and vowels are distinguished at the level of the place component, where each is structured differently (see (3)).

The complete set of possible manner components is given in (1):



C = complete closure in the oral cavity; V = relatively free escape of air; voicing

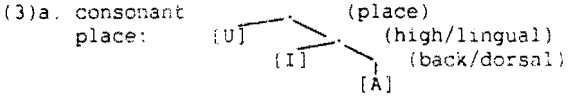
All segments have **one** manner component. Fricatives and nasals also have **one** manner component even though it is a complex one. The interpretation of each of these components, as in (1), is unique. Similar structures are also found in Dependency Phonology and related frameworks but then fricatives and nasals consist of two components instead of one complex one. Because of this, more than just the four combinations in (1) can be made; some examples from van der Hulst & Ewen (1992) are given in (2):



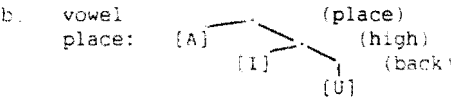
Each separate part of the structures in (2) is accessable to operate on, e.g. to be referred to by a rule. In (2f) nasality is represented by the |C| component of the structure, not by the structure in its entirety. However, the interpretation of C as a nasal component relies on its structural position. In cases where nasalization is best dealt with in terms of a floating nasal component it would not be possible to distinguish this |C| from other |C| components. The problem

results from the fact that the components are not uniquely interpretable, while those in (1) are, making it the more constrained approach.

In (3) below the internal structures of consonant and vowel place components are given (see also van der Hulst (1989) and Humbert (1989)):



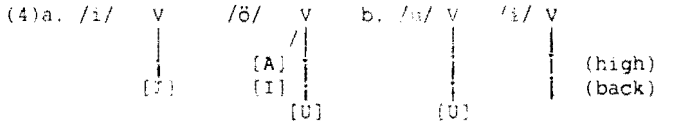
[U] = labial, [I] = coronal, [A] = velar/pharyngeal[1]



[A] = low; [I] = front; [U] = round

From now on I will insert **cpl** and **vpl** for a consonantal **p**lace node and a vowel **p**lace node respectively, wherever I believe this to lucidate the structural representations. In the structures in (3) the terminal specifications are unary, but they are part of a binary contrast expressing equipollency, except for [A] in consonants and [U] in vowels, which are genuinely privative (see Trubetzkoy (1939)). The consonant place structures in (3a) were developed on the basis of those in (3b), along the same lines of thought (see also Humbert (1994)). The structures express implicational relations: In vowels, [U] implies the presence of nodes representing high[2] and back, [I] implies the presence of high.

Each segment is to surface with one terminal specification. Segments with more than one are more complex and hence more marked so that in (4a) /ö/ is more marked than /i/. Segments with no terminal specification are also more marked: in (4b) /ɨ/ is more marked than /u/:



In (3b) we have shown the possible ingredients of the vowel place component

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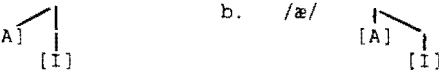
[1] If a language distinguishes between velars and pharyngeals the velars will be represented by the node representing back, lacking a terminal specification, the pharyngeals by [A].

[2] The nodes are interpretable as high, back etc, but they are never actively involved in phonological processes. Therefore I distinguish them from components (features) represented between sqaure brackets, such as [A], [I] and [U].

and the mutual relations these have, while in the second structure of (4a) head-dependency relations enter into the structure which influence the output[3]. This component internal type of head-dependency relation is illustrated in (5), where straight lines indicate headship and slanting lines express dependency:

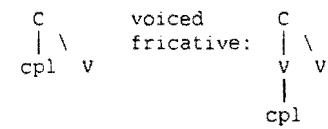
(5) a. /e/ b. /æ/



The output of (5b) is a lower segment than that of (5a) due to the fact that in (5b) [A] is the head and therefore dominant in the structure, while in (5a) it is a dependent. How a segment is represented depends essentially on the phonemic inventory of the language under discussion, since there it is determined which phonemes we must distinguish and how they are related to each other.

Distinctive voicing in obstruents is represented by the presence of a dependent V (vowel manner component). In case of fricatives, voicing is a dependent component of the entire complex head component and therefore it does not have a sister relation to the V of the fricative manner component:

(6) voiced stop: voiced fricative:



Debuccalization is a phonological process where the place component of a segment is delinked or deleted. The result typically affects segments the following way: stops become /?/, fricatives become /h/ and, following Trigo (1988), nasals become /N/, where /N/ stands for nasality without place of articulation. Trigo deals with these segments as a natural class referred to as laryngeal glides. In our approach the laryngeal glides /?/, /h/ and /N/ are the phonetic realizations of manner components (cf.(1)). Vowels are never debuccalized so that no corresponding laryngeal glide exists. Debuccalized segments are degenerate in that they lack an otherwise obligatory place component. Corresponding to a large extent to the specifications organized under the LARYNGEAL-node in many feature geometries (e.g. Sagey 1986, Clements 1989, McCarthy 1988), each of these degenerate segments, which are themselves manner components, may modify complete segments by a simple adjunction operation. This is illustrated in (7), where in the first component represents a degenerate segment, adjoined to a full-fledged segment. The resulting new root node will be labeled as a projection of the segment: C' or V' See Humbert (1994) for more details on adjunction.

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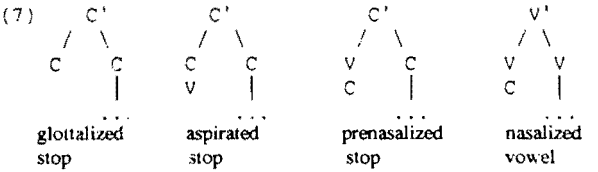
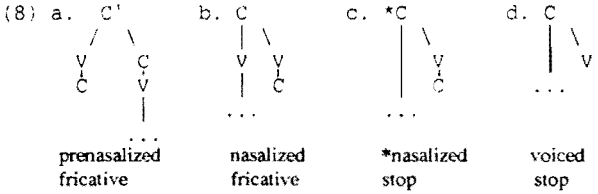
[3] For an extensive discussion of the various types of head-dependency relations see, for example, Van der Hulst (1989) and Humbert (1994).



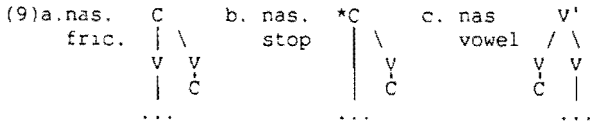
Because these laryngeal modifications are derived from the basic segmental structure, no extra ingredients are required to express them. A second consequence of deriving them the way we did, is that nasality but not voicing is included. Furthermore, we can predict that in phonological processes referring to these modifications, they will behave as manner components. We will now focus on the nature of nasals and nasalization. For further details on the configurations discussed here, see Humbert (1994).

In (8) below it is shown that configurations representing prenasalized stops or prenasalized fricatives are complex segments. Nasalization of a segment simultaneously realized with the rest of the structure is only found in fricatives.



(8c) is ungrammatical because the internal structure of the dependent component is more complex than that of the head. We follow Dresher (1993) in that the complexity of the structure of the dependent may not exceed that of its head. It then follows that the head-internal complexity of fricatives licenses the dependent nasal component which is also internally complex. This analysis is possible due to the fact that we regard the heads of nasals and fricatives as being essentially single components.

In this approach, nasalization can only be viewed as the spreading of an entire nasal component. Nasal components target only those structural positions that are V-headed. Since the V-node in fricative heads is component-internal it is not a suitable landing site for an entire component. This leaves vowels, which are V-headed, and the structural position for distinctive voicing in obstruents, as possible landing sites:



Obviously, if stops are targeted for nasalization they will block the processes since it cannot apply successfully (cf. ungrammaticality of (9b)). This is the case in Applecross Gaelic, for instance, where fricatives nasalize and stops are opaque (Borgstrøm (1941). However, if a language has no distinctive voicing, structures representing voiced obstruents (see (6)) will be foreign to the language. In such languages nasalization does not target obstruents because they predictably lack a landing site in their structural configuration, hence they will be transparent to nasalization. Two such languages are Guaraní and Terena. The transparency of obstruents in both languages will be illustrated and discussed in the next sections.

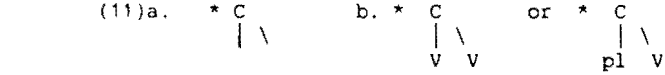
3. Guaraní Nasalization

In accordance with previous analyses, I will show that Guaraní has two nasalization processes, quite independent of each other. The unary approach I use does not allow for orality or [-nasal] or similar entities to play a role, though previous analyses have all exploited some such concept (Poser (1982), Kiparsky (1985), van der Hulst & Smith (1982), Piggott (1989, 1992)). The structural constraints imposed upon the possible configurations in my approach not only suffice to deal with Guaraní nasalization in a unary framework but do so more elegantly, namely by regarding it as a simple case of harmony involving dominance and recessiveness.

The data presented here is taken from Adelaar (1986), which is based on native speakers, and from van der Hulst & Smith (1982). I will assume the phonemes in (10) to represent the Guaraní inventory:

(10)	p	t		k	k^w	?		i	ɨ	u
	m	n						e		o
		s	š			h			a	
	w	r	y	ɾ	$ɾ^w$					
	w	r	n^y							
	l									
	l									

As can be seen in (10), Guaraní has no distinctive voicing. A branching structure as in (11a) is therefore foreign to the language; it can only be filled in as in (11b):



This explains the transparency of obstruents to nasalization, as explained in the previous section. The filter in (11a) is best regarded as a language-specific parameter.

To establish the existence of two nasalization processes in Guaraní and their relative independence, consider the following examples:

(12)a.	puru?á	'to be pregnant'	b.	ãi̯aipá	> ãi̯aipá	'sin'
	pu̇ru?á	'navel'		o-manó-má	>o̥manõm^{b}á	'they all die'
	tupá	'bed'		o-hó-ne	> o̥hóne	'he will go'
	tupá	'god'		a-há-ma	> ahámã	'have gone already'

The examples in (12a) show lexically distinctive nasalization in the absence of nasal consonants. The vowels on both sides of /?/ and of /p/ are affected by nasalization, showing that obstruents are completely transparent.

Comparing the first two examples of (12b) to the second two examples we find that nasalization triggered by nasal consonants can spread from right to left and vice versa.

The examples in (13) illustrate the bi-directionality of the lexically distinctive nasalization process:

(13)	n-o-ti̇-ri	> nõtĩ̇rĩ (*nõtĩ̇ri,*notĩ̇rĩ) 'he is not ashamed'
	n-o-sẽ̇-i	> nosẽ̇ĩ (*nosẽ̇i,*nosẽ̇ĩ) 'he is not going outside'

In order to gain insight into the nature of the nasal spans we find here, compare the nasal spans in (13) to the oral ones in (14):

(14)	ãgai-té	> ãi̯ãité	'immediately'
	mara̯atú	> mãrãi̯^{g}atú	'holy'
	ma?é m+as+	> m^{b}a?em^{b}+as+	'sadness'

What they have in common is that they contain the vowel with main stress. I propose an approach that takes this into account and covers the facts in an explanatory way. Let us assume that the difference between the examples in (12) follows from the difference between lexical entries as in (15):

(15)a. [tupa]$_{\sigma}$ > tupá 'bed'

N

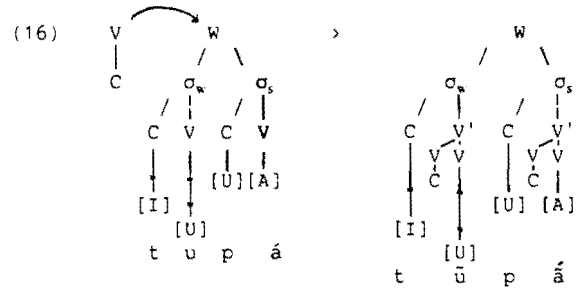
b. [tupa]$_{\sigma}$ > tu̇pá 'god'

(15) illustrates that the lexical distinction between nasalized and non-nasalized words lies in the presence versus the absence of a floating nasal component.

Structural Representation and Analysis of Guaraní Nasalization

For nasalization to be realized it must latch onto segmental structure. The most likely candidate to be picked, and one that is structurally guaranteed to be compatible (see (9)), is the prosodically most prominent one in the word: the vowel with main stress. In Guaraní stress is predicatbly word final, apart from for a few lexical exceptions.

(16)



Taking into consideration the fact that nasalization starts out at the word-level, it is perhaps the pyramid nature of prosodic structure that lies at the bottom of the centrifugal power nasalization subscribes to in this language, where the term 'centrifugal' is used to express the bi-directionality away from the segment with main stress:

(17) C V C V́ C V

N ⟵⊣ ⊢⟶ N

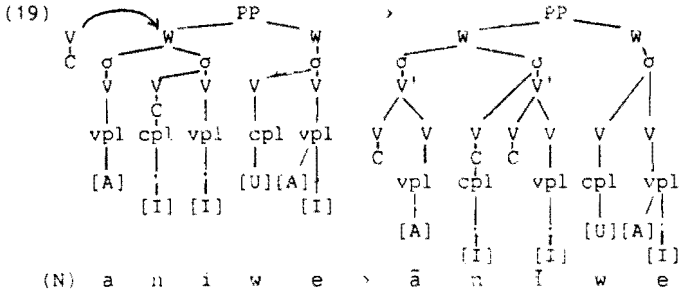
Whether or not this bi-directionality is governed by binary branching, hence pyramid-shaped, prosodic structure, the nasalization triggered by nasal consonants spreads according to the same principle, as we showed earlier in (12b).

The lexically distinctive nasalization process was argued to be triggered by a floating nasal component that latches onto the most prominent segment of the word. Having established that this process starts out at word-level, we may consider other prosodic word-level constituents to be inaccessible:

(18)

Oral stressed vowels must be protected from nasalization because both nasalization and the lack of it are lexically distinctive. If nasalization was allowed to spread into distinctively oral domains, neutralization between lexical items might result. Neutralization can be avoided with a recoverability condition. Such a condition can be formulated in terms of prosodic constituents: if nasality latches onto the structure at word-level as shown in (18a), other word level nodes will be inaccessible, whereas both prosodic words will be accessible if it latches on at a higher prosodic level. In order to ensure that nasalization triggered by nasal consonants does not proceed into a distinctively oral item either, we must assume word boundaries in general to be opaque. This stipulation can be regarded as an extension of the inaccessibility of the prosodic constituent representing the phonological word, which we need anyway. Even though nasalization by consonants is not directly

governed by prosodic structure as the lexically distinctive type of nasalization is (i.e. (18) does not apply), this process does follow the bi-directionality of the lexically distinctive process (cf. (16) and (17)). A derivation of a compounded word is given in (19):



Although nasality is said occasionally to leak into oral domains (Adelaar (1986), van der Hulst & Smith (1982)), an oral domain is never entirely nasalized. The major part of it will always remain oral, indicating that a recoverability condition is indeed at work.

We have shown how Guaraní nasalization can be dealt with without resort to binary features or a specification for orality. Regarding oral segments as recessive and invoking a recoverability condition, we can derive the outputs on the basis of nasal components spreading centrifugally from the stressed vowel to all segments it is structurally compatible with. Obstruents were shown to be transparent due to lack of distinctive voicing. Next we will analyze Terena nasalization, where many aspects are similar, but what causes the process to apply in the first place is entirely different.

Nasalization in Terena

In this section we will argue that, as in Guaraní, obstruents in Terena are transparent to nasalization, even though the process stops immediately preceding them. Secondly, we will argue that in Terena the nasal spans that surface in 1st person forms are due to something other than an urge of nasal components to spread.

The Terena phonemic inventory is given in (20); all data is from Bendor-Samuels (1960) and Trigo (1988):

(20)	p	t		k	ʔ
	m	n			
		s	s	x	h
			h^y		
	w	r	y		

The data in (21) shows that nasals do not spread nasality:

(21)	emo?u	'his word'
	yono	'he walked'
	niko	'he ate'

In (22) some examples of nasalization are given:

(22)	emo?u	'his word'	ẽmõ?ũ	'my word'
	owoku	'his house'	õwõŋgu	'my house'[4]
	piho	'he went'	mbiho	'I went'
	arunoe	'girl'	ãrũnõẽ	'my girl'

We can deduce a number of facts from this data: first, the nasalization process starts out at the left edge of a word (see third example) and, secondly, it indicates 1st person. It behaves like a prefixing morpheme consisting of a nasal component, /N/, only which, instead of surfacing as a prefix, spreads onto compatible structure until it encounters an obstruent. Thirdly, where the process stops, a nasal surfaces that is homorganic with the following obstruent. The first example shows that /ʔ/ is transparent; /ʔ/ has an obstruent manner component but no place component, as is the case with /N/ itself.

Analysis of Terena Nazalisation

In contrast to the laryngeal glides /ʔ/ and /h/, /N/ does not surface in the phonemic inventory of the language nor does it surface in output forms; /ŋ/ is not a phoneme of Terena but it does surface when nasalization stops at a velar obstruent: Nk > ŋk, surfacing as [ŋg] (see (22) owoku > owoŋgu)

I believe the underlying cause for nasalization to take place in this language at all (nasal consonants do not trigger nasalization) is the very fact that /N/ is not part of the Terena inventory: if /N/ may not surface it must either be erased or find some way to repair itself. Erasure would result in neutralization with other forms, as the examples in (22) show.

The degeneracy of /N/ is lifted once it gets a consonantal place specification. Nasalization in Terena can then be viewed as the testimony of a degenerate segment repairing itself by going out to look for such a specification.

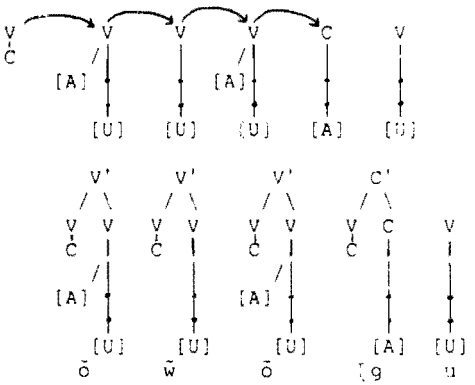
The nasalization takes place just in case the word turns out not to have an obstruent with place specification. If the nasal component does not leave its mark and does not encounter a fully specified consonant, there would still be neutralization. This fact tells us that the consonantal place specifications are not visible from a distance. In Humbert (1994) it is argued that consonantal place features are passive, and only interact passively with other structures

[4] In Terena and Guaraní voiced obstruents surface due to phonetic leakage by nasals. Neither language has distinctive voicing.

under strict adjacency universally. The same is true in Terena: consonantal place features do not spread but they are shared by /N/. The trace /N/ leaves while parsing the word is evidence of the non-visibility of consonantal place specifications over a distance.

The transparency of the placeless segment /ʔ/ shows that it is of no use to /N/, so that /N/ must continue its search. There is no reason not to assume that all obstruents are transparent. The lack of distinctive voicing in Terena predicts obstruents to be transparent the same way they were argued to be transparent in Guaraní. The reason nasalization stops at fully specified obstruents is not due to opacity of these segments but rather to the fact that /N/ is satisfied at that point. This is shown in (23).

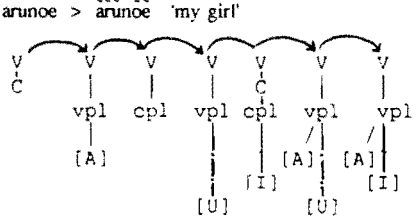
(23) owoku > õwõ-gu 'my house'

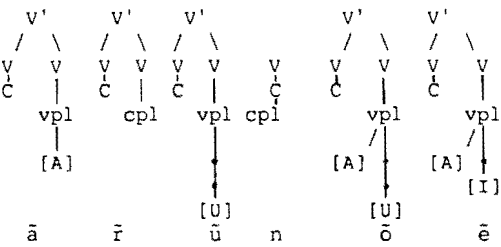


In accordance with Bendor-Samuel (1960) and Trigo (1988) I assume that no consonant clusters exist in Terena. Since we have ruled out nasalization on stops (see (9b)) the result of the nasal component and the obstruent coming together must be a complex segment.

Nasalization of /r/ does not contradict our hypothesis: since /r/ is the only liquid in the language, its susceptibility to nasalization can be ascribed to underspecification for place together with a manner component compatible to nasalization. The structural derivation of /arunoe/, illustrating nasalization of /r/ is given in (24):

(24) N + arunoe > ãrũnõẽ 'my girl'





We have shown in this section that nasals in Terena do not spread and that the nasalization we find is rather a matter of avoiding neutralization and thus of recoverability of the morphological information a prefixing nasal component carries. We have also shown that in Terena, as in Guaraní, obstruents are not opaque, even though the nasalization process stops at obstruents. This is not due to opacity of obstruents, but to the fact that the obstruent has the material to repair the nasal component so that it may surface. The framework used here allows us to give this unified account of two -in most respects- entirely different processes, without having to use many rules. We have also argued for the rather strong claim that all languages with no distinctive voicing will have transparent obstruents with respect to nasalization.

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Weak and Strong Agreement in Gitksan*

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0. Introduction

In this paper I propose an analysis of an agreement paradigm in Gitksan, a Tsimshianic language spoken in British Columbia. In particular, I discuss an apparent incompatibility between the distribution of this paradigm and the approach to agreement presented in Chomsky (1992). I show, however, that under a particular elaboration of the theory the data can be viewed as compatible with it.

1. Chomsky (1992) and Arabic agreement

Chomsky (1992) proposes that inflectional features are assigned to morphemes in the lexicon. In the syntax, these features must be licensed by a process of checking or matching. This checking may take place between a head and a NP, via spec-head agreement, or between two heads, when one head adjoins to another. Checking cannot take place in a lexical projection, and so heads and arguments must move to functional projections in order for their features to be licensed. Such movement may be overt (occur at S-Structure) or covert (occur at LF), depending on the so-called "strength" of the features involved. Strong features must be checked at S-Structure, and so the presence of strong features motivates overt movement. Weak features, however, are checked only at LF, and so are associated with covert movement.

Since the notion of feature strength plays a crucial role in the analysis which follows, it is important to establish what is meant by this term. In most of the data presented in Chomsky (1992), feature strength is determined solely on the basis of whether or not overt movement has occurred. However, a purely movement-related definition of the notion feature strength is circular - strong features motivate overt movement, while features are strong if they motivate overt movement.

Chomsky does allude to a relationship between feature strength and morphological richness, but this is not explored in detail. The only data mentioned in this context come from Arabic, and since the data are in some respects similar to the Gitksan facts, I discuss them here.

* Thanks to Barbara Sennott for providing the Gitksan data, to Michael Rochemont, Bill Dolan and Dan Everett for discussion of the issues raised in this paper and to Bruce Rigsby and Marie-Lucie Tarpent for their ground-breaking work on Gitksan and Nisgha.

In Arabic, there is a relationship between word order and the richness of subject agreement on the verb. When the verb agrees in person, number and gender with the subject, then the subject precedes the verb, as in (1).

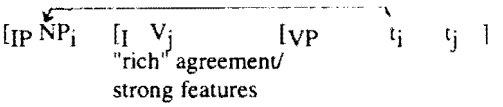
(1) al - ?awlaad - u jaa?uu
the-boys-NOM came 3pm
"The boys came" Mohammad (1989)

However, when the verb shows only default third person singular masculine agreement with the subject then the subject follows the verb, as in (2).[1]

(2) jaa?a al - ?awlaad - u
came 3sm the-boys-NOM
"The boys came" Mohammad (1989)

In Chomsky (1992), the difference between SV and VS order is accounted for by a difference in the surface position of the subject. SV order arises when the subject raises overtly from the VP to the specifier of a functional projection which dominates VP, as in (3). This overt raising can be motivated only by the need to check strong features.

(3) S-Structure



Thus the sentences which exhibit SV order in Arabic must have strong agreement features. Recall that the SV sentences are also those which have morphologically rich agreement. Thus one can derive a correlation between strong agreement features and morphologically rich agreement.

Similarly, morphologically weak agreement correlates with weak agreement features. In Chomsky (1992), VS order occurs when the subject remains in the VP and does not undergo overt raising, as in (4). Overt raising fails to occur because there are no strong features needing to be checked

[1] Everett (pc) notes that the correlation between SV order and rich subject agreement exhibited by Arabic may not be typical. In Yagua (Everett 1989), for example, VS order occurs when a subject clitic is present, while SV order occurs when there is no person-marking clitic.

(4) S-Structure

$[_{IP}\ [_{I}\ V_j$ "impoverished" agreement/ weak features $[_{VP}\ NP\ t_j\ ]$

Thus the sentences which exhibit VS order in Arabic have weak agreement features. These same sentences have morphologically impoverished agreement, and so a correlation between weak agreement features and impoverished morphology can be derived.

2. Gitksan agreement

In the previous section I illustrated that in Arabic strong features correlate with overt movement and rich morphology, while weak features correlate with covert movement and impoverished morphology. In this section I consider some data from Gitksan which appear to be problematic for this approach to agreement.

Series II agreement in Gitksan has the following forms (Rigsby 1986:413):

(5) Series II agreement

	sing	plural
1	-y'	-m'
2	-n	-s m'
3	-t	-ti:t

These agreement morphemes appear suffixed to lexical heads, and may license a coreferential pro, as in (6), in which the /-t/ suffix licenses a third person singular pro subject.

(6) ka? - ə - **t** t = John
see-erg-3sg cn=John
"S/he saw John"
ga'at t John

Series II agreement can also cooccur with a third person overt argument, as in (7), in which the /-t/ suffix is coreferential with the overt subject "Mary".

(7) nim naks - x^w - ə - **t_i** = qat = s **t = Mary$_i$** t = John
want marry-pass-erg-3=rep=case cn=Mary cn=John
"Apparently Mary wants to marry John"
nimnaksxwitgas Mary t John

An overt subject licensed by Series II agreement must occur in postverbal position, as in (7), rather than in preverbal position, as illustrated by the ungrammaticality of (8), in which the subject precedes the verb.

(8) *$\mathbf{t = Mary_i}$ nimnaks - x^w - ə - $\mathbf{t_i}$ = qat = s t = John
subject verb object

3. Accounting for Series II agreement

The facts just outlined are problematic for Chomsky's approach to agreement. In Chomsky's model, pro is licensed in a SPEC-head relation to strong (rich) agreement. That Series II agreement can license pro therefore suggests that it must be associated with strong features. However, Series II agreement does not motivate S-Structure raising of overt NP subjects, and in this respect it behaves as though it is associated with weak features.

So far the notions of feature strength and morphological richness have been left at a rather intuitive level. I argue that under explicit definitions of these terms, Series II agreement can be viewed in such a way that it is compatible with Chomsky's model.

Specifically I propose the following definitions of feature strength and morphological richness for Gitksan:[2]

(9) **Feature Strength (Gitksan)**
A feature is strong if it is associated with a morphologically rich agreement morpheme.

(10) **Morphological Richness (Gitksan)**
An agreement morpheme is morphologically rich if it overtly encodes both person and number features.

Under this definition of morphological richness, all members of the Series II agreement paradigm, as given in (5), are morphologically rich, since each morpheme represents a particular combination of person and number features. It therefore follows under (9) that the features associated with each of these morphemes is strong. This means that pro subjects must undergo raising at S-Structure to preverbal position, in order to license the strong agreement features associated with it. Thus the S-Structure associated with a sentence such as (6) will be that given in (11).

[2] These definitions are also compatible with the Arabic data considered earlier. Further research is required to determine whether they are more widely applicable.

(11) **[pro]$_i$** ka? - ə - **t$_i$** t = John
3sg see - erg - 3sg cn=John
"S/he saw John"
ga'at t John

This account cannot be extended to explain sentences containing overt subjects, however. Overt subjects licensed by Series II agreement remain in postverbal position, and this is incompatible with the presence of strong features on the verb. A solution to this problem lies in the fact that Series II agreement with overt subjects patterns slightly differently from Series II agreement with pro. As was first noted in Tarpent (1988), Series II suffixes do not differentiate between third person singular and third person plural when cooccurring with overt subject NPs.[3] This is illustrated in (12) and (13), in which the Series II agreement marker takes the form /-t/ regardless of whether the subject is singular (12) or plural (13).

(12) nim naks - x^w - ə - **t$_i$** = qat = s **t = Mary$_i$** t = John
want marry-pass-erg-3=rep=case cn=Mary cn=John
"Apparently Mary wants to marry John"
nimnaksxwitgas Mary t John

(13) ɬis = ɬ simim - naks - **t$_i$** - ma = s **[tip John qan t = Mary]$_i$**
already = cn tog-marry-3-probably=case cn John and cn=Mary
"John and Mary probably got married already"
hlishl simimnaksdimas dip John gan t Mary

In fact, it is ungrammatical for the expected 3pl Series II morpheme (/-ti:t/) to cooccur with a 3pl overt subject, as illustrated in (14).

(14) *ɬis = ɬ simim - naks - **ti:t$_i$** - əma = s **[tip John qan t = Mary]$_i$**
3pl

This suggests that Series II agreement should not be viewed as a single unified paradigm, but rather as two subparadigms. As well as the morphologically rich paradigm already discussed, there is also a morphologically impoverished paradigm, consisting solely of the morpheme /-t/:

[3] Tarpent's observation was based on comparable data from Nisgha, a language which is very closely related to Gitksan.

(15) Revised representation of Series II agreement

	morphologically rich paradigm		morphologically impoverished paradigm
	sg	*pl*	
1	-y'	-m'	
2	-n	-s m'	
3	-t	-ti:t	-t

Unlike the suffixes in the rich paradigm, which are specified for both person and number features, /-t/ is specified only as third person, with no value for number. It is thus morphologically impoverished, and is therefore associated with weak features. Since its features are weak, they do not motivate overt movement. This accounts for why overt subjects occur postverbally.

One question raised by this split paradigm analysis is why pro occurs only with the rich agreement paradigm, while overt NPs occur only with the impoverished paradigm. That pro must be licensed by rich agreement is explained by the requirement that the features of pro must be recovered or identified, as claimed by Rizzi (1986) and others. It is more difficult to explain why overt NPs can occur only with the impoverished paradigm. One possible explanation is in terms of economy. Chomsky (1992:43) claims that LF movement is "cheaper" than overt movement. Since a derivation in which NPs cooccur with impoverished agreement allows covert movement, it is more economical than one in which they cooccur with rich agreement and thus must move overtly. However, such an explanation would need to allow for parameterization, given that in Arabic overt NPs can cooccur with either rich or impoverished agreement.

4. Conclusions

In this paper I have proposed an analysis of Series II agreement in Gitksan which is consistent with the general approach to agreement outlined in Chomsky (1992). In the course of the analysis I have elaborated on Chomsky's proposal by providing specific definitions of feature strength and morphological richness. I have claimed that the Gitksan Series II paradigm consists of two subparadigms, one of which is associated with strong features and licenses pro arguments and the other of which is associated with weak features and licenses overt NP arguments.

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PREPOSITIONS AND THE DOMAINS OF INCORPORATION*

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0. Introduction. I outline here a semantically-based approach to the phenomena of morphological incorporation in universal grammar, which will be applied to some issues in the investigation of argument structure. In the Minimalist framework (Chomsky 1992), parametric differences across languages are characterized as manifestations of differences in the strength of particular features. Verb raising and Wh-movement can be defined as reflexes of "strong" vs. "weak" features in particular grammars; these processes are language universal by LF, but are strong (i.e., overt in the syntax) in some languages, and weak in others. In this paper, I propose that the feature of Quantifier Raising varies parametrically in strength across languages, and produces contrasts in argument type. In some languages, the raising of quantified or definite NPs is a weak feature that may be delayed until LF; in others, it is a strong feature that receives overt syntactic expression. In languages without determiner quantification, the default interpretation of NPs (or Determiner Phrases) is definite. These DET P are confined to adjunct positions in the syntax, corresponding to their operator positions at LF. In languages with this feature, we see only pronominal arguments, as in many "incorporating" or "polysynthetic" languages of Native America (Jelinek 1984, 1993 a,b; Baker 1992).

Logical Form is a level of representation where linguistic expressions are distributed according to their semantic type. Languages vary parametrically with respect to whether the overt syntactic distribution of elements of a particular semantic type corresponds to the LF distribution of these elements. The morphological incorporation of an expression is constrained by its semantic type; incorporation is permitted only when the expression appears in the domain of the sentence that corresponds to its proper LF domain.

It is the semantic feature of definiteness that underlies the definition of these semantic types and their LF domains. Evidence in support of these claims will be drawn from a survey of the properties of morphological incorporation of direct arguments, as well as certain oblique arguments (adpositional phrases) in some Native American languages.

1. The distribution of (In)definiteness. Diesing (1990, 1992) argues that the syntactic division of the sentence into IP vs. VP corresponds to the parts of the sentence which map into the restrictive clause vs. the nuclear scope of the

semantic interpretation of the sentence, in a tripartite representation of the kind developed by Heim (1982), Kamp (1981) and Kratzer (1989).

1) The Mapping Hypothesis (Diesing 1990, 1992)

a. VP maps into the Nuclear Scope (the domain of existential closure)
b. IP maps into the Restriction (on some quantifier)

Indefinite subjects introduce variables under the scope of a quantifier, as in (2).

2) Cellists seldom play out of tune.
Seldom $_x$ [x is a cellist] x plays out of tune

Aside from contexts of this kind, existential constructions, and agents that receive their interpretation within the VP, subjects are presuppositional and definite, established in the discourse as old information. Indefinite object NPs introduce new information, and receive default existential closure within the VP. Quantified or Definite object NPs, as well as morphologically indefinite NPs on a presuppositional reading, are raised out of the VP by LF. In some languages, this subject/object asymmetry with respect to definiteness is overt in the syntax, as seen in the following examples from Egyptian Arabic.

3) a. kaan fii-h talaat Talaba fi-l 'ooda.
was in-it three students in-the room
There were three students in the room.

b. walad kaan biyiktib dars-uh
boy was writing lesson-his
A boy was writing his homework. [one of the students]

In Ex. (3b), reference is to one of a presupposed set; otherwise, Egyptian Arabic excludes indefinite subjects. To begin a discourse, one would say

4) kaan fii-h walad biyiktib dars-uh
was in-it boy writing lesson-his
There was a boy writing his homework.

Finally, the subjects of generics in Egyptian Arabic are marked definite in the syntax. Reference is to a specific class. Definite subjects in generics are not uncommon across languages.

5) 'il-fiil luh widaan kibiira
DET-elephant for-him ears big
The elephant has big ears.

In contrast to this distribution of definites, we may safely predict that NO language requires subjects to be *indefinite*.

Note also that nominals above IP, as in Quantifier-raising at LF, or adjoined topics, must also be definite/specific:

6) a. The boy, he did his homework.
b. *A boy, he did his homework.
c. The boy, I saw him.
d. *A boy, I saw him.

In sum, the distribution of arguments is:

7) By LF, indefinite nominals appear in the VP; presuppositional nominals appear above the VP.

In some languages, definite object pronouns raise to IP in the syntax, while definite object NPs remain in the VP until LF (Diesing and Jelinek 1993). The following Blackfoot examples are adapted from Fox and Frantz (1979), who argue that the final element in (9) is an object clitic, since it excludes a coreferential NP. I assume a verb-raising analysis of Blackfoot where the verb raises to adjoin Tense and the pronominal inflection in IP.

8) nohkowa iinoyii-wa koko'siksi
my:son see:PAST-3sg your:kids
My son saw your kids.

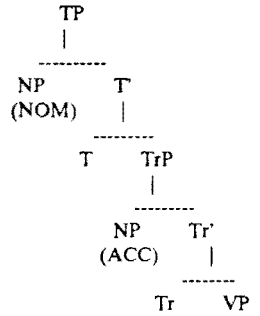
9) nohkowa iinoyii-wa-iksi (*koko'siksi)
my:son see:PAST-3sg-3pl
My son saw them.

In addition to splits of this kind in the distribution of object pronouns vs. NPs, there are also contrasts across languages in case-marking within the class of object NPs, to be described in the following section.

2. The case of indefinite objects. In the Minimalist framework, subject and object NPs raise out of VP-internal positions to [Spec, AgrS] and [Spec, AgrO] positions, where they are case-checked. I follow Murasugi (1992) in assuming that subject NPs are case checked at a [Spec, Tense] position at the top of the

syntactic tree, corresponding to [Spec, AgrS]; and object NPs are case-checked at a [Spec, Transitive] position, equivalent to [Spec, AgrO] in some (non-ergative) languages. In a somewhat different analysis, Kratzer (1992) proposes that the functional head associated with transitivity should be recognized as a VOICE node. The structure I propose is shown in (10).

10)



It is of interest that there are languages where object NPs that differ only with respect to definiteness or specificity are not case-marked the same. Turkish and Finnish are examples. Where such a contrast in object case-marking is present, definite NPs receive overt Accusative case, and indefinite NPs do not; this suggests that in these languages, only definite NPs are case-checked at the [Spec, Tran] position in IP. If this is so, there are two possibilities to consider for languages where indefinite object NPs do not show structural case:

11) a. Indefinite objects have some non-structural case; or
b. Indefinite objects have no case.

I propose that both of these possibilities are realized. Indefinite objects in some languages may show some overt non-structural or oblique case, and in other languages indefinite objects may be incorporated, and thus entirely lack case marking. Let us consider some evidence on these points.

2.1. Overt case on objects. In Turkish, definite objects show Accusative case, while indefinites show no overt case. Enč (1991) gives the following examples, cited by Diesing (1992).

12) a. Ali bir kitab-i aldi
Ali one book-ACC bought
A book is such that Ali bought it.

12) b. Ali bir kitap aldi
Ali one book bought
Ali bought some book or other.

Partitive case appears on indefinite objects in Finnish. Belleti (1988) argues that this is true of Italian also.

13) Hän pani kiriat pöydälle
he put the books (ACC:PL) on the table
He put the books on the table.

14) Hän pani kirjoja pöydälle
he put (some) books (PART:PL) on the table
He put some books on the table.

Partitive is an oblique case that also has other functions in Finnish (Vainnika 1989). What is of concern here is the fact that it is a non-structural case that can be used to mark indefinite objects.

In Persian, specific vs. indefinite objects NPs are case-marked differently (Karimi 1990; p.c.).

15) in ketab *ra* did-am
this book *ra* saw-I
I saw this book. (Specific object)

16) emruz ketab xarid-am
today book bought-I
I bought books today. (Indefinite object)

Karimi shows that *ra* appears elsewhere as well, on topics and other adjuncts.

17) a. ketab *ra* xarid-am-es
book *ra* bought-I-it
As for the book, I bought it.

b. šab-e piš *ra* aslạn na xabid-am
night-EZ last *ra* at all NEG slept-I
As for last night, I didn't sleep at all.

Karimi concludes that *ra* marks specific adjuncts. I will return to this point in a moment.

2.2. Transitivity and indefinites. In the Eskimo Anti-Passive (Woodbury 1977) indefinite nouns do not show the ABS case that appears on definite transitive objects. Compare:

18) a. miirqa-t paar -ai
child-(ABS)pl take care of-IND:3sg:3pl
She takes care of the children.

b. miirqu-nik paar-si -vuq
INSTpl -ANTIPASSIVE-IND:3sg
She takes care of children.

In Anti-Passives generally, the indefinite object is marked oblique and the sentence is marked intransitive. This is evidence that Anti-Passive patients do not raise to a specifier position in IP for case-checking.

2.3. The incorporation of indefinites. Another kind of intransitive construction where indefinite arguments fail to receive overt object case are those showing noun incorporation. Baker (1988) argues that nouns incorporate only from positions properly governed by the verb. Most commonly, an incorporated noun corresponds to a transitive object, and is unmarked for case, number or definiteness. The examples in (19) are from Yaqui, an SOV language (Uto-Aztecan).

19) a. Peo u-ka papa-ta vesuma
Pete DEM-ACC potato-ACC peel:IMPERF
Pete is peeling the/that potato. [Definite]

b. Peo papa-ta vesuma
Pete potato-ACC peel:IMPERF
Pete is peeling a potato. [Non-specific/Indefinite]

c. Peo papa-vesuma
Pete potato-peel:IMPERF
Pete is potato-peeling. [Non-referential]

In (19a), the object NP is definite; (19b) permits either an indefinite or a non-specific presuppositional reading of the object; in (19c) potatoes represent entirely new information in the discourse. Incorporation produces a single phonological word. Much less commonly across languages, Unaccusative subjects incorporate. A Mohawk example (Hopkins 1988:238):

20) te-yo-itshat-a-yv-0
du-ZP-cloud-J-be lying-stat
It's cloudy.

Agents, including unergative subjects, do not incorporate, since they are not properly governed by the verb.

In "Classificatory noun incorporation", the verb remains transitive. A Mohawk example (Mithun 1986:34) is shown in (21), and an (uncommon) English example in (22).

21) onu:ta' wa'-k-hnek-i:ra
milk PAST-1sg.-liquid-consume
I drank milk.

22) I was baby-sitting little Pete.

Constructions like (21, 22) appear to represent a derivational process in the lexicon. Some incorporated nouns do not correspond thematically to objects:

23) Peo maaso-ye'e
Pete deer-dance:IMPERF
Pete is deer-dancing (performing the deer dance).

Whether noun incorporation is lexical or syntactic is not at issue here. What is relevant is the fact that the resulting complex form appears in the VP. If we assume that structural case is checked only in a specifier position in IP, then it follows that incorporated indefinite objects cannot show structural case.

Incorporated nouns participate in complex predicate formation. While the incorporated indefinite noun is not referential, it is subject to existential closure if the verb is subcategorized for an object.

24) Peo maaso-peute-n
Pete deer-butcher:IMPERF-PAST
Pete was butchering deer.

Compare (23), where no deer need be present. Existential closure may be blocked by certain modal properties of the verb, whether or not incorporation is present.

25) a. Pete was dinosaur-hunting.
b. Pete was hunting dinosaurs.

Baker (1988) provided a unifying account of noun incorporation in terms of proper government. Note that the feature of (in)definiteness provides for the same distribution of noun incorporation, demonstrating the underlying semantic motivation for incorporation phenomena.[1]

2.4. To summarize this section: The overt case marking of indefinite NP objects varies across languages. We see indefinite objects that

26) a. Have the same case-marking as definites (either overt or null);
b. Have some non-structural case (oblique, partitive);
c. Incorporate, and show no case marking.

All object NPs receive their semantic interpretation within the VP. Where a language shows a contrast in the overt case marking of object NPs according to definiteness, only definite NPs raise to [Spec, Tran] for structural case-checking, while indefinites remain within the VP, receiving a non-structural case or undergoing incorporation into the verb.

While both definite and indefinite NPs may appear in the VP in the overt syntax across languages, there is universal raising of all quantified or definite NPs to operator positions by LF. By LF, if not before, the sentence has sorted itself out via raising: indefinites participate in predicate formation, and presuppositional NPs have moved into adjoined operator positions. This suggests a motivation for the fact that the particle *ra* in Persian marks both specific objects and adjuncts; in Persian, definite objects may not remain in the VP in the syntax, but must raise to an adjunct position.

3. Domains of incorporation. Just as there is a specific domain for the incorporation of indefinites, the VP, there is a domain for the incorporation of definites; this is IP. Pronouns are necessarily definite, and must raise out of the VP by LF. Pronouns are also heads, and may incorporate into an inflectional head in IP as affixes or clitics (Baker and Hale, 1990). These facts suggest the following:

27) Incorporation Principle

> An argument incorporates only in that domain of the sentence that corresponds to its LF distribution.

That is, an argument may undergo morphological incorporation only in the domain of the sentence (VP or IP) where it must appear by LF. The Incorporation Principle predicts that although definite NPs may remain within the VP in the overt syntax, they may not undergo the morphological process

of incorporation in the VP, or even in IP, since they appear in operator positions at LF.

3.1. Incorporation within IP: pronouns. Pronouns are familiar variables that need to escape default existential closure by LF. Pronouns may incorporate in IP, again a process subject to parametric variation. Incorporated pronouns constitute pronominal arguments, which can be distinguished from agreement on the basis of the exclusion of coindexed NPs in A-positions, as we saw above in (9), the Blackfoot example. Incorporated subject pronouns are more common across languages than incorporated object pronouns; the problem of analysis is sorting out subject agreement, with "pro-drop", from true pronominal subjects with associated topics or adjoined predicates -- grammars where NPs are confined to adjunct positions. Jelinek (1993a, in press) argues that languages that lack Determiner Quantification exclude NPs from argument positions. Navajo lacks Determiner Quantification, and when a free-standing pronoun is added to a sentence, it apparently produces a topic-like construction (Willie 1991; Jelinek and Willie 1993).

29) a. yíníɬts'ee'
2s:ate:mushy substance
You ate mushy stuff.

b. ní yíníɬts'ee'
you 2s:ate:mushy substance
YOU, you ate mushy stuff.

Since free-standing pronouns are adjoined for contrastive emphasis, it is semantically odd to include more than one. These pronouns do not mark case. The Navajo sentence in (30) is apparently worse than its suggested gloss.

30) ?* ní shí shiiniltsą́
you I 1sO-2sS-saw
YOU saw *ME*.

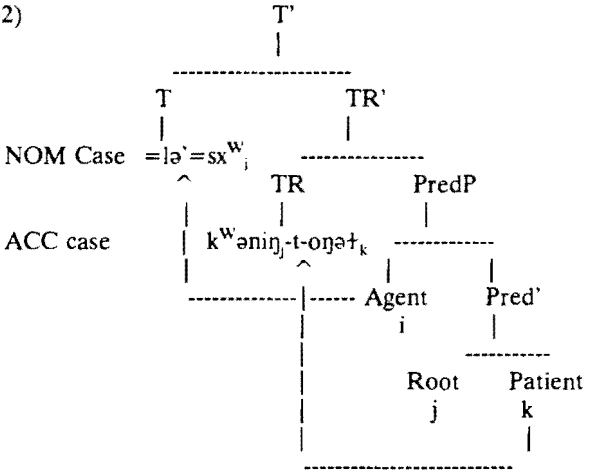
Straits Salish is one of the pronominal argument languages that have NO free-standing pronouns, only pronominal affixes and clitics. There are no pronouns that may be added to Ex. (31).

31) nəp-t-oŋəɬ=lə=sx^{w}
see-TRANS-1pACC=PAST=2sNOM
You advised us.

It seems desirable to avoid invoking complete paradigms of null pronouns

(subject, object) just in order to "drop" them. A welcome aspect of the Minimalist program is that systematic properties of the lexicon must be confronted, since the derivation builds upward from the lexicon. In the tree sketched in (32), arrows show the movement paths of the pronominal arguments in Straits Salish, which raise to incorporate into the inflectional heads TENSE and TRANSITIVE. Transitivity in Salish is marked in an overt inflectional head.

32)



k^wəniŋ-t-oŋəɬ =lə'=sx^w
help-TRAN-1pACC =PAST=2sNOM
You helped us.

The predicate root raises successively to adjoin TRAN and TENSE, producing the observed order of constituents.

Salish Determiners derive "headless" relatives from any sentence by binding a variable within it. There are no lexical categories uniquely associated with VP vs. DET P. Any open class word may serve as the lexical head of either.

33) a. k'^wey'=0 cə nə-ŋənə
hungry=3ABS DET my-child
He is hungry, the (one who is) my child.

b. nə-ŋənə=0 cə k'^wey'
my-child=3ABS DET hungry
He is my child, the (one who is) hungry.

If the adjoined DET P are assumed to be in A-positions, binding violations appear.

34) q'əq'enəɬ=0 'aɬ š-šət-ŋ-s cə 'əs'eləx^{w}
slow=3ABS CONJ SBD-walk-MIDDLE-3POSS DET elder
(he$_i$ is slow when he$_i$ walks, the elder$_i$)
The old man is slow when he walks.

Despite the position of the Determiner Phrase after the temporal clause verb, this sentence does not mean:

35) *he$_i$ is slow when the old man$_j$ walks

See Baker (1992) for arguments that nominals are not in A-positions in Mohawk, and Jelinek and Willie (1993) for similar arguments for Navajo.

3.2. Some properties of IP-incorporation. IP-incorporation differs from VP-incorporation in a number of ways, as shown in Table 1.

Table 1

VP-Incorporation	IP-Incorporation
1. Indefinites	1. Definites
2. Head nouns	2. Pronouns
3. Objects	3. Any grammatical relation
4. No case	4. Any structural case

These properties all follow from the Incorporation Principle. (1) states the distribution of the feature of definiteness across VP vs. IP, and (2) is the distribution of this feature across the categories noun vs. pronoun. (3) follows from the distribution of grammatical relations with respect to IP/VP. Pronouns raise out of the VP by LF, and may incorporate into either TENSE or TRANSITIVE in IP, according to their case features. (4) follows from the fact that all structural cases are checked in IP. A property common to VP and IP is that definite NPs cannot incorporate in either; they do not appear in either VP or IP at LF. If noun incorporation derives complex predicates, then the following associations between incorporation domains and semantic types appear:[2]

36)

VP	IP	Adjunct
<e,t>	<e>	<<e,t>t>

3.4. Pronominal Argument languages. In languages with exclusively Pronominal Arguments, the definite DET P are in adjunct positions and bind variables within the sentence. These variables are overt Pronominal Arguments, that have structural case features, and are case checked in IP. The Pronominal Arguments satisfy the principle of full interpretation, and thus no DET P are required for grammaticality.

37) a. Pronominal Argument languages: Determiner Phrases are confined to adjunct positions in the overt syntax, as they are at LF.

b. Lexical Argument languages: The syntactic distribution of Determiner Phrases does not correspond to their LF distribution.

DET P cannot incorporate; as complex derived constructions they include their own domains of incorporation.

38) a. cə leŋ-t-ən Incorporated subject pronoun
DET see-TRAN-2sSUBORD
the (one) you saw (Straits Salish)

b. the car-washing Incorporated noun

3.5. (In)definiteness in PA languages. In both Navajo and Straits Salish, definiteness is not marked in the Determiner system, and there is no Determiner Quantification. While the default interpretation of Determiner Phrases is definite, an indefinite interpretation is possible in certain quantified contexts, including existentials.

3.5.1. Indefinites in Navajo. There is a class of verbs in Navajo, traditionally called the "handling" verbs, that "classify" their objects or unaccusative subjects.

39) shá'ní'ą
1s-to-3-lend:roundish object
He lent me a roundish object. (cf. a coin)

40) neiníką
2s-to-3s-gave:open container with contents
He gave a container-full to you. (cup of coffee, can of peaches, etc.)

An adjoined nominal coreferent with the theme may receive an indefinite reading. These verbs do not merely agree with the theme, but assign properties to it.

41) a. béeso naa ní+tsooz
money 2s-to 1s-gave-flat, flexible object
I gave you a dollar bill.

41) b. béeso naa níjaa'
money 2s-to 1s-gave-small plural objects
I gave you coins.

These verb classes mark the following features of the transitive object or an unaccusative subject:

42) a. solid roundish
b. slender flexible
c. slender stiff
d. flat flexible
e. single animate
f. mushy substance
g. plural
h. small plural objects
i. non-compact, soft
j. in open vessel
k. load, quantity

I consider these complex verbs to be instances of "classificatory" incorporation. Navajo also has a verbal prefix *'a-* that derives an intransitive verb used to describe an activity or state of affairs.

43) a. 'a-jiyá
s.t.-4:eats
He is eating.

b. na-'a-+'éé+
about-s.t.-floats
There is boating.

3.5.2. Indefinites in Straits Salish. Salish shows classificatory incorporation of indefinites in the "lexical" suffixes. Montler (1986) lists fifty-eight of these in Saanich, including:

44) a. -k^{w}lə? "inside surface of an open container"
b. x^{w}t'ək^{w}-k^{w}ilə? "she's washing dishes"

Straits Salish also has a detransitivizing suffix which derives an "anti-passive" construction that usually describes a culturally recognized activity.

45) x^{w}əl'k'-el's=0
roll-s.t.=3ABS
He's rolling (cf. a cigarette).

Both (44) and (45), like the Navajo (41, 43) are morphologically intransitive. Both Salish and Athabaskan have overt valence markers in the verbal system.

4. Incorporated prepositions and their objects. Straits Salish shows only a single preposition, which serves to mark adjuncts oblique; this particle might also be considered an oblique case marker. This Salish prepositional phrase never incorporates. In contrast, Navajo is very rich in postpositions, and in the incorporation of postpositional phrases.

4.1. Navajo. Willie (1991) divides Navajo postpositions into two primary classes: "Grammatical" vs. "Lexical".

46) a. Grammatical postpositions appear suffixed to a pronoun;
b. Lexical postpositions appear suffixed to a noun phrase.

Grammatical postpositions (GP) include semantic relations often expressed by oblique cases across languages: Dative, Benefactive, Malefactive, Comitative, Comparative, etc. Lexical postpositions (LP) are exclusively locative and directional in meaning. LP derive oblique adjuncts.

47) Kinłání-góó déyá
Flagstaff-to I will go
I will go to Flagstaff.

48) Kinłání-jí déyá
-up to
I will go as far as Flagstaff.

The GP fall into three morphological classes (Young and Morgan 1992).

49) A. Postpositional phrases that are never incorporated;
B. Postpositional phrases that occur both incorporated and free-standing in particular verb complexes;
C. Postpositional phrases that always incorporate.

Nothing may interrupt the complex formed by the GP Phrase plus the verb, whether or not there is phonological incorporation. These complexes are directly comparable to "verb particle" constructions in English, and represent a derivational process in the lexicon. In the following examples, postpositions are underlined. Example of a Type A GP phrase (unincorporated):

50) shich'į yááłti'
1s-to 3-spoke
He spoke to me.

Evidence that the GP + Verb complex is a derived verb is provided by the

scope of the Direct-Inverse voice alternation. Compare the English "pseudo-passive" with the gloss for (51b).

51) a. yich'į yáá+ti'
3-to 3-spoke (DIRECT)
He spoke to him. (Agent focus)

b. bich'į yáá+ti'
3-to 3-spoke (INVERSE)
He was spoken to by him. (Patient focus)

The Inverse voice alternation occurs also with simplex verbs:

52) a. yizta+
3-3-kicked (DIR)
He kicked him.
(Agent focus)

b. bizta+
3-3-kicked (INV)
He was kicked by him.
(Patient focus)

"Psych verbs" in Navajo contain Experiencer pronominal arguments as GP objects, comparable to "Dative Subjects" (Belletti and Rizzi, 1988). Type A examples:

53) shi+ nizhóní
1s-with 3-nice
I like it. (with me, it is nice)

54) shiyáh hodeeshiz
1s-under 3-twists
I'm "spooked" (suddenly frightened).

Examples of Type B GPs occurring incorporated and unincorporated:

55) a. yik'iníyá
3-at-Perfect-3-arrive (DIR)
He "came across" him/he found him.

b. bik'iníyá
3-at-Perfect-3-arrive (INV)
He was found by him.

56) bee ńdadii'na'
3-with 1p-stood up
We voted on it.

A Type C Grammatical Postposition always incorporates.

57) shich'ahóóshkeed
1s-P-3-scold
He scolded me ("bawled me out").

In addition, Young and Morgan analyze some Navajo verbs as containing "null postpositions"; these are triadic verbs.

58) shiidiitsih
1IO-3O-3S-pointed
He pointed it at me.

Navajo also has a large class of adverbial prefixes that mark path and direction, but do not change the valence of the verb.

59)	a. 'a-	away
	b. 'ahá-	apart
	c. dáá-	leave behind

4.2. Straits Salish. There are no prepositions that take either nouns or pronouns as objects. There is a small set of relational/directional prefixes comparable to the Navajo prefixes in (52); they do not affect valence.

60) Possessive Relational

a. sɬeniy'=sən
female=1sNOM
I am a woman.

b. č-sɬeniy'=sxw
PSR-female=2sNOM
You have a wife (are "wived").

61) Directionals

a. ƛ'i-x^{w}otqəm=sən
to-waterfall=1sNOM
I [am going] to Bellingham.

b. čə-x^{w}otqəm=sən
from-waterfall=1sg
I [am] from Bellingham.

Ex. (60b) is a simple Possessive sentence. Note that the examples in (60) and (61) are all intransitive. The single free-standing preposition or oblique case marker introduces only oblique adjuncts:

62) a. k^{w}ənəŋ-t-ŋ=sən ə cə nə-men
help-TR-PASS=1sNOM OBL DET 1sPOSS-father
I was helped by my father. (Oblique agent)

62) b. qey'ləs=0 'ə ti'ə qəyəs
sad=3ABS OBL DET day
He is sad today. (Temporal adjunct)

There are no ditransitive predicates. For the predicate glossed "give", the goal argument is Accusative, and the theme is an optional oblique adjunct.[3]

63) 'oŋə-t-0=sən cə siem 'ə cə sčeenəx^{w}
give-TR-3ABS=1sNOM DET chief OBL DET fish
I gifted the chief with the fish.

The goal argument is the Passive subject.

64) a. 'oŋəs-t-0=sx^{w}
give-TR-3ABS=2sNOM
You "gifted" him.

b. 'oŋəs-t-ŋ=sx^{w}
give-TR-PASS=2sNOM
You were "gifted".

There are locative and directional "prepositional" predicates that build main clauses.

65) a. sɬəq^{w} to go through
b. λ'əčələwəɬ to be underneath
c. 'nəwəɬ to be inside
d. ɬel to go ashore

66) 'əstesɬ=sən 'ə cə swəy'qə'
near=1sNOM OBL DET male
I am close to the man.

4.3. Summary on Adposition Incorporation. Salish has no incorporated oblique arguments and no triadic verbs, while a large class of Navajo verbs have constituents of this kind. The property which distinguishes Grammatical vs. Lexical postpositions in Navajo is:

67) a. Grammatical postpositions add an argument in the verb complex.
b. Lexical postpositions add adjuncts to the sentence.

The Grammatical postpositions occur with prononinal objects and the Lexical postpositions do not, since Navajo is a Pronominal Argument language.

The Navajo Grammatical postpositions constitute a closed class of inflectional heads. As with light verbs and auxiliaries, they cannot occur without a "main" verb; they are what Craig and Hale (1988) call "relational preverbs", that add

an applicative argument to the sentence. Evidence that this GP object is a "core" argument in Navajo can be drawn from two sources: 1) the applicative is the subject in the Inverse (Passive-like) construction, as we saw above in (51b); and 2) the applicative corresponds to a "Dative Subject" with psych verbs, as in (53, 54).

In contrast, Straits Salish permits a maximum of two IP arguments. There are no triadic verbs. Verbs in the "give" class take the goal as direct object, and this goal is the Passive subject, as in (64b). Note that Salish has no "light" verbs; no auxiliaries, no copula, no Possessive "have". The lexicon includes only predicates and various operators and inflectional items. Therefore, there are no grammatical prepositions, only the single lexical preposition or case marker that serves to introduce all oblique adjuncts, as we saw above in (62).

5. Conclusions. I have argued that where elements incorporate, they do so according to the Incorporation Principle:

27) An argument incorporates only in that domain of the sentence that corresponds to its LF distribution.

That is, arguments may not incorporate in sentential domains where they may not appear at LF. Since quantified or definite NPs universally appear in adjoined positions by LF, they cannot incorporate at any level of the sentence. We see the incorporation of indefinites in the VP across languages, and the incorporation in IP of definite pronouns corresponding to the core arguments, in Pronominal Argument languages where DET P are excluded from argument positions. Defining the domains of incorporation permits us to recognize the central role of the semantic feature of definiteness and its distribution in morphological variation across languages.

To say that an element attaches because it is an affix, and a clitic "leans" because it is a clitic, does not provide us with any new information. Elements incorporate because of the kind of movement process they undergo. Head movement applies to incorporation processes, for indefinites in the VP, and for definite pronouns in IP. In contrast, NPs may raise to Spec positions in IP or "scramble"; quantified or definite NPs may not incorporate, since they are restricted to adjunct positions by LF. The domain of the sentence in which an element may incorporate is defined in terms of its semantic type, and reflects the LF distribution of these semantic types. The phenomena of incorporation across languages provides important empirical evidence on semantic types and Logical Form as levels of linguistic structure.

NOTES

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[1] Mark Baker (to appear) claims that definite nouns may incorporate in Mohawk. If Baker's examples can be identified as instances of "classificatory" noun incorporation, where there is a definite object pronoun present as well as the incorporated noun, there would be no conflict with the view of incorporation domains proposed here.

[2] See Partee (1987) for an analysis of the semantic types which may be associated with noun phrases.

[3] Montler (1986) identifies a type of Benefactive construction in Saanich where the goal argument becomes the direct object, and the theme is either an ablique adjunct or may be represented in a "lexical" suffix.

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Local vs. Regional Place Naming Conventions in Alaskan Athabaskan Languages

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0. Introduction

Athabaskan is a large spreading language family, the largest language family in area of occupation of comparable homogeneity in Native North America.[1] One indication of the impact of the Athabaskans on prehistoric North America is the distribution of Athabaskan place names in vast, continuous networks of ecosystems in Alaska, northern Canada, coastal Oregon-California, and the Southwest. In the past twenty years I have had the privilege of working with expert speakers of several of the Alaskan Athabaskan languages. I have been compiling place names lists and researching the lexicon, geography and territory of a number of the languages.

In a series of papers I have been exploring regional prehistory, especially in central and western Alaska and in the Cook Inlet area (Kari 1989a, forthcoming a, forthcoming b; Kalifornsky 1991:xxiii-xxx). Drawing upon a variety of evidence (analysis of narratives, comparisons of lexical inventories and cultural characteristics, analysis of regional geography and ecology), I have outlined several interrelated hypotheses: 1) the Tanana River basin, with four smallish language areas (Lower Tanana, Middle Tanana[2], Tanacross, and Upper Tanana) as well as a portion of Koyukon, has been an ancient *center* of Northern Athabaskan culture; 2) there was gradual territorial expansion by the Athabaskans into western and south-central Alaska; and 3) that the Dena'ina language of Cook Inlet Basin has been at the *archaic periphery* of the Alaskan Athabaskan expansion.

When I first researched Athabaskan ethnogeography (in the Dena'ina and Ahtna languages) I tried to show how place names inventories represented the local geography (Kari 1983, Kari and Fall 1987). In recent years the documentation on the toponomy in the twelve Alaskan Athabaskan languages has expanded, and the collected corpus has become increasingly interesting. When Athabaskan place name documentation extends over contiguous language areas, we find that there are highly interesting ethnoscientific and systemic principles to Athabaskan geography, some of which are local, and some of which are regional and even continental in scope. In this paper (and in Kari 1989b and forthcoming b) I summarize some of the ways in which prehistoric Alaskan Athabaskan territorialty is reflected in the ethnogeography.

1. Criteria for evaluation of toponomy and sources on Alaskan Athabaskan toponomy

My own Alaskan ethnogeographic research has been done sporadically, usually in settings removed from the areas under investigation. It should be noted that most Alaska Native place names data have been obtained *after* the 1971 Alaska Native land claims settlement. There has been no funded research on Native territory in Alaska on the scale of that taking place in Canada and Australia *prior* to their land claims settlements. Currently, there are no place names surveys as definitive as those being conducted in the Yukon Territory by the Yukon Native Language Centre (e.g. Ritter 1978, Sydney 1980, Tom 1986). Certainly formal mapping and analysis of Alaskan Athabaskan place names inventories would make a significant contribution to the culture history.

In general, I find that people underestimate the complexity of ethnogeographic research. A place names list that strives to be as complete and accurate as it can be with speakers who know interlinked networks of traditional territories requires sustained concentration. Place names data can vary in quality and in density for a wide range of reasons, e.g. accuracy of transcription and/or mapping. There can be extremes in field work situations. Some speakers have detailed first-hand knowledge about three or more band territories, have good eyesight, and can read and draw maps. For example, working with Andy Frank of Northway in March of 1992, the Upper Tanana list went in subsequent sessions from 420 names to 490, 522, 550, 572, 597, 617, and 641 names. As the density of the place name data increases, the complexity of the research increases. Depopulated areas (e.g. the Kuskokwim Mountains, the Yukon River between Circle and Eagle) where only a skeletal system is known, have special problems. Also there can be problems caused by the perturbation of the English names (Hunn forthcoming). Typically, we find that basic questions have never been asked, such as what do the Gwich'in call the Chena River?

Table 1 summarizes some methods and evaluation criteria that might be applied to ethnogeographic data. In section D these criteria are applied to the toponymic data sets in the twelve Alaskan Athabaskan languages. The order of presentation of the languages is east-to-west and downriver. Most of the sources on Alaskan Athabaskan toponyms are unpublished lists or obscure gray literature publications. The sources reviewed for theis paper and the total number of place names per language are presented in Table 2 and Figure 1.

Table 1. Criteria for evaluating documentary records of toponomy
Table 2. Sources and numbers of Alaskan Athabaskan place names
Figure 1. Map of totals of place names in Alaskan Athabaskan languages

The total of 8795 includes some duplication in uncollated lists, and multilingual attestations of mutually known features. However, it does not include

Table 1. Criteria for evaluating documentary records of toponomy

A. Graded A, B, C, D on the basis of
- Density of names coverage: comprehensive-good-fair-sketchy-void
- Accuracy of recorded language data
- Accuracy of mapping
- Status of records (computerized, mapped, GIS capability, published, etc.)
- Ancillary methods (e.g. field survey, aerial survey, landscape photography, hand-drawn maps, GIS analysis)
- Incorporation of historic information
- Extent, quality of place names texts and folklore
- Quality of filing systems
- Number of times corpus has been reviewed and refined

B. Status of uncollected information
- 1 = Hardly begun, basic information needed
- 2 = Major improvements and expansion possible, intermediate collating and mapping needed
- 3 = Fine-tuning, minor technical additions and refinements needed
- 4 = Can't be improved (i.e. a closed corpus)

C. Urgency
- n = None, can't be improved
- m = Moderate, several resource persons available
- u = Urgent, one or a very few aged experts available

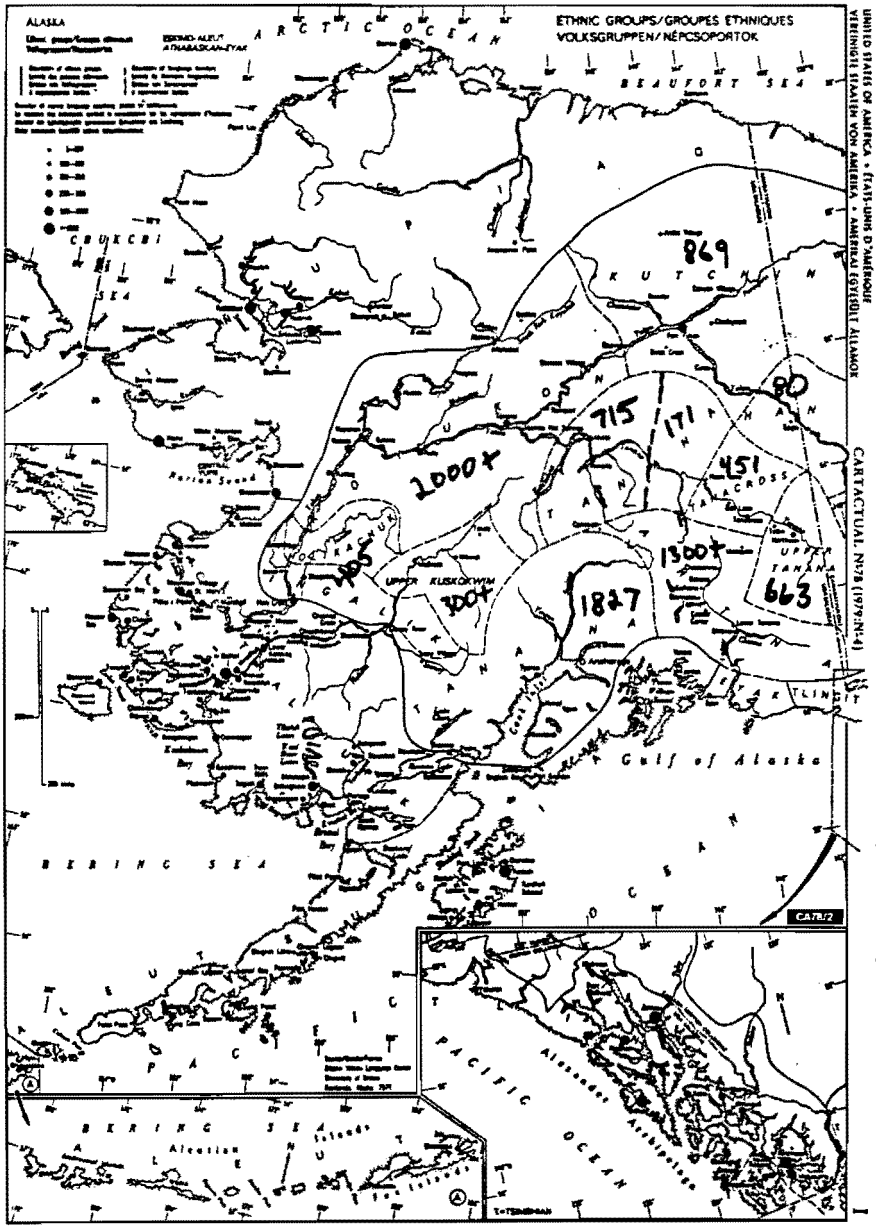
D. Status of research on Alaskan Athabaskan toponomy
1. Gwich'in (excluding Canadian Gwich'in)
    - Northern Gwich'in: C+ :: 2m
    - Yukon Gwich'in: D :: 1u
2. Han: C :: 3u
3. Upper Tanana: B :: 2m
4. Tanacross: B :: 2m
5. Middle Tanana: B :: 3n
6. Lower Tanana: B :: 3m
7. Koyukon
    - Upper Koyukon: C :: 2u
    - Central Yukon Koyukon: B :: 3u
    - Koyukuk River Koyukon: A- :: 3m
    - Lower Koyukon: C :: 2u
8. Holikachuk: C :: 3u
9. Ingalik: C :: 3u
10. Upper Kuskokwim: B :: 3m
11. Dena'ina
    - Inland Dena'ina: A :: 3m
    - Upper Inlet, Lower Cook Inlet Dena'ina: A- :: 4n
12. Ahtna: A- :: 3m

Table 2. Sources and numbers of Alaskan Athabaskan place names

Note: Figures in parentheses are subsumed into a single total for that language.

language (abbreviation)	no. of names	on computer?
1. Gwich'in (Gw)		
Caulfield et al 1983	869 (no Canadian Gwich'in)	no
2. Han (Han)		
Ritter & Paul 1978	80 (some Candian)	no
3. Upper Tanana (UT)		
Kari 1991-	663	yes
4. Tanacross (Tc)		
Kari 1983-	465	yes
5. Middle Tanana (MT)		
Mischler 1986	(56)	
Kari 1993	171	yes
6. Lower Tanana (LT)		
Kari 1990-	715	yes
Andrews et al 1980	(255)	
7. Koyukon (Ko, U,C,L = Upper, Central, Lower)		
Jetté 1910	(1200+)	no
Jones 1982-	(500+)	no
Robert 1984	{ (125) } 2000+	no
Nelson et al 1982	(288)	no
Gudgel-Holmes 1990	(125)	no
8-9. Holikachuk-Ingalik (Ho) (Ing)	(many bilingual names)	
Kari 1979-		
Yukon	285	no
Kuskokwim Ingalik	120 (some Yupik)	no
10. Upper Kuskokwim (UK)		
Collins 1982-	300+	no
Stokes 1984	(265)	no
Gudgel-Holmes 1990	(20)	no
11. Dena'ina (Den)		
Kari 1980-	1827	yes
P. Kari 1983	(278)	
Kari and Fall 1987	(711)	
Kalifornsky 1991	(252)	
12. Ahtna (At)		
Kari 1983 plus updates	1300+	yes

Total of recorded place names: 8795


ALASKA
ETHNIC GROUPS/GROUPES ETHNIQUES
VOLKSGRUPPEN/NÉPCSOPORTOK
ARCTIC OCEAN
BEAUFORT SEA
CHUKCHI SEA
KUTCHIN
869
715
171
80
2000+
451
ACROSS
1300+
1827
663
UPPER TANANA
UPPER KUSKOKWIM
300+
Gulf of Alaska
BERING SEA
PACIFIC OCEAN
Aleutian Islands
Alexander Archipelago
UNITED STATES OF AMERICA • ETATS-UNIS D'AMÉRIQUE
VEREINIGTE STAATEN VON AMERIKA • AMERIKAI EGYESÜLT ÁLLAMOK
CARTACTUAL N°28 (1979-IV-4)

numerous Athabaskan-origin map names that have not been reelicited.

2. Athabaskan Place Names and Local Geographical Knowledge

There are many ways in which geography is the central theme in Athabaskan culture history. I feel that the continuous network of Northern Athabaskan names from western Alaska to Hudson Bay follows similar rules and reflects a similar ideology. Athabaskan place names are systematic and multifunctional because they are actually verbal maps for occupation and travel over large areas (Kari 1989b). Experts on Athabaskan territory typically know two, three, and four band territories in considerable detail. The names are learned and reported in lists along stream drainages and trails. The noted authority on the Dena'ina country of Upper Cook Inlet, the late Shem Pete, knew about 13,500 sq. miles of territory based upon his travel experiences on foot and in small boats. He reported nearly 650 names in this area, and he knew adjacent areas as well (Kari and Fall 1987). Shem was fond of listing the sequences of names, and he was entirely consistent in the pronunciation, order, and general location of places. He also consistently stated that he did not know certain places, which is another measure of the integrity of the data he reported. On a world-wide scale, this is one of the largest indigenous place names inventories ever recorded from a single person (Eugene Hunn, p.c.). In fact, many of the well-known Alaskan Athabaskan elders of our times have territorial knowledge similar to that of the late Shem Pete.

The sets of place names are generative, predominantly linear, uncluttered and memorizable over a large area. Multifunctionality and memorizability are reflected in the lexical and grammatical structure of the place names. Table 3 presents an outline of the geographical lexicon in Lower Tanana.[3] Lower Tanana geography is typical of the interior of Alaska, being by a major river, with navigible lake districts and accessible upland hunting areas. I symbolize the typical range of the geographic terms which can be grouped into regions ( ), linear features |, points ·, and local areas ⊙.

Table 3. Geographical Lexicon in Lower Tanana

Most place names are either binomial in the form of 'attributive + geographic stem' (B on Table 3) or are nominalized verbs (A on Table 3). The stream names are the key organizing principle to the local names systems. Stream names are linear and apply to entire drainage systems, i.e. the stream name does not change in mid-course. Names often occur in clusters where a major stream and a nearby visible mountain are named for the same attribute. Thus Ziztiana River near Manley is in Koyukon **Ch'edzæye' No'** 'heart river' which is named for an

associated mountain named **Ch'edzæye'** or 'heart'. The Zitziana River can also be subdivided into districts: the course of the stream, the headwaters, and the mouth. Thus with a few major stream names one can give general directions and memorize the name system for a large region.

What makes Athabaskan geography a highly precise verbal mapping system is the geometric graphing of regions where the place names are transected by the *riverine directional system* (D on Table 3) which has the structure of a scaled-back version of the Athabaskan verb complex (Leer 1989). When directionals are lexicalized, they contribute to the economy of the name system. For example, in the lake district north of Old Minto, three lakes have the same attributive term and are distinguished by two directionals and an areal noun:

Ch'exonidi Nomenhtr'ediłtoni 'upstream lake that we found again'
Ch'extonidredi Nomenhtr'ediłtoni 'middle lake that we found again'
Ch'exoxdodi Nomenhtr'ediłtoni 'downstream lake that we found again'.

Several of the regional district names in the Lower Tanana area are a place name modified by a directional:

Tena Don'a, Ten Don'a Tanana River Valley 'the upstream trail'
Ninano' Dontha' the region west of Nenana River (Teklanika to Kantishna) 'out from migration river'.

We also find some systematic patterning within place names inventories (such as within the 715 names recorded in Lower Tanana) which suggests that from time to time name sets have been coordinated and planned. One such pattern is the duplication of attributives for fairly closely situated features. The mountain by the Zitziana River named **Ch'edzæye'** has a partner mountain of the same name to the south at Bearpaw, and the Bearpaw River is also called **Ch'edzæye' No'**. Similarly, both the Healy and Chatanika Rivers have the same name, a name that refers to the round or pinnose whitefish: **Ts'eedleey Ndiig** (in Tanacross) and **Dradlaya Nik'a** (in Lower Tanana). These are the only two Athabaskan languages with this innovated term for this species of whitefish, and it is probably not coincidental that these two northerly tributaries of the Tanana have cognate names. The Volkmar River **Ahtaan Ndiig** in the Tanana drainage is paralleled by a stream which has nearby headwaters but which flows to the north into the south side of the Yukon River, **Ahtaani Na'**, upper Birch Creek above Circle. These names both mean 'inner willow bark river'. In the Tanacross area there is a hill due north of Mansfield Lake and on the trail system to the upland hunting country which is called **Tseyh Tl'iig** 'shiny ochre (or mercury)'. This is also the name for Mount Harper, about 40 miles to northwest and the largest mountain in the local range.

On occasion a set of names has a common theme. A conspicuous example is a group of four ridges north and east of New Minto, all with accessible upland trails into former caribou country, which are named as for vegetation:

T'egheth Yozra Nilani 'the baby cottonwood one'
Ts'eba Ttha Dala Nilani 'the baby spruce one'

Table 3. Geographical Lexicon in Lower Tanana

Symbols for range of terms: regions ⟨ ⟩, linear features |, areas ⊙, points ↘

A. Common verb suffixes or enclitics in place names
   1. local area: ⊙ **-xw**
   2. specific place: ↘ **-denh**
   3. 'that which is VERB': ⊙,↘ **-i**

B. Common geographic noun roots in place names
   1. Land forms
      a. land, country: ⟨ ⟩ **nen', -nena'**
      b. mountain: ⊙ **ddhel, -ddhela'**
      c. hill: ↘ **teyh, -teya'**
      d. ridge: | **seth, -sedha'**
      e. riverbank: | **beth**
      f. island in stream: | **nu, -nu'**
      g. flat, meadow: ⊙ **chenh, -chena'**
   2. Water features
      a. lake: ⊙ **benh, -bena'**
      b. stream: | **-no'; -nik'a**
      c. stream mouth: ⊙ **-chaget, -dochaget**
      d. headwaters: ⊙ **-tl'ot**
      e. long straight stream channel: | **-toyana'**
      f. slough on stream: | **-nunkw**
   3. Man-made or man-utilised features
      a. village: ⊙ **kayex**
      b. trail: | **-tena**
      c. pass: | **-teth**
      d. portage: | **-toteth**
      e. accessible mountain ridge: | **ch'oghwna'**

C. Some common areal nouns in place names
   1. below, beneath: ⊙ **-t'ox, -t'ogha**
   2. on, at a place: ↘ **-k'et**
   3. on a surface: ⊙ **-koget**
   4. in a region, broad area: ⟨ ⟩ **-ti**
   5. along the distance of: | **-ghoyet**
   6. at the end, limits of: | **-logha, loyet**

D. The directional roots
   1. upstream: **-n'a, -nit**
   2. downstream: **de'o, dot**
   3. lowland, to a stream: **-tthen', -tthii**
   4. upland, away from stream: **-nga', -nget**
   5. up, above: **-deq, -deget**
   6. down, below: **-yeq, -yeget**
   7. across: **-non', -nona'**
   8. out in the open: **-'en', -'o, 'ogha**
   9. off at a distance, at the perimeter: **-ntha', -nthet**

Ts'etsan' Nilani 'the grassy one'
K'iyh Ttha Nilani 'the baby birch one'.

This is as orderly a naming system as 1st Avenue, 2nd Avenue, 3rd Avenue, but since it is natural to the landscape it is far more beautiful.

In the Tanacross language area the names for a closely situated group of hills that afforded good lookout vistas seem to have been thematically planned:

Uk'et Ndaaxk'ee 'lookout (is) on it'
Uk'iig Ndaaxk'ee 'lookout (is) on the ridge'
Ndaaxk'ee Gaay 'little lookout'
Ndaaxk'ee Chox 'big lookout' (three hills).

Such patterns tend to be a rather small part of the larger name inventories, and certainly there has been some elaboration and change in the names over time. However, a more formal analysis (with GIS mapping and analysis combined with linguistic analysis) would likely reveal other patterns. For example, the viewsheds and intervisibility of features with duplicated names might be explored.

3. Some Regional Naming Strategies

In aboriginal Alaska there most certainly was extensive knowledge of distant extraterratorial geography especially by men in leadership roles or who participated in trading. Certainly most Alaskan Athabaskans knew the names of many distant peoples and distant villages. Certain genres of stories contain place names many of which are hundreds of miles apart. Stories by Katie John in Kari 1986 are situated as far west as the lower Tanana River and as far east as the Nahani Mountains (at the Yukon Territory-Northwest Territories border). There is documentation on sacred hills and mountains near the major village sites in most of the Alaskan Athabaskan language areas, and potlatch oratory regularly features the names of sacred hills and mountains (see a speech by Chief Fred John of Mentasta in Kari 1986:13-14). An excellent early historic demonstration of distant Athabaskan geographic knowledge is the Native-drawn map published by Wrangell in 1839 (which is analysed in Kari 1986:104-105 and in Kari and Fall 1987:34). This map indicates that a Dena'ina, probably a man from the Kenai area, knew drainages and village names over 400 miles away and in two different directions (Batzulnetas at the head of the Copper River and Toklat on the north side of Mount McKinley).

The most obvious indication of conservatism and inter-regional coordination in Alaskan Athabaskan place names is at boundary areas between the Athabaskan languages where several hundred multilingual Athabaskan names for shared features have been recorded. Mutually known features almost always have the same name said with regular phonological or lexical adjustment (Kari 1989b). For example, lower Birch Creek on the Yukon River (near Beaver) is **Q'iyh Doltonh No'** in Koyukon and **K'ii Dootin Gwinjik** in Gwich'in, literally

'birchbark is placed-river'. This is one of the last upstream bilingual place names around the Koyukon-Gwich'in boundary. Multilingual Athabaskans travelling far from their home band area continually found names that had been passed on for generations and that were basically familiar.

The congruence in the place names across Athabaskan language boundaries is so proto-typical that notable exceptions may have prehistoric significance. Consider the "***ts'itu'** problem". The Tanana River is one stream that has two different names. In four languages on the Tanana River (UT, Tc, MT and LT) the river is called **Tth'itu'** lit. 'straight water'. (This is one of the only stream names in Alaska with the hydronym **-tu', < tu** 'water'.) A cognate term appears in three languages (Han, At, and Upper Inlet Dena'ina) meaning 'major river' but not as a place name. The word ***ts'itu'** seems to be absent elsewhere in the Alaskan languages. The Koyukon and the Gwich'in call the Tanana River, (Ko) **Tene No'** , (Gw) **Tananjik** apparently 'trail river'. In several languages the Tanana River Athabasksan peoples are called 'trail people'. LT and Ko **Ten Xʊt'ænæ**. Thus it is striking that at the Lower Tanana-Koyukon interface, where the languages are highly intelligible, the Tanana River has distinct names.

We might also speculate whether far flung and distant duplication or similarity in place names is prehistorically signifcant or is simply the reflection of common ideology. It is interesting that these six shallow fishing lakes, all with ancient village sites, have the same name, ***Ben Dæs Bene'**, literally 'shallows lake': Old Man Lake (near Eureka on the Glenn Highway), Mentasta Lake, Healy Lake, Cooper Lake (near New Minto), Fish Lake (east of Tanana), and Tundra lake (near Lime Village). When such great distances involved, the duplication in names may be coincidental, but then this reiteration should to be kept on file for future analysis. There seem to be quite number of widely dispersed mountains named with stems for 'obisdian' ***bæch"'e** and **q'o'** 'arrowhead', and these too should be mapped out.

Consider these two well-known Athabaskan-origin place names, both of which use the same verb 'to be distant':

Tanacross language:	Deg Hit'an/Holikachuk languages:
Dihthaad	**Xwdidhod**
'nearby place'	'distant place'
Mansfield Lake site (Dixthaada)	Iditarod River and site.

Is this chance similarity in structure and meaning? Or is it possible that these two names were given in the same generation by ancient Athabaskan geographical names committees that carefully coordinated the place naming throughout Athabaskan territories?

Ethnonyms for other Native peoples have functioned as a kind of index to the geography of aborignal Alaska. The common word for people **koxt'ana** in Lower Tanana or **gwich'in** in Gwich'in means 'those who have territory'. Many of the ethnonyms used for Athabaskans as well as for other Alaskan Natives are based upon geographic province (or bioregional) names: 'the downstream people',

'the mountain people', 'the small timber people', 'the people of the lake district', 'the headwaters people', etc. In addition, there is some duplication in ethnonyms which may be prehistorically significant. Note that these two high country bands have cognate names:

Xwtthaayh Xwt'een the Ketchumsuk band (Tanacross),

Hwtsaay Hwt'eene the Western Ahtna, lit. 'the small tree people'.

Similarly two Dena'ina bands on opposite sides of Cook Inlet have the same name:

Xtsax T'an the Stony River-Telaquana Dena'ina,

Xtsax T'ana the Kenai Mountains Dena'ina, lit. 'rocky area people' or 'the first people'.

Could it be that some duplicate ethnonyms reflect sequential occupations by the same band?

We are beginning to detect some of the ways in which Athabaskan place names have functioned as boundary markers. Two place names at the southern limits of Dena'ina territory on the west side of Cook Inlet reported by the late Nick Kolyaha of Lake Iliamna are so overtly ideological that they must have functioned as *boundary declarations* (Kari forthcoming a):

Naq'ezhch'en Big Hill (on Kamishak Bay) lit. 'on our side',

Veq' Ch'ul'egi Big Mountain (on Iliamna Lake) lit. 'the one on which we make medicine, the one on which we conjure'.

There are indications that one of the directional roots, ***nes,** sometimes means 'perimeter, boundary, edge'. A number of place names with this stem have been mapped in boundary regions in several of the languages. For example, a mountain on the Kaltag Portage at the Eskimo-Koyukon boundary is called in Koyukon **Nełts'ene** 'the boundary side' (where ***nes > neł**). On the eastern edge of Koyukon are three mountains near Stevens Village called **Łel'one** 'the object on the boundary' (where ***nes > ł**) which are near the Koyukon-Gwich'in inteface. The name for the Lower Susitna River Dena'ina people, **dustnay**, contains ***nes** (reducing to s). This seems to mean 'people at the edge, at the boundary' and suggests that the Lower Sustina band was the first Dena'ina band to reach Cook Inlet. Furthermore, some of the places named with the stem ***nes** can be viewed as *superceded perimeters* and are indicative of the dynamics of territorial expansion.

Probably the most striking indication of the geopolitical function of Athabaskan place names can be seen in abrupt changes in the common stems used in place names for 'stream' and 'mountain' (see Kari forthcoming b where I discuss the evidence in detail). As indicated in Table 4 and in Figure 2, there is an abrupt shift in the stems used for 'stream' in place names at Athabaskan language boundaries on the Yukon River (around Beaver village) and the Tanana River (around Delta and the Goodpaster River).

Table 4. 'Stream' in Alaskan Athabaskan languages

Figure 2. Map of 'stream' and 'mountain' isoglosses

Most of the several hundred major streams in Alaskan Athabaskan territory have recorded Native names. Table 4 summarizes the primary and secondary stems being used for 'course of a stream' in Athabaskan place names, the totals of the stems in stream names, and the general term for stream. These are listed upstream to downstream. In Figure 2 we see a change in the terms for 'stream' across the Athabaskan language boundaries on the Yukon and Tanana rivers. Compare the numbers of primary and secondary stems for stream with various languages that have shared boundaries. We can group the Alaskan languages into downstream or western Alaskan languages which use **-na'** in stream names, and upstream or eastern Alaskan languages which use **-niq'e** (or **ndiig, niign, njik**).

There are some interesting exceptions to the shift in stream names above and below the lines on the Yukon and the Tanana: eleven streams in the Tanacross language area use the stem **-nda' (<*-na')**; and conversely ten streams in the Lower Tanana language area, and seven others, mainly in the Kuskokwim drainage, use **-nik'a (<*-niq'e).** These streams seem to stand out in the name inventories as being important, possibly as signs of travel corridors or even as signs of original migration routes, precisely because they are exceptions across the line where the stems for 'stream' shift (Kari, forthcoming b).

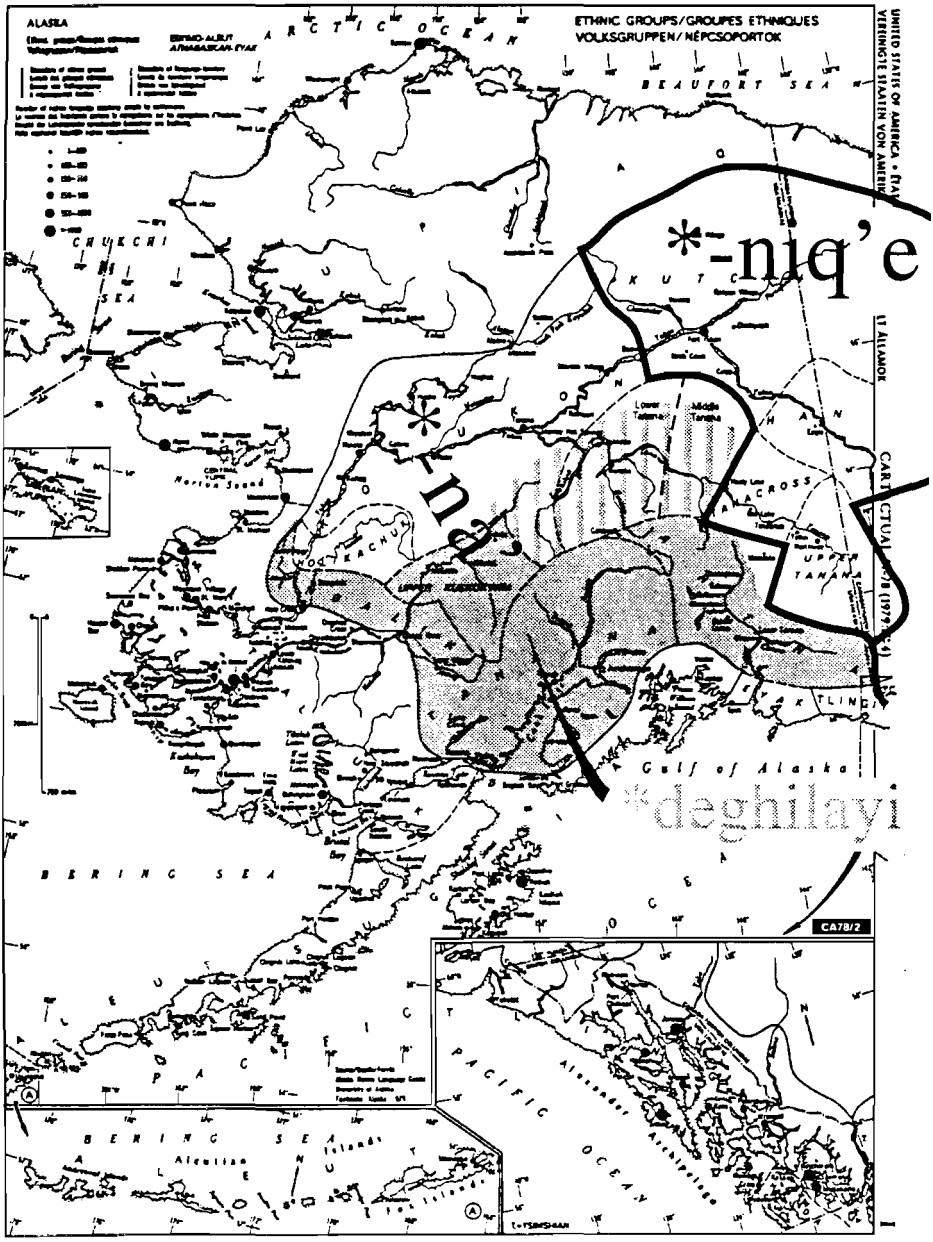
Furthermore, in Canadian Athabaskan territory the stems for 'stream' *group into other regional patterns* using stems such as **-tu', ge',** and **koh.** We should look more closely at what appear to be Northern Athabaskan *hydronymic districts*. Other hydronymic stems, such as 'river mouth' and 'lake', do not vary much at all in Northern Athabaskan. The shifts in the stream stems on the Tanana and Yukon and elswhere in northern Canada are so arbitrary that they seem to function as *toponymic lines* that have been scored along certain streams. Such lines attest to the prominence of streams in the ethnogeography and must be indications of ancient agreements about band territories and land use.

Analogous to the change in stems for 'stream', in western Alaska four languages positioned south or west of the Alaska Range (in Figure 2 Ahtna, Dena'ina, Upper Kuskokwim and Deg Hit'an) use an innovated term for 'mountain', ***deghilayi,*** both in place names and in the general lexicon replacing the widely distributed Athabaskan stem ***dzeł**. This innovation stems from a Lower Tanana place name for the Alaska Range, **Deghiloyi** which can be translated as 'objects that are suspended' or 'objects that extend in a line'. This seems to be another abrupt and deliberate policy change. This also implies that an Athabaskan place names conference took place long ago in the Lower Tanana River Valley. This change in mountain naming probably reflects boundary and land use agreements as well as the onset of incursions into the mountainous territories around and within the Alaska Range.

Athabaskan territorial expansion had geopolitical elements that were continental in scope and place naming was central to this process. The Northern

Table 4. 'Stream' in Alaskan and adjacent Canadian Athabaskan languages

language	*main stem in p.n.* *secondary stem in p.n.*	*commonly 'stream'*
A. *-tu' languages		
Tagish	-túu'e	?
Southern Tutchone	-chù, -gà'	tágà'
Northern Tutchone	-chú, -tú, -gé', -njik, -nyak (rare)	tahgé', tehgé'
B. *-niq'e languages		
Gwich'in	-njik (71), -k'ǫǫ (23)	gwinjik
Han tächöö	-juu, -ndek (45)(*same root*), -chù' (1)	
Upper Tanana	-niign (148), -tu' (1)	haniign
Tanacross	-ndiig (102), -nda' (13), -tu'(2)	hen
C. *-na' languages		
Middle Tanana	-na' (50), -niige (6), both (8)	ch'ena'
Lower Tanana	-no' (200), -nik'a (10), -tu'(2), -k'eddhet(1)	xwn'a, ch'eno'
Koyukon	-no' (500+), -niq'e (4), -q'edlet (10+)	k'eno', sexno'
Holikachuk	-no' (40), -nigh (1)	sexno'
Ingalik	-no' (50), -nìgh (1)	srexno'
Upper Kuskokwim	-no' (52), -nik' (4)	srexno', xwno'
Dena'ina	-tnu (500+), -niq', -naq' (3), -ti (1)	k'etnu
Ahtna	-na' (480), -tu' (3)	k'ena'


ALASKA
ETHNIC GROUPS/GROUPES ETHNIQUES
VOLKSGRUPPEN/NÉPCSOPORTOK
ARCTIC OCEAN
BEAUFORT SEA
CHUKCHI SEA
*-niq'e
*-ne'
*deghilayi
Gulf of Alaska
BERING SEA
PACIFIC OCEAN
CA78/2

Athabaskan place names inventories and directional systems reflect a common ideology and sense of territoriality. This is seen in the economy and coordination of the local place name inventories that would facilitate memorization and travel safety; the general congruence of Athabaskan place names across language boundaries; the naturalistic naming of bioregions; the commonly known bioregional ethnonyms; and in the various indications of boundary awareness (such as the use of ***nes** as 'perimeter' in Western Alaska or the abrupt replacements for 'stream' and 'mountain').

The Northern Athabaskans have been shackled with numerous academic and social stereotypes both in earlier and in recent times. Some of these stereotypes are: 1) the Northern Athabaskan environment was submarginal and had no well defined linguistic and territorial boundaries; 2) ancient Athabaskan political organization was extremely simple; and 3) Athabaskans were so disrupted by historic contact that we cannot determine what their traditional culture was like.[4] In fact, Athabaskan geography is a vast body of counter-evidence to such stereotypes.

NOTES

1. I acknowledge with thanks and appreciation some of the speakers of Alaskan Athabaskan languages with whom I have worked on geographical names: Pete Bobby, Andy Frank, the late Andrew Isaac, Hester Evan, Fred John, the late Silas Solomon, the late Abraham Luke, the late Eva Moffit, the late Shem Pete, and Jake Tansy.

I also thank John Ritter of Whitehorse whose work on ethnogeography is state-of-the-art. I thank colleagues with whom I have shared data and discussions on Athabaskan geography: Eliza Jones, Sharon Hargus, Dianne Gudgel-Holmes, Mike Krauss, Jeff Leer, Siri Tuttle, Elizabeth Andrews, Ray Collins, and Eugene Hunn.

2. The maps and tables in this paper refer to a recently recognized Athabaskan language, Middle Tanana. Krauss' 1974 map treats the languages of this area as "Tanana" with three dialects, Minto-Nenana, Chena, and Salcha. However, materials from the last Salcha speaker, Eva Moffit, collected by Kari and Siri Tuttle, make it clear that there was a distinct language on a section of the Tanana River between the Salcha and the Goodpaster rivers.

3. The orthographic conventions used in this paper strive for maximal congruence while giving some attention to maintaining local spelling conventions. Consonants follow Athabaskanist practice and employ digraphs and trigraphs, e.g. **tth**, etc. Front and back velars are standardized as **k, k', g, q, q', gg**.

Vowels in reconstructed Proto-Athabaskan (PA) forms are with single

symbols: **i** (high front), **æ** (low front), **u** (high back), and **a** (low back). For convenience, **e** is schwa in PA forms and in most of the languages, except for Upper Tanana, Han and Northern and Southern Tutchone where schwa is **ä**, and in Gwich'in where schwa is **i/a**. The schwa conventions for three languages have been reversed. For Upper Kuskokwim, Holikachuk, and Ingalik **e** = schwa and **i** = [i,]. Note that in Lower Tanana and Upper Kuskokwim **w** is used for [ʊ]. Languages with vowel length distinctions, such as Middle Tanana and Ahtna, have doubled vowels as long vowels.

In this paper Koyukon has a completely overhauled vowel system. All vowels have a single symbol and follow these conversions: **ee** = **i**, **aa** = **æ**, **oo** = **u**, but **o** = **o**; **e** = **e** (schwa), **u** = ʊ, and **a** = **a**

4. Here are some sources that give a stereotypical characterization of Northern Athabaskan "simplicty" which, in my view, are not supported by the documentary evidence on Athabaskan geography.

This 1911 statement on Athabaskan place naming made by the famous Alaska geologist Alfred H. Brooks.

> The Alaska Indian has no fixed geographic nomenclature for the larger geographic features. A river will have half a dozen names, depending on the direction from which it is approached. The cartographers who cover Alaska maps with unpronounceable names, imagining that these are based on local usage, are often mislead (Brooks 1911:22).

Eileen Jenness published this popularized summary of the Northern Athabaskans in 1933:

> With neighbors not more than a few hundred miles away having a civilzation as rich and bizarre as that of the West Coast tribes,one marvels at the primitiveness of these northern [Athabaskan] people. They resembled far more the homely wandering tribes of the eastern woodlands, but lacked the cheerfulness of the eastern people, and were even less progressive. No doubt their backwardness was partly due to the country they inhabited... Where they did encounter tribes higher in the scale of culture, they quickly assimilated foreign traits, and their lives took on a more picturesque aspect (Jenness 1933[1966]:87-89).

A recent summary by achaeologist Donald Clark claims that the Northern Athabaskans had "vague boundaries" and "rudimentary" political organization:

> According to the studies of ethonologists, Subarctic people came together in various kinds of settlements and social groups... The loosely structured bands, with fluid membership of probably one hundred persons, usually visited and intermarried with adjacent bands that spoke the same dialect. A cluster of bands interacting in this way might, in a very loose sense, be termed a *tribe*. But the

tribes, too, [emphasis added] *had rather vague boundaries, where different tribes interacted socially and intergraded linguistically and culturally. The composition of tribes was unstable. They split up, merged or disappeared, and remnants of decimated groups were absorbed by others. Thus, political organization was extremely rudimentary in the Subarctic but bands, and even tribes within a relatively large area, generally shared the same cultural characteristics* (Clark 1991:19).

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Semantic constraints on binding conditions
The French and German Inalienable Possession Construction*

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Recent cross-linguistic studies of binding constraints have shown that particular pronouns and anaphors lexically select different values of binding parameters as well impose different semantic or syntactic conditions on their antecedents (see Enç, 1989, Dalrymple, 1993). An important issue raised by such cross-linguistic investigations is the range of syntactic and semantic conditions that anaphors can impose on their antecedents. Roughly speaking, two kinds of semantic conditions have been recorded in the literature: the antecedent must stand in a certain thematic relation to the anaphor (typically, higher on the thematic hierarchy, Jackendoff, 1972) or the antecedent must be the center of perspective in the clause (Sells, 1987, Engdahl, 1990). In this paper, I show that the kind of semantic conditions anaphors can impose on their antecedents is not restricted to either of these two notions. In particular, I show that the French and German Inalienable Possession Constructions (or IPC) involve a reflexive anaphor which constrains its antecedent to satisfy a semantic predicate of a kind previously not mentioned in the literature. This paper thus supports Dalrymple's contention that different binding conditions are lexically or constructionally attached to anaphors and pronouns. It also indirectly supports grammatical theories in which syntactic and semantic information can locally interact (like Construction Grammar, HPSG or Categorial Grammar), by showing that non-trivial semantic information can be relevant to the adequate characterization of constraints bearing on syntactic processes like binding.

1. The varieties of Possessor Ascension in French and German

1.1. An overview of the IPC

Sentence (1) is an example of the IPC construction: an NP denoting a body-part and which does not contain a possessive adjective *le pied* is understood as belonging to the denotatum of another complement of the verb, *Marc*. I will speak of a body-part NP like *le pied* as being bound by *Marc*, meaning simply for now that the POSSESSOR of the body-part *le pied* is co-referential with *Marc*. Sentences like (1) raise two questions. (i) What is the nature of the relation between the body-part NP *le pied* and the NP interpreted as co-referent with its possessor, *Marc*? (ii) What restrictions (if any) are there on the types of phrases that can bind the body-part NP? As shown in section 2, recent studies of the IPC have given very different answers to these two questions. All of them, though, take into consideration only a subset of the actual contexts in which a body-part NP is bound to an another NP in the same clause. Before discussing these various proposals, I therefore begin with a list of all cases where a body-part can be bound by another NP in

French and German.[1]

Case 1: The clause denotes a "natural gesture" (Hatcher, 1944):

(1) Marc$_i$ a avancé le pied$_i$. 'Marc$_i$ moved his$_i$ foot forward'.

(2) Jacques$_i$ a froncé les sourcils$_i$.'Jacques frowned'

Case 2: The body-part is an instrument of the binder:

(3) Jean$_i$ a poussé la balle de la main$_i$. 'Jean$_i$ pushed the ball with his$_i$ hand'

Case 3: The binder and the body-part are affected entities:

(a) The binder is an affected dative

(4) Marc lui$_i$ a lavé les pieds$_i$. 'Marc$_i$ washed his$_i$ feet' (lit. *to him$_i$ the feet$_i$*)

(5) Marc$_i$ s'$_i$est mis l'écharpe autour du cou$_i$. 'Marc$_i$ put the scarf around his$_i$ neck'

(b) The binder does not surface:

(6) Cette médecine fait enfler les jambes.
this medecine make.PR swell.up.PR the legs
'This medecine makes people's legs swell up'

(c) Possessor Ascension (the binder is a direct object)

(7) Il a frappé Marc$_i$ sur le nez$_i$. 'He hit Marc$_i$ on the nose$_i$'

Case 4: The body-part is the semantic argument of a predicate denoting a relation of inalienable possession:

(a) The predicate is expressed by *avoir*

(8) Marc$_i$ a les yeux$_i$ bleus. 'Marc$_i$ has blue eyes$_i$'

(b) The predicate is expressed by *avec* or is understood semantically:

(9) Elle$_i$ était allongée sur le divan (avec) les yeux$_i$ fermés.
'She$_i$ was lying down on the sofa, with her$_i$ eyes closed'

Case 5: The body-part is the object of a locative PP which is an argument of a predicate denoting physical possession, like holding, wearing:

(a) The main predicate is expressed by the verb *avoir*, *porter*, *tenir*:

(10) Marc$_i$ avait vingt francs dans la main$_i$. 'Marc$_i$ had 20FF in his$_i$ hand'

(b) The main predicate is entailed by the main verb, but is not expressed syntactically:

(11) Marc$_i$ a mis l'écharpe autour du cou$_i$. 'Marc$_i$ put the scarf around his$_i$ neck'

Case 6: The body-part is the cause of some physical sensation in the referent of the binder:

(12) Le dos$_i$ me$_i$ fait mal. 'My back hurts'
the back 1SG.DAT cause.PR pain

(13) '..les petons$_i$ nous$_i$ démangent' (Zola, *Son excellence Eugène Rougon*, p.90)
the tootsies 1SG.DAT cause.itch.PR 'Our tootsies itch'

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[1] Due to space considerations, I can only give French examples here. The exact same set of cases exists in German. The analysis presented in section 3 also applies to the corresponding German data. While I go over the various IPC cases, the reader should keep in mind that my contention will be that all the examples presented in this section are covered by a single semantic generalization, expressed in (γ) and (δ) in section 3.

All previous cases where examples of phrases which can bind a body-part NP. There is one important restriction on the class of posssible binders of a body-part NP.

Case 7: An NP playing a proto-agent role cannot bind a body-part with a proto-patient role:

(14) *Marc$_i$ a lavé les pieds$_i$. 'Marc$_i$ washed his$_i$ feet'
Marc have.PR wash.PPT the feet

(15) Marc$_i$ s'$_i$ est lavé les pieds$_i$. 'Marc$_i$ washed his$_i$ feet
Marc REFL be.PR wash.PPT the feet

Note that this constraint only applies to the direct binding of the patient body-part to the agent subject. As (15) shows, the body-part can be bound to an affected dative reflexive, eventhough the reflexive itself is bound to the subject.

Let me mention briefly two last facts concerning the IPC. First, more than one of the various types of IPC can be combined in a single sentence. In sentence (16), for example, two different body-parts are bound to two different persons and in sentence (17) two different body-parts are bound to the same person.

(16) Je$_i$ lui$_j$ ai mis la main$_i$ sur l'épaule$_j$. 'I put my hand on his shoulder'

(17) '...le Compagnon$_i$ pose la main droite$_i$ sur le coeur$_i$'.
'The Compagnon$_i$ puts his$_i$ hand on his$_i$ heart'

Second, the body-part NP is not always c-commanded by its "binder", *contra* Guéron, 1985, as examples (12)-(13) clearly show. In both sentences, the body-part subject is bound to a VP (or I') internal clitic.[2]

1.2. Why the pattern is not merely a pragmatic fact

In view of the wide range of contexts in which a body-part NP is interpreted as inalienably possessed by the denotatum of another NP, it is tempting to reduce the IPC facts to general pragmatic factors. There is good evidence against this hypothesis.

First, the binding must be local and occur within the next predicative phrase up (i.e. VP or predicative uses of AP's, NP's, or PP's), as briefly illustrated in (19), where the body part *la main* can be bound to the persuadee, but not the persuader:

(19) a. Je l'$_i$ ai persuadé de lever la main$_i$. 'I persuaded him to raise his hand'
b.*Je$_i$ l'ai persuadé de lever la main$_i$. 'I persuaded him to raise my hand'

There is no easy account for such a fact within a pragmatic approach. Pragmatically constrained retrieval of referents, like the pragmatic search triggered by the use of a definite NP or a pronoun is not subject to such locality constraints, as is well-known.

Second, the binder must obey semantic constraints, as mentioned above and illustrated in sentence (14). From a pragmatic perspective, it is not clear why the reflexive in (15) makes more sense as an antecedent of the body-part than the subject with which it is co-indexed. "Pragmatic sense" is not therefore a sufficient condition for an NP to be a possible binder of a body-part noun. Third, the same pattern does not occur

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[2] The IPC is not the only cross-linguistically attested example of an anaphor which does not need to be c-commanded by its antecedent (see Keenan, 1991).

in English, as shown in (18) (to be compared to (3)). Such variation in usage must be learnt (or derived from other properties of the grammars) by native speakers. It is difficult to see how a pragmatic approach could account for such cross-linguistic variation, without saying that discursive strategies can be conventional, and thus *de facto* making the IPC a grammatical phenomenon.

(18) *Marc$_i$ pushed the ball with the hand$_i$.

2. Previous analyses

Having briefly argued that the facts illustrated in (1)-(15) are grammatical in nature, I now turn to three recent accounts of the IPC within the Principles and Parameters approach. As mentioned earlier, none of them covers all the cases mentioned above.

2.1. Guéron 1985

Guéron's proposal relies on two main hypotheses. First, Guéron suggests that the body-part and its binder form a lexical chain. The head of this chain is the person whose body-part is mentioned, *Marc* in (8), and the tail of the chain is the body-part itself, *les yeux* in (8). Second, the determiner of the tail of this chain, *les*, is a PRO element, and not the usual iota-operator associated with definite determiners. The second hypothesis accounts for the local presence of a binder of the body-part, since the PRO element included in it must be controlled within its minimal domain-governing category (see Manzini, 1983). The first hypothesis partly accounts for the fact that only body-parts can participate in the IPC and the fact that (14) is ungrammatical. I say partly, because the explanation requires two amendments to the usual conditions on chain formation. The two amended conditions on chain formation are given in (α) :

(α) i. The head and the tail of a chain cannot be distinct in reference. This condition constitutes a weaker form of the co-indexing requirement on chain members. It is meant to account for the fact that the referents of the head and tail of the lexical chain in the IPC must be in a relation of inalienable possession to each other: only possessors of body-part nouns obey the non-distincteness condition on lexical chains in the IPC, according to Guéron.

ii. Chains must receive a single primary theta-role, where primary theta-roles correspond to lexically-specified arguments, like agent or patient. This condition constitutes a weaker form of the theta-criterion, as it applies to chains, and accounts for case 7. In sentences like (14), both *Marc* and *les pieds* receive two different primary theta-roles from *laver* 'to wash'. They cannot therefore form a lexical chain, and the sentence is ungrammatical.

Guéron's analysis is based on semantic intuitions concerning the IPC which I think are partly correct and are reflected in the analysis I give below. But there are empirical and theoretical reasons to reject Guéron's specific proposal. First, as is, it only accounts for a subset of the IPC cases I described in section 1. It covers cases 3a and 3c, 5a and 7 and can be amended to cover case 2. It cannot account for any of the other cases, where both the body-part NP and its binder receive primary theta-roles. Case 5b. is one such example, since in (11) both the subject *Marc* and the locative PP *autour du cou* receive primary theta-roles from *mis* 'put'. The same is true for case 6 and sentence

(13), since *démanger* assigns both a primary agent theta-role to its subject *les petons* 'the tootsies' and a primary experiencer theta-role to its indirect object *nous* 'us'. A similar case can be made for examples (8) and (9) and case 4, despite Guéron's claim to the contrary. In (9), for example, both *elle* 'she' and *les yeux* 'the eyes' receive two primary theta-roles (although from different predicates). *Elle* is assigned a primary theta-role by *fermés* 'closed', and *les yeux* is assigned a primary theta-role by *bleus*.[3]

Finally, Guéron's analysis cannot account for case 1 and sentences like (1) either, since *avancer* 'move forward' assigns primary theta-roles to both the subject and the object. Guéron mentions case 1 and suggests that sentences like (1) should be handled via a process of LF reanalysis which absorbs the theta-role borne by *le pied*, thus obviating the need for the IPC to achieve the binding of *le pied* to the subject. Guéron gives no independent evidence to justify this new process of LF reanalysis. Nor does she explain exactly how the reanalysis of *avancer* in (1) as 'a pronominal verb' insures the body-part is understood as the body-part of the subject's referent.

Second, the two hypotheses on which Guéron's analysis rests are costly. To justify the claim that the body-part and its binder form a lexical chain, Guéron needs to amend the conditions on chain formation in two ways (see (α)). Both amendments lead to difficulties. The assumption that the body-part NP and its binder are not distinct in reference is problematic semantically. If the body-part and the binder do not differ in reference, it is unclear why sentences (19)a. and b. are not synonymous:

(19) a. Marc$_i$ s'$_i$ est lavé le cou$_i$. 'Marc$_i$ washed his$_i$ neck'
b. Marc$_i$ s'$_i$ est lavé les pieds$_i$. 'Marc$_i$ washed his$_i$ feet'

If *les pieds* or *le cou* are not distinct in reference from the reflexive clitic, they are not distinct in reference from each other, by transitivity of equality. (19)a and b should therefore be truth-conditionally equivalent, contrary to fact.

The reference to a single primary theta-role in the definition of chains also hampers the recoverability of a verb's semantic arguments from the input string. According to her new definition of the theta-criterion, there are three possible relations between a chain and a verb's semantic arguments (or adjuncts): (i) the head of a chain bears a primary theta-role, and the tail a secondary theta-role; (ii) the head of a chain bears a secondary theta-role and the tail a primary theta-role; (iii) the entire chain bears a single primary theta-role. The simple rule that the tail of a chain is the theta-marked position cannot anymore be maintained.

Finally, Guéron's second hypothesis (that body-part NP's in the IPC contain a PRO determiner) forces us to postulate without any independent evidence that the French definite article is ambiguous between a determiner and a pronominal. Moreover, there

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[3] Guéron claims that her analysis covers case 4 because *avoir* 'have' in (8) subcategorizes for a small clause, and assigns a secondary locative theta-role to the subject *elle*. She presents no independent evidence of the secondary nature of the theta-role assigned to its subject by *avoir*. Nor does she explain why in either (8) or (9), by opposition to all other cases, the two members of the putative lexical chain are assigned theta-roles by two different predicates (the predicative adjective *bleus*, and the verb *avoir* in (8)). Finally, the same analysis cannot be generalized to (9), as mentioned in the text.

are some cases, as mentioned in Authier, 1990, where the determiner of the body-part NP is not definite, as shown in (20).

(20) Pauline lui a arraché quelques/deux dents (Authier's (18c))
'Pauline pulled some/two of his/her teeth'

The ambiguity of the definite article Guéron posits must therefore be generalized either to the entire set of "article"-like French determiners, including a null article in sentences like (20), if *quelques* and *deux* are treated like cardinal adjectives, or to a denumerably infinite number of quantifier determiners (since the upper-bound to the number of toes, limbs and other body-parts is not grammatically determined). In both cases, we are lead to multiplying the number of French determiners without any independent motivation.

2.2. Authier, 1990

Authier's proposal is that French is a null subject language in the determiner phrase (DP), as shown in (21):

(21) a. $[_{DP}\ pro_i\ [_{D'}\ son_i\ [_{NP}\ livre]]]$
b. $[_{DP}\ pro_i\ [_{D'}\ le\ [_{NP}\ livre]]]$

In (21a) the ϕ-features of the null *pro* subject are identified with the determiner *son*. In (21b), i.e. in the IPC case, the identifier is a dative clitic or a null A' quantifier included in the VP or IP the DP complements. The two possible mechanisms of *pro* identification that apply in the case of (21b) are summarized in (β) below (Authier's (23)):

(β) (i) *pro* is identified by the agreement features of the closest X^0 category which heads an XP in which it is contained
(ii) *pro* is identified by an unselective operator which c-commands it.

In sentence (4), clause (i) applies and identifies *pro* to *lui* 'to him'. In (6), clause (ii) applies, and *pro* is identified by a null A'-quantifier of a quantificational force equivalent to *often*.

Authier's treatment is more reduced in scope than Guéron's. It only accounts for cases 3 a. and b and 7.[4] Moreover, his account of cases 3a. and 3b. is seriously flawed. Its two main shortcomings are apparent in sentences (22) and (23) :

(22) Les livres lui$_i$ sont tombés $[_{PP}$ sur $[_{DP}\ pro_i\ [_{D}$ le] $[\ _{NP}$ pied]
(23) J'ai lavé les cheveux$_i$ à Marie$_i$ (Guéron's (72b))
(24) a. *Elle en a pensé aux dangers. 'She thought about the dangers of it'
b. *Elle en a pensé $[_{IP}$ aux dangers *pro*]

Authier's proposal predicts that in (22) the null *pro* in SPEC of DP is identified by the dative clitic *lui* 'to him' across the boundary of the PP phrase headed by *sur*. This identification of *pro* violates the well-known constraint on French clitics that they cannot

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[4] Authier specifically mentions case 1 and case 4a., and claims that both cases should not be considered instances of the IPC. I do not have the space to counter his arguments in detail here. Let me simply mention that case 1 is entirely productive within its semantic class, *contra* Authier's claim. In any case, Authier's proposal does not cover cases 2, 3c, 4b, 5, and 6.

identify a *pro* element across a PP boundary (see (24a)). Moreover, Authier's account predicts that the DP *pro* in the IPC requires a CLITIC identifier in non-generic contexts, a prediction which (23) contradicts. Both facts strongly argue against the hypothesis that the IPC is a case of *pro* identification by a clitic (or an unexpressed generic A'-quantifier).

Final confirmation of this conclusion is found in German. German has the same IPC construction as French, as I mentioned above. But in German the pronoun corresponding to *lui* or *se* in (4) or (15) is demonstrably not a clitic attached to the verb, as shown by sentence (25) where the dative pronoun is coordinated to a full NP. Clause (i) of the identification principle, cannot therefore apply to the similar German facts:

(25) Sie kämmte sich und den Kindern die Haare
she comb.PST refl.DAT and the children.DAT the hair
'She combed her hair and that of the children'

2.3 Vergnaud and Zubizarreta, 1992

Vergnaud and Zubizarreta's account of the IPC is embedded in a comprehensive theory of noun denotations which I cannot review here. I only focus on its consequences for the analysis of the IPC. Their account of the IPC does not rely on PRO control and chain formation, as Guéron's or *pro* identification, as Authier's, but on predication theory. Their basic claim is that in sentences like (4), the entire body-part DP subcategorizes for a subject requirement corresponding to the possessor argument. This subject requirement left unsatisfied within the DP is satisfied via predication, i.e. co-indexing of the DP with the clitic *lui* in (4). Vergnaud and Zubizarreta explain the locality of the IPC (see section 1.2) by appealing to a general constraint on predication that the predicate and its non-structural "subject" mutually m-command each other at s-structure.[5] This last constraint on predication is too strong and severely limits the empirical coverage of their account.

As they note, the mutual m-command condition on predication prevents their analysis from directly covering case 1, since the subject of (1) is not m-commanded by the object body-part predicate. Like Guéron, they propose that (1) undergoes reanalysis. As I mentioned earlier, such a move is entirely *ad hoc*. Moreover, reanalysis usually occurs at LF, whereas the predication relation must hold *ex hypothesi* at s-structure. It is unclear how LF reanalysis can help in the satisfaction of a structural condition on predication that must be checked at s-structure.

Many other cases not mentioned by Vergnaud and Zubizarreta, also violate the constraint that the predicate and its binder m-command each other at s-structure. Case 2 is an obvious example, assuming, as is generally accepted, that instrumental phrases are

[5] In fact, to cover cases 3a and 3 b, Vergnaud and Zubizarreta must stipulate that expletive determiners and so-called case-marker prepositions like *à* do not count when assessing the m-command relation. Such a stipulation, which is partly semantically based, calls into question the alleged structural nature of the constraint on the two members of the predication relation.

generated within (or adjoined to) the VP. So ares case 4 and 6.[6] Case 5 is an even more glaring counterexample to the mutual m-command constraint, since in sentences like (11) the body-part predicate is the object of a VP-internal P and is bound to the subject of the clause. Finally, case 3c. is only covered by Vergnaud and Zubizarreta via some added stipulations which have no application outside the IPC.

Although, this brief critique of Vergnaud and Zubizarreta's article does not do justice to some of their claims, notably concerning what they call the necessary distributivity effect of the IPC, the previous remarks should make clear that their solution is seriously flawed too. Note that, as the two other analyses I reviewed in this section, Vergnaud and Zubizarreta's account does not treat the relationship between the body-part and the binder of its possessor as a "strict" anaphoric relation, i.e. as the same kind of relation instantiated by a reflexive anaphor and its antecedent. By contrast, the analysis I propose in the next section assumes that the relation involved in the IPC is of a purely anaphoric nature, and does not differ in kind from the relation which holds of an ordinary reflexive anaphor and its antecedent.

3. The IPC as a strictly anaphoric phenomenon

The analysis I propose has two parts. First, I assume body-part nouns in the IPC contain an anaphoric referential-index which correspond to their possessor argument. In other words, they specify that the filler of their possessor argument must be co-referent with another NP. It is not crucial for my present purposes how this anaphoric referential index is introduced. In the attribute-value grammatical framework within which I work, CG (see Fillmore and Kay, 1993), it results from the combination of body-part nouns with the construction represented in Figure 1 in the Appendix where subscripts in italics in front of feature-matrices corresponds to the type of object denoted by the matrix (see Pollard and Sag, 1994 on typed feature structures). Without going into the technical details of this attribute-value matrix, the construction depicted in figure 1 introduces an anaphoric dependency corresponding to the possessor argument in the lexical structure of body-part nouns. This dependency is indicated by the presence of one element in the set-value of the TO-BIND attribute whose reference or INSTANCE value is structure-shared with the referential index of the possessor argument (see the circled *#1* in the diagram).[7]

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[6] Note that sentences like (13) do not require the presence of a clitic, as shown in (i). Even if clitics are adjoined to I at s-stucture, the mutal m-command requirement on predication at s-structure is therefore violated by case 6:

(i) 'Ursule à qui la langue démangeait d'avoir à répandre la nouvelle' (Balzac). 'Ursule who was anxious to divulge the news'

[7] I cannot detail here the general mechanisms through which binding dependencies present in lexical entries or introduced by constructions are resolved within CG. Suffice it to say that the member of the TO-BIND set in Figure 1 is passed up the constituent-structure tree by a general convention on binding features (i.e. on members of the TO-BIND set) similar to the slash percolation convention in GPSG or HPSG. It is then instantiated on the relevant predicate and identifies one of its argument (i.e. the element of the valence set in figure 1) as the antecedent of the anaphor which introduced this member of the TO-BIND set.

The anaphoric dependency would probably be introduced by other means in other frameworks. It could be the result of a lexical rule applying to body-part nouns, as would probably be done in HPSG. Or the anaphoric index could be that of an empty category generated under the N' headed by the body-part noun. In other words, this null possessor anaphor could be the pure anaphor equivalent of null object *pro* analyzed in Rizzi, 1986, as illustrated in the (simplified) labelled bracketing in (26):

(26) $[_{DP}\ [_{DET}$ le $[_{N'}\ [_{N}$ pied] $[_{NP}$ *e/+ana; -pron/*]]]]

The important point for me is that body-part NP's contain such a reflexive-like anaphoric dependency and that specific binding conditions are attached to it. I call this dependency the possessor anaphor, to make clear it corresponds to the possessor argument of the body-part.

This possessor anaphor selects— as Dalrymple's work shows any anaphoric dependency does— a set of specific binding constraints, in particular, a specific binding domain. I briefly mentioned in section 1.2. that the particular domain within which this reflexive must be bound is the next predicative phrase up, or equivalently what Dalrymple calls the Minimal Complete Nucleus domain. This constraint is represented in the diagram in the value of the DOMAIN attribute (i.e. [PRED +]). As such, the IPC possessor reflexive behaves very much like many other cross-linguistically attested reflexive anaphors, except for its absence of phonological manifestation.

What makes this constructionally introduced anaphor more interesting, though, is that it also imposes a very specific semantic constraint on its binder. The constraint is represented in figure 1 in the RESTRICTION attribute of the semantics of the binder (i.e. of the relevant part of the member of the TO-BIND set). To model the semantic condition the antecedent must obey, I make use of the notion of active-zone discussed in Langacker, 1984. My specific definition of active-zone is given in (γ):

(γ) The **active zone** of an entity *x* is that portion of *x* which is directly involved in the participant-role *x* plays in a situation *s*.

In other words, I define the predicate *active-zone* as a three place predicate which holds of an entity *x*, a part of that entity *y*, and a situation one of whose participant-role is played by *x*. Sentences (27)-(29) illustrate the meaning of the *active-zone* predicate:

(27) Your dog bit my cat (Langacker's (5a))
(28) Roger peeled an orange (Langacker's (6h))
(29) Roger blinked (Langacker's (6a))

In (27), the dog's active-zone is his mouth; in (28) the active-zone of the orange is its outer surface, and in (29) Roger's active-zone is his eyelids. Note that, in conformity with the definition in (γ), the determination of the active zone of the dog in (27) (its mouth) depends on its role in the event, namely its being the biter. As a bitee, it active-zone, like that of the cat in (27), would be different. This dependency of the notion of active-zone on the role the entity plays in a given situation has one important consequence. To two different participant-roles often correspond two different active-zones, even when a single individual satisfies the two semantic roles.

Let's see now how the *active-zone* predicate applies to some of the sentences given in section 1.1. In sentence (3), the hand is that part of Jean's body directly involved

in his pushing the ball. Similarly, if Marc advances his foot (sentence (1)), the foot is the part of Marc's body accomplishing the move forward. Note that in both cases, the body-part is the active-zone of the referent of the NP which binds the possessor reflexive. My claim is that the active-zone relation just observed for cases 1 and 2 holds generally for all potential binders of the possessor reflexive. This condition is expressed as clause (ii) of (δ):

(δ) **Constraints on the set of possible binders of a body-part NP:**

An NP_1 can bind the possessor anaphor contained in a body-part NP_2 iff:
(i) NP_1 and NP_2 belong to the same predicative domain.
(ii) It is true (in all possible worlds) that the body-part is the active-zone of the referent of NP_1 with respect to the participant-role of NP_1 in the situation.

Let's now consider the other cases mentioned in section 1, and check that the active-zone constraint properly licenses the binding of the possessor anaphor by the relevant NP, as well as exclude improper binding of the possessor anaphor, as in (14). Cases 3a and 7 and sentences (14) and (15) illustrate the importance of referring to a given participant-role in the definition of the active-zone predicate. In the ungrammatical (14), the possessor of the patient body-part is bound to the agent subject. The active-zone constraint rules out (14) since the body-part, the feet here, is not the body-part used by Marc as an agent.[8] In the grammatical (15), on the other hand, the patient body-part is not bound to the agent subject but to an affected dative reflexive. This kind of dative complement, as is well-known, satisfies an affected-party role in both French and German (see Barnes, 1985, among others). This time, the active-zone constraint is satisfied by the binder since the body-part is indeed critical in assessing the affectedness of the referent of the dative reflexive. Sentence (15) is therefore grammatical.

The contrast between (14) and (15) illustrates the partial second-order nature of the *active-zone* predicate. Although the subject and the reflexive marker in (14) and (15) denote the same individual, only the dative reflexive is compatible with the active-zone constraint because it satisfies a different semantic role than the subject.

In that respect, the possessor anaphor is not radically different from other anaphors. Other cases of second-order semantic conditions on antecedents have been recorded in the literature. Dalrymple, 1993, for example, argues that the Norwegian reflexive *seg* discussed in Hellan, 1988, semantically constrains its binder to bear a higher theta-role on the thematic hierarchy than the theta-role of the NP it binds. In the case of Norwegian *seg* too, the semantic condition the anaphor imposes on its binder mentions the role its referent plays in the event and not merely its identity. What sets the French and German possessor anaphor apart, though, is the fact that the constraint is not reducible to a simple hierarchical condition on the respective roles of the antecedent and

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[8] Note that the ungrammaticality of (i):

(i) *Marc$_i$ a lavé les mains$_i$. 'Marc$_i$ washed his hands$_i$.'

where Marc could be using his hands in washing his hands, is accounted for by the requirement in clause ii. of (δ) that the active-zone constraint be true in all possible worlds.

the anaphor. The condition is a full-fledged semantic predicate similar to the kind of semantics associated with lexical items. In fact, the active-zone constraint functions very much like a modifier would: it restricts the relation the denotation of the antecedent can have to both the event it is a participant of and the body-part of which the anaphor is an argument.

The contrast between (14) and (15) also illustrates the fact that the active-zone constraint often leads to predictions identical to those made by Guéron's single primary theta-role condition. When both the body-part and the binder satisfy two primary-roles, they cannot form a lexical chain. But then, as we have seen with (14), typically, the body-part is also not critical in defining the participant role played by the binder and the active-zone constraint is not met either. The major exceptions to this generalization are the "natural gesture" case, and case 6. In the "natural gesture" case, the agent both acts on the body-part (via its nervous system), and the body-part is the portion of the agent's body where its activity manifests itself. In case 6, the body-part both causes some physical-discomfort to the person, and is the locus of this discomfort. In both instances the body-part is the active-zone of the antecedent, eventhough they satisfy different primary theta-roles. The semantically weaker active-zone constraint thus covers cases 1 and 6, which Guéron's revised theta-criterion either leaves unexplained (case 6) or only explains via an *ad hoc* reanalysis process (case 1).

The active-zone constraint also explains case 4, where the body-part and the antecedent of the possessor anaphor are assigned theta-roles by two different predicates. Case 4 illustrates a trivial satisfaction of the active-zone constraint. I assume that (part of) the semantic representation of sentences like (8) is as in (ϵ), where I use a neo-Davidsonian representation for convenience:

(ϵ) *inalienably-possess (s) ∧ possessor (s, Marc) ∧ possessed (s, eyes) ∧ blue-rln (t) ∧ blue-object (t, eyes)*

In other words, I assume that the use of *avoir* present in (8) exemplifies a lexical entry whose semantics is that of (inalienable) possession and which subcategorizes for three complements: a subject and object NP's satisfying the two argument positions of the possession relation and a secondary predicate predicated of the direct object.[9]

If these assumptions concerning the lexical semantics of *avoir* in (8) are correct, the subject, *Marc*, trivially satisfies the active-zone constraint. The possessed body-part is obviously that portion of Marc's body critical in assessing whether it satisfies the role of inalienable-possessor of the body-part. Sentences like (9) are explained along the same

[9] This assumption, which differs from the usual GB assumption that *avoir* in (8) is an existential predicate, is motivated by two facts. First, it relates this use of *avoir* to other uses of the same verb where it indisputably denotes a relation of possession. Second, we can account for the fact that in sentences like (8) the direct object NP must denote an object which can be inalienably possessed by the denotatum of the subject (body-parts, broadly speaking). Both facts are left unexplained by the existential analysis of *avoir*.

lines, if we assume that they semantically involve an (inaneliable) possession predicate.[10]

Turning now to the remaining cases, the active-zone constraint is clearly satisfied by the direct object *Marc* in sentence (7): Marc's nose is the portion of his body involved in his being a patient of the hitting event. Case 3b. and sentences (6) is more interesting, since in this case there is no overt binder of the possessor anaphor. To understand (6), we must compare it to (4) or (15). In sentences like (4), the dative clitic is an instance of the general French affected dative linking pattern, as mentioned above. This complement is thus an indirect object and designates an entity affected by the event denoted by the verb. As such, it satisfies both the syntactic and thematic conditions on arbitrary object *pro* in Romance discussed in Rizzi, 1986. We therefore expect arbitrary object *pro* to be able to apply to the affected dative binder of the possessor anaphor exemplified in (4) and (15), provided the third condition on object *pro* in Romance is met, namely that the verb is used in a generic context. As noticed already by Authier, this is what happens in (6), which contrasts with the ungrammatical (30), where the context is not generic:

(30) *Cette longue marche hier a fait enfler les pieds
this long walk yesterday have.PR make.PPT swell.up the feet
'This long walk yesterday made my feet swell up' (intended meaning)

Finally, in sentences (10) and (11) which illustrate case 5, the main verb either directly denotes a relation of holding or wearing or denotes a relation which entails such a relation. So, in (10) *avoir* could be replaced by *tenir* 'to hold' without any change in truth-conditional semantics. In (11), the action of putting entails as an end-state a situation where Marc has or wears a scarf around his neck. In both cases, the body-part is the portion of Marc's body involved in his playing the relevant participant-role in the situation: it is the hand which holds the cigarette and the neck which holds the scarf.[11] The active-zone constraint is therefore satisfied by the subject.

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[10] Two facts justify this last assumption. First, the adverbial phrase without any marker alternates with the same phrase preceded by *avec* 'with' (see (i)), a well-known surrogate of *avoir* in many languages (see McCawley, 1983):

(i) Il est parti avec le visage en larmes. 'He left in tears'
he be.PR leave.PPT with the face in tears

(ii) 'Si on trouve quelqu'un les yeux hagards, on saura que c'est lui' (Valérie10/08/93)
'If we find somebody with wild eyes, we'll know it's him'

Second, phrases like *la tête haute* can occur as a secondary predicate or the main predicate of a small clause complement to verbs like *trouver* (ii). In this context, they function as a predicative phrase, and subcategorize for a subject which must be interpreted as the possessor of the body-part, as the gloss of (ii) suggests. In other words, they function exactly like the VP headed by *avoir* in (8).

[11] Note that, as mentioned in the text, the active-zone predicate in case 5b. applies not to the relation denoted by the main verb, but to a relation which is entailed by the relation denoted by the main verb. The statement of the body-part construction diagrammed in Figure 1 must be slightly altered to accomodate such cases. I cannot enter the details of this technical modification here.

Conclusion

I have now answered the two questions I raised concerning the relation between *Marc* and *le pied* in (1). (i) *Marc* binds a possessor anaphor included in the structure associated with *le pied*. (ii) *Marc* (and more generally binders of possessor anaphors) must occur in the next predicative phrase up, as well as satisfy a semantic condition, the active-zone predicate.

Neither of these specific constraints is qualitatively different from the constraints selected by other anaphoric elements cross-linguistically. In that sense, I have reduced the complex and as yet not satisfactorily acounted for IPC facts to a variation on well-known cross-linguistic themes.

But the specific semantic condition at play in the IPC and its interaction with ordinary binding principles is of a larger theoretical significance. Phenomena like the IPC suggest that natural language grammars can impose semantic conditions on syntactic phenomena like binding. Semantic information, including complex thematic information, must therefore be available for the statement of such constraints independently of the projection of a predicate argument-structure onto d-structure, *contra* the claim made in Belletti and Rizzi, 1988 or Grimshaw, 1990. Conversely, grammatical frameworks like CG, HPSG or Categorial Grammar, which claim that syntax and semantics are associated directly and locally and that semantic information is available at any point in building linguistic structure receive support from the existence of constructions like the IPC.

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Appendix

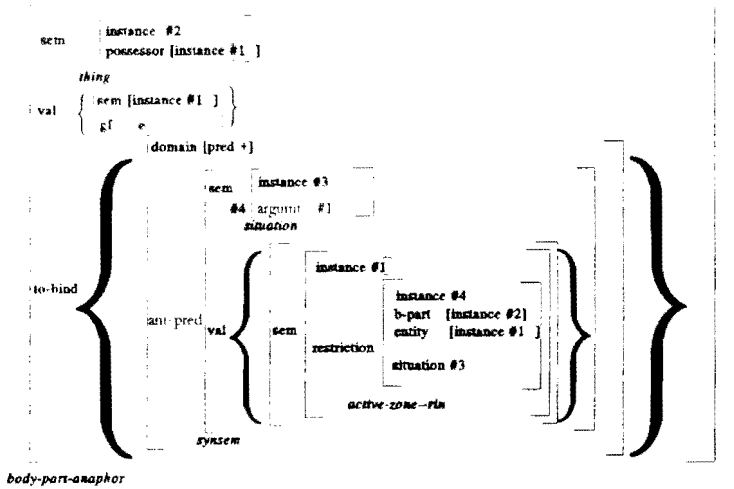

Figure 1: The body-part noun construction

The Syntax of Predicate Clefts: A Case Study from the Predicate Cleft Construction in Korean

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1. Introduction

Koopman (1983) analyzed the predicate cleft (PC) construction in Vata as a case of a verb movement. An essentially same point was made by Baltin (1991) and Larson and Lefebvre (1990). However, while the movement possibility for X^o category is generally more restricted than that for XP category, the PC Construction is known to exhibit an apparently unbound dependency between the initial verb and its twin, unless a syntactic island intervenes. In this paper, I argue that the PC Construction can be analyzed as a case of XP movement with XP movement properties rather than an exceptional case of X^o movement with XP movement properties. The argument is based on the PC Construction in Korean.

2. Properties of the PC Construction

The example (1) shows that in the PC construction of Vata, in addition to a verb in the sentence-initial position, an identical twin of the verb appears in the verb's normal clausal position.

(1) **ngOnU** n ka bI **ngOnU** a
sleep you FUT-ASP now sleep Q
'Are you going to SLEEP now?' (Koopman (1983, chapter. 6, (1b)))

(2) shows that the initial verb and its twin can be separated by an apparently unbound distance.

(2) **yi** O wa na a **yi.**
come s/he want NA we come
'S/he wants us to COME.' (Koopman (1983, chapter. 6. (14d)))

(3) and (4) illustrate that the relationship between the initial verb and its twin respects syntactic islands.

(3) ***taka*** [$_S$ n wa [$_{NP}$foto$_i$ [$_{S'}$ mUmU [$_S$ n **taka** bO aba [$_{NP}$ e]$_i$]]]]
show you like picture IT-IT you showed-REL Aba
'You like the picture that you SHOWED to Aba.'
(Koopman (1983, chapter. 6. (15b))) (Complex NP)

(4) ***nyE*** a nI [$_{S'}$ zE a ka-o kofi **nye**] yi.
give we NEG-ASP thing we FUT-ASP REL Kofi give know
'We don't know what to GIVE to Kofi.'
(Koopman (1983, chapter. 6. (19a))) (Wh-Island)

Larson and Lefebvre (1990) discussed the PC construction in Haitian Creole, as illustrated in (5).

(5) Se **kouri** Jan s **kouri.**
It-is run John run
'It is run that John did (not, e.g. walk).'

The PC construction in this language shares the properties of that in Vata. In addition, in this language, ambiguity arises when the predicate in the normal position contains a complement. The sentence in (6) is three ways ambiguous. Contrast can be understood with respect to a verb as in (a), a whole verb phrase as in (b), and a complement as in (c).

(6) Se **manje** Jan **manje** pen an.
It-is eat John eat bread Det.

a. 'It is eat that John did with the bread (not, e.g. bake).'
b. 'It is eat the bread that John did (not, e.g. wash the dishes).'
c. 'It is the bread that John ate (not, e.g. the apple).'

3. Previous Analyses

Even though the PC construction exhibits island effects, which are characteristics of movement, a question to ask with respect to this construction is, 'What moves'? A movement process is usually suspected when an element occurs in a position distinct from its normal position, and the normal position is phonologically empty. In this case, however, the focused position and the normal position are both lexically occupied by the same verb.

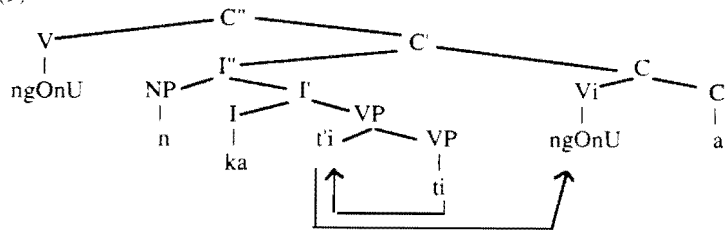
Koopman (1983) proposes to decompose movement into copying and deletion. The copying operation is the operation that is sensitive to island constraints. After the verb is successive cyclically copied into the spec of each CP, the copied verb in the spec of each intermediate CP deletes. The initial verb, however, cannot delete due to the ECP. The initial verb, being a theta-role assignor, is not theta-governed and thus would have to be antecedent-governed, in order to satisfy the ECP, if empty. However, antecedent-government from Comp, Koopman (1983) argues, is not possible in Vata, as evidenced by the fact that wh-movement from a subject position always requires a resumptive pronoun as in (7).

(7) alO_i O_i/*[e] yE mO ye la?
who he-RES/*[e] saw you PART WH
'Who saw you?'

The PC construction, in Baltin's (1991) view, is akin to the relative clause. Just as a wh-word must move to a position close enough to the head noun phrase in a relative clause, Baltin (1991) argues that in the PC construction a sentence-internal verb moves at LF to a position close enough to the sentence initial verb (which is base-generated in the spec of CP), namely to a position adjoined to Comp. The sentence (1) will have D-structure in (8) and LF representation in (9).

(8) [C'' [ngOnU] [C' [I'' [NP n] [I' [I ka] [V' [A bI] [V' [V ngOnU]]]]] [C a]]]

(9)



On the other hand, Larson and Lefebvre (1990) argue that, in the PC construction, at LF the lower predicate replaces the higher one in accord with the Full Interpretation Principle of Chomsky (1986 b). During this replacement, if only a lower verb is raised, then we get the reading where the verb is focused (6a); if a lower VP is raised, then we get the VP-focus-reading (6b); the object-focus reading (6c) comes when a lower VP is raised and then an object is raised from it as in (10).

(10) Se [pen an]$_i$ [manje t_i]$_j$ [Jan t_j]

4. Head Movement Constraint

So far I briefly reviewed Koopman (1983), Baltin (1991), Larson & Lefebvre (1990). All of these analyses agree in one point. Namely, the PC construction involves movement of the head level (Verb) category .

However, the movement possibility for the head level category is noted to be more restricted than that for adjuncts, which is in turn more restricted than that for arguments. (11) shows that adjuncts can move unboundly.

(11) How do you think that Bill solved the problem t.?

If heads and adjuncts behave alike with respect to movement possibility, it should be true that heads also move unboundly. However, adjunct-like unbound movement of the head level category as in (12) results in an ungrammatical sentence.

(12) ** Have he thinks that Bill would t solved the problem ?

In fact, Travis (1984) observes that movement of the head level category is much more bound than that of XP in that the head level category cannot move over another head level category. The deviance of (14), in contrast with (13), shows the effect of the HEAD MOVEMENT CONSTRAINT of Travis (1984) (which is later subsumed under RELATIVIZED MINIMALITY in Rizzi (1990) and the economy principle MAKE SHORTEST MOVEMENT in Chomsky (1992)).

(13) a. Has Fred enjoyed that ?
b. [CP [C has$_i$] [IP [NP Fred] [I' [I t'_i] [VP [V t_i] [VP [V enjoyed] [NP that]]]]]

(14) a.*Have Fred would enjoyed that ?
b. [$_{CP}$ [$_{C}$ have$_i$] [$_{IP}$ [$_{NP}$ Fred] [$_{I'}$ [$_{I}$ would] [$_{VP}$ [$_{V}$ t $_i$] [$_{VP}$ [$_{V}$ enjoyed] [$_{NP}$ that]]]]]

(15) Head Movement Constraint

Movement of a zero-level category β is restricted to the position of a head α that governs the maximal projection γ of β, where α theta-governs or L-marks γ if α = Comp. (from Chomsky (1986a, 71))

Noticing this problem, Baltin (1991) proposes (i) that Head Movement Constraint is reducible to the ECP and (ii) that the LIKE-ATTRACTS-LIKE CONSTRAINT does not hold at LF.

(16) The Like-Attracts-Like Constraint (LALC)

When they move, phrasal categories adjoin to phrasal categories, and nonphrasal categories adjoin to nonphrasal categories. (Baltin 1982)

The LALC will prevent *have* from adjoining to VP in the derivation of (14) and so the barrierhood of VP cannot be voided. Thus, the trace of *have* cannot be antecedent-governed, resulting in a violation of the ECP. On the other hand, the LALC does not hold at LF and so a head *ngOnU* can adjoin to VP during the LF derivation of (1) as in (9). Now, there is no barrier between this VP-adjoined position and Comp. Thus, the trace of *ngOnU* can be antecedent-governed with the ECP satisfied and therefore (1) is well-formed.

This is one possible way to explain the unbound dependency in the PC construction, if the PC construction truly involves the head movement. Another possible way is to assume with Ian Roberts (1991) that there are two types of head movement. One is the genuine morphological cases of head-to-head movement such as noun incorporation and affixation, where excorporation is not possible. The other is cases like cliticization, where excorporation is possible. The unbound head movement in the PC construction will belong to the latter cases. On the other hand, if the PC construction involves XP movement, which looks like head movement superficially, one way to capture the properties of the PC construction is to assume movement of VP-operator as in Laurent Dekydtspotter (1992). In the next section, based on the PC construction in Korean, I will suggest another way to go under the assumption that the PC construction involves XP movement.

5. The PC Construction with XP movement

5.1. The PC Construction in Korean

(17) illustrates the PC Construction in Korean: a verb appears sentence-initially, with its twin in the verb's normal position.

(17)	**ilk**-ki-nun	John-i	chayk-ul	**ilk**-ess-ta.
	read-KI-fp	John-nom.	book-acc.	read-tns-SE

a. 'It is read that John did with a book (not, e.g. sell).'
b. 'It is read a book that John did (not, e.g. wash the dishes).'
c. 'It is a book that John read (not, e.g. the newspaper).'

The initial verb is followed by a nominalizer *-ki* and a focus particle *-nun*. As the translation shows, the sentence is three-ways ambiguous as in Haitian languages. The dependency between the two verbs is unbound as shown in (18) unless a syntactic island intervenes as in (19) and (20).

(18) **ilk**-ki-nun Mary-ka John-i chayk-ul **ilk**-ess-ta-ko malhayessta.
read-KI-fp M.-nom J.-nom. book-acc. read-tns-SE-Comp said

a. 'It is read that Mary said John did with a book.', b. ...., c. ...

(19) ***ilk**-ki-nun Mary-ka [[John-i e **ilk**-un] chayk-ul] chackoissta.
read-KI-fp M.-nom J.-nom. read-PNE book-acc. is-looking-for

a. 'It is read that Mary is looking for a book that John did with.', b. ....,
c. ... (relative clause)

(20) ***ilk**-ki-nun, Mary-ka [John-i ku chayk-ul **ilk**-ki-ceney]
read-KI-fp M.-nom. J.-nom. that book-acc. read-KI-before
panwhan-ul yokuhayessta.
recalled
a. 'It is read that Mary recalled the book before John did with that book.',
b. ...., c. ... (adjunct clause)

Interestingly, there is a variant of (17) as shown in (21), where both of two verbs occur sentence-internally.

(21) John-i **ilk**-ki-nun chayk-ul **ilk**-ess-ta.
John-nom. read-KI-fp book-acc read-tns-SE

a. 'It is read that John did with a book (not, e.g. sell).'
b. 'It is read a book that John did (not, e.g. wash the dishes).'
c. 'It is a book that John read (not, e.g. the newspaper).'

This variant is also three-ways ambiguous as shown in the translation. Let us call (17) type as Type I PC Construction and (21) type as Type II PC Construction.

5.2. XP-movement

One possibility to get the island effects in Type I PC construction is to derive Type I PC Construction from Type II PC construction, by preposing Verb-nominalizer-focus particle complex to the sentence-initial position as in (22).

(22) [**V**- KI- fp] [... t **V**- tense ...]
↑_____|

Now, consider the pair (23) and (24).

(23) [chayk-ul ilk-ki-nun] John-i [LGB-lul ilk]-ess-ta.
book-acc. read-KI-fp John-nom. LGB-acc. read-tns-SE
'It is LGB that John read.'

(24) John-i [chayk-ul ilk-ki-nun] [LGB-lul ilk]-ess-ta.
John-nom. book-acc. read-KI-fp LGB-acc. read-tns-SE
'It is LGB that John read.'

(23) shows that not only a verb but also an object of that verb can appear in the sentence-initial position. If Type I PC Construction is derived from Type II PC construction, the involved movement in deriving (23) from (24) is clearly an instance of XP movement.

Given this, going back to the pair (17) and (21), I suggest that the involved movement there can also be XP movement. Saito (1991, class lecture) defined a resumptive pronoun as in (25).

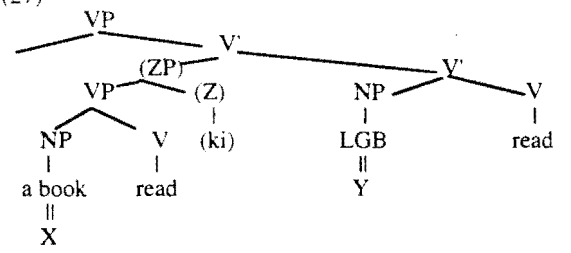
(25) X can be a resumptive pronoun iff there is Y such that

i) X and Y are coindexed
ii) X does not c-command Y.
iii) X is not more referential than Y.
iv) X is a member of R.

(26) R = the set of "least referential" overt non-anaphoric expressions.

In accord with (25), *chayk* 'book' in (24) can be a resumptive expression. *chayk* is not more referential than LGB: *chayk* can be a member of R: *chayk* can be coindexed with LGB: *chayk* does not c-command LGB, assuming the structure (27) for (24).[1]

(27)



Now, given that an overt resumptive pronoun can appear in the PC construction, it is possible to re-represent (21) as in (28) with a covert resumptive *pro*. (17), then, is derived from (28) by XP movement as in (29).

[1]Refer to Kang (1988) for the assumed structure.

(28) John-i [**pro** ilk-ki-nun] [chayk-ul ilk]-ess-ta.
John-nom. read-KI-fp book-acc read-tns-SE (<--- (21))

(29) [**pro** ilk-ki-nun] John-i t [chayk-ul ilk]-ess-ta.
read-KI-fp John-nom. book-acc. read-tns-SE
|_____| (<--- (17))

To be more specific about the categorial feature of the XP, I suggest that it is NP-shell dominating VP. (24), where the verb *ilk-* assigns an accusative Case to its own argument *chayk*, implies that the verb in the verb-nominalizer complex retains its verbal feature internally.

(24) John-i [chay**k-ul** ilk-ki-nun] [LGB-lul ilk]-ess-ta.

The contrast between the verb-nominalizer complex in the PC construction and a lexically nominalized verb[2] as shown in (30) to (33) also indicates this.

(30) 'V [+stative] -ki' in the PC construction

Mary-ka **yeppu**-ki-nun **yeppu**-ta
M.-nom. pretty-KI-fp pretty-SE
'Mary IS PRETTY'

(31) *lexical nominalization of 'V [+stative] -ki' :

***yeppu**-ki: pretty-KI: 'prettiness (?)'

(32) *modifier + 'V-ki' in the PC construction

*Mary-ka **pparun** ilk-ki-nun chayk-ul ilk-ess-ta.
M -nom. fast read-KI-fp book-acc. read-tns-SE
'intended meaning; Mary did READ A BOOK SO FAST.'

(33) modifier + lexically nominalized 'V-ki' :

a. po-ki: see-KI: 'example'

b. Mary-nun hangsang **parun** po-ki-lul sayongha-n-ta.
M.-top. always right example-acc. use-N-SE
'Mary always uses a **right** example.'

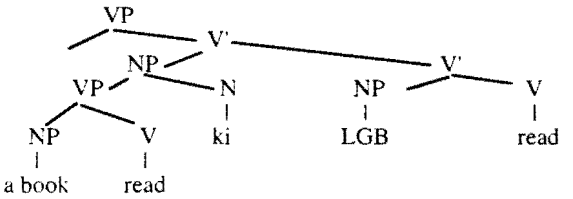
(30) shows that in the PC construction *-ki* can be attached to a [+stative] verb, while (31) shows that *-ki* cannot nominalize a [+stative] verb lexically. While a lexically-nominalized verb can be modified by nominal modifiers such as adjectives, relative clauses, numerals as in (33), modifying a verb with *-ki* in the PC construction, results in an ungrammatical sentence as in (32).

---

[2] I borrowed the criteria for a lexically nominalized verb from Yoon (1989).

On the other hand, the external distribution of the verb-nominalizer complex in the PC construction, such as occurring in an NP-position and taking nominal morphologies such as delimiters (focus particles), suggests that the verb-nominalizer complex in the PC construction acts as a nominal with respect to its external category. This mixed property of the verb-nominalizer complex in the PC construction, that is, the internally verbal and externally nominal property can be captured structurally as in (34), by adopting the NP-shell structure in the sense of Kang (1988).

(34)



5.4. Focus operator Movement

So far, I argued that if Type I PC construction is derived from Type II PC construction, the involved movement can be analyzed as movement of XP with a (c)overt resumptive pronoun rather than movement of the head level category.

In this section, I argue that the three-way ambiguity shown in the PC construction can be captured by the focus operator movement.

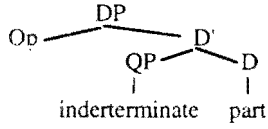
It is argued in Yang (1973), Kim (1989), Nishigauchi (1986, 1990), Watanabe (1991) that a quantifier in Korean and Japanese consists of an indeterminate expression and a particle as shown in (35) and that this particle gives a quantificational force to the whole noun phrase.

(35)

a quantifier		an indeterminate	a particle
dare-ka 'someone'	<---	dare	-ka
dare-mo 'everyone'	<---	dare	-mo
nani-mo 'anything' (Japanese)	<---	nani	-mo
nwukwu-nka 'someone'	<---	nwukwu	-nka
nwukwu-na 'everyone'	<---	nwukwu	-na
amwu-to 'anybody' (Korean)	<---	amwu	-to

Based on this, Watanabe (1991), proposing the internal structure (36) for a quantifier, argued that the particle as a head of DP determines what kind of an operator appears in the DP spec and this null operator in the DP spec actually does the semantic job for a quantifier.

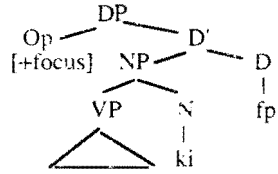
(36)



(Watanabe 1991)

Extending this analysis to the PC construction, I suggest that a focus particle gives a quantificational focus force to the whole projection. In the structure (37), a focus particle as a head of DP will motivate a focus operator in the spec of DP and this focus operator will do a semantic job.

(37)



Suppose that the focus operator can be coindexed with a verb, with a whole VP, or with a resumptive object. In addition, suppose that, for the appropriate interpretation, this focus operator should be in the spec of a Focus Phrase (FP), or more generally Polarity Phrase in terms of Culicover (1991), in accord with a focus-criterion in (38).[3,4]

(38) The Focus-Criterion (or The Polarity-Criterion)

A. A focus-operator must be in a spec-head configuration with an X [+focus].
B. An X [+focus] must be in a spec-head configuration with a focus-operator.

Borrowing formats from Larson and Lefebvre (1990), the LF representation of the sentence (21) will be (39a), with its interpretation (39b) and the mapping to focus and presupposition (39c).

(21) John-i ilk-ki-nun chayk-ul ilk-ess-ta.
John-nom. read-KI-fp book-acc read-tns-SE

a. 'It is read that John did with a book (not, e.g. sell).'
b. 'It is read a book that John did (not, e.g. wash the dishes).'
c. 'It is a book that John read (not, e.g. the newspaper).'

---

[3]See Rizzi (1991) for THE WH-CRITERION.

[4]Alternatively, movement of the focus operator is motivated by focus-feature-checking in terms of the Checking Theory in Chomsky (1992).

(39) a. $[_{FP}\ Op_i\ [\ \ldots\ t_i.\alpha_i \ldots\ ]\ ]$

b. $[\ x_i\ ;\ x_i = Op\ ]\ [\ \ldots\ x_i..\alpha_i \ldots]$

c. Op_i = Q-RESTRICTION = FOCUS

$\ldots x_i\ .\alpha_i..$(for some x_i) = Q-SCOPE = PRESUPPOSITION

The reading of (21) will vary from (21a) to (21c) in accord with the choice of α_i which ranges over the set {a verb, a resumptive object, a VP}.

Positing the focus operator and its movement to the spec of the FP to explain the three-way ambiguity of the PC construction, has another welcome result in capturing the island effects in Type II PC construction as in (40) and (41), where nothing moves overtly.

(40) ?*Mary-ka [[John-i **ilk**-ki-nun **ilk**-un] chayk-ul] chacko-iss-ta.
M.-nom J.-nom. read-KI-fp read-PNE book-acc. is-looking-for
'It is read that Mary is looking for a book that John did with.'
(relative clause)

(41) ?*Mary-ka [John-i **ilk**-ki-nun chayk-ul **ilk**-ki-ceney]
M.-nom J.-nom. read-KI-fp book-acc read-ki-before
panwhan-ul yokuhayessta
recalled
'It is read that Mary recalled the book before John did with that book.'
(adjunct clause)

In fact, the island effects shown in (40) and (41) are more general phenomena related with clefting without overt movement. Huang (1982) observed that the clefted element may not occur within a relative clause or a sentential subject as in (42) and (43).

(42) *[wo xihuan [shi Zhangsan mai de gou]]
I like FM buy DE dog
'*I like dog that it is Z. that bought.' (relative clause)

(43) *[[Zhangsan shi mingtian lai] mei guanxi]
Z. FM tomorrow come no matter
'*That it is tomorrow that Z. will come does not matter.' (sentential subject)

(44) and (45) show that the same fact holds in Korean.

(44) ??Mary-ka [John-i ku chayk-**un** ilk-ki-ceney] panwhan-ul yokuhayessta
M.-nom J.-nom. that book-fp read-ki-before recalled
'Mary recalled the book before John read THAT BOOK.' (adjunct clause)

(45) ??Mary-ka [[John-**un** ilk-un] chayk-ul] chacko-iss-ta.
M.-nom J.-fp read-PNE book-acc. is-looking-for
'Mary is looking for a book that JOHN read ' (relative clause)

The ungrammaticality of the sentences (42-45) is due to movement of the focus operator out of an island.

Assuming the same sort of the focus operator movement in Type I PC construction too,[5] I suggest that the variation between Type I PC construction and Type II PC construction comes from the optionality of the condition (46).

(46) A quantificational operator, its associated D head, and an indeterminate expression all have to be directly (not through a trace) related at SS. (Watanabe 1991)[6]

Suppose that the condition is on. After movement of the focus operator at SS, the rest of DP with the D head and the indeterminate expression (VP with a semantic variable in it) should then adjoin to the operator at S-structure. This will result in Type I PC construction with overt movement of DP (dominating VP). On the other hand, suppose that the condition is off. After movement of the focus operator at SS, the rest of DP will adjoin to the operator at LF. This will result in Type II PC construction with covert movement of DP. Alternatively, the variation between Type I PC construction and Type II PC construction is due to scrambling of DP in Type I PC construction, even though this analysis is hard to be extended to the non-scrambling languages.

6. Summary

In Korean, there are two types of PC construction. I argued that the three way ambiguity of these two types of PC construction can be captured by positing movement of the focus operator in the spec of DP. I suggested that the variation between Type I PC construction and Type II PC construction is due to the optionality of the condition (46) or due to scrambling. In any case, the involved movement, I argued, can be analyzed as movement of XP with a (c)overt resumptive pronoun rather than movement of the head level category. It is an interesting open question to be worked on whether the PC construction in Vata and Haitian Creole, which is similar to Type I PC construction in Korean, can be argued to be derived from the structure similar to Type II PC construction in Korean.

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[5]By this assumption, the island effects shown in Type I PC construction will be captured by the focus operator movement as well as the overt movement of DP-shell.

[6]Watanabe (1991) proposes this condition to explain the difference between overt wh-movement languages such as English and covert wh-movement languages such as Korean/ Japanese.

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Event and Control Structures of the Japanese Light Verb Construction

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1. Introduction

The topic of this paper is Japanese *suru* constructions. There are two types of ***suru*** 'do' constructions: incorporated and unincorporated forms, as in (1). The verbal noun (VN) and *suru* form a morphological word in the incorporated form. In the unincorporated form, a verbal noun phrase is marked by accusative, *o*.

(1)

a. Incorporated form:
Taroo ga Hanako ni bara o PUREZENTO-suru.
NOM to rose ACC present-do

b. Unincorporated form:
Taroo ga Hanako ni [bara no PUREZENTO] o suru.
NOM to rose GEN present ACC do

'Taroo presents roses to Hanako.'

This paper concerns the unincorporated form. As in (2), there are three different ideas concerning the semantic weight of *suru* in the unincorporated form.

(2)

(i) VN-*o* ***suru*** = heavy (e.g. Terada, 1990)
(ii) VN-*o* ***suru*** = light (e.g. Yamamoto, 1992)
(iii) VN-*o* ***suru*** = either light or heavy (e.g. Grimshaw and Mester, 1988)

I will opt for the first possibility that *suru* is a heavy verb.

The outline of the paper is as follows. First, I will review Grimshaw and Mester's (1988) Transfer Hypothesis and point out its problem. Second, I will show that *aspect* plays a significant role in characterizing the unincorporated *suru* construction (which I will simply refer to as *suru* constructions hereafter). Third, I will provide evidence that the *suru* construction is a control structure.

1.1. Transfer Hypothesis

θ-marking obeys strict locality. Thus, for example, the head of an NP is not allowed to assign a θ-role outside its domain, as schematized in (3).

(3) (Grimshaw and Mester, 1988: 206)

[NP [N]NP NP]VP

Japanese has productive instances of what looks like an instance of the θ-marking in (3).

(4)

Taroo ga murabito ni [ookami ga kuru to no KEIKOKU] o shi-ta.
NOM villagers to wolf NOM come COMP GEN warning ACC do-PAST
'Taroo warned the villagers that the wolf was coming.'

In (4), the verb, *suru* 'do', somehow lets the head of its direct object θ-mark its clausal NPs. To account for such a complex predicate formation, Grimshaw and Mester (1988) posit the Transfer Hypothesis: when a Sino-Japanese nominal is taken as the head of an Object of *suru*, some or all of the arguments of the nominal are transferred into the argument structure of *suru*, as exemplified in (5).

(5)

a. KEIKOKU	'warning'	(Agent, Goal, Theme)
b. *suru*	'do'	( ) <acc>
c. KEIKOKU	'warning'	(Theme) + *suru* (Agent, Goal) <acc>

Grimshaw and Mester (1988) then claim that there are three generalizations or constraints imposed on *Transfer*, as in (6).

(6) (Grimshaw and Mester 1988: 215)

(i) At least one argument apart from the subject must be outside the NP

(ii) The subject must always be outside the NP

(iii) For Nouns that take a Theme and a Goal, if the Theme argument is realized outside NP, the Goal must also be realized outside NP

1.2. Problem of the Transfer Hypothesis

The basic problem of the Transfer Hypothesis is that it has a very limited application in accounting for *suru*-constructions: it can account only for those with ditransitive and some transitive VN's. In other words, the Transfer Hypothesis does not account for why the *suru*-construction is incompatible with unaccusatives, as in (7i), psycho verbal nouns, as in (7ii), and also with certain verbal nouns, such as (7iii). It does not really explain why a PP cannot be inside the Pred NP, as in (7iv). It does not account for why when an argument is realized inside the accusative-marked Pred(icational) NP, the whole NP functions as an Object of *suru*, as in (8i), while when no argument is realized inside the domain, the NP fails to function as an Object of *suru*, as in (8ii). Also, the Transfer Hypothesis does not explain why the Subject of *suru* must always be an Agent, as seen from the ungrammaticality of the sentences in (9); and given this fact, it does not explain why the external argument of verbal nouns is always phonologically null.

(7)

(i) *Kodomo ga [TANJOO] o shi-ta.
child NOM birth ACC do-PAST
'The child was born.'

(ii) *Hanako ga Taroo no kooi ni [KANDOO] o shi-ta.
NOM GEN kindness to delight ACC do-PAST
'Hanako was delighted with Taroo's kindness.'

(iii) ?*Nisoo wa ryooseitachi kara [sono zasshi no BOSSHUU] o shi-ta.
nun TOP dorm-students from that magazine GEN confiscation ACC do-PAST
'The nun confiscated the magazine from the students in the dormitory.

(iv) *Taroo ga [Tokyo e no RYOKOO] o shita.
NOM to GEN travel ACC do-PAST
'Taroo made a trip to Tokyo.'

(8) (i) [+Passivization]
Taroo ga murabito ni [ookami ga kuru to no KEIKOKU] o shi-ta.
NOM villagers to wolf NOM come COMP GEN warning ACC do-PAST

(ii) [-Passivization]
Taroo ga murabito ni ookami ga kuru to [KEIKOKU] o shi-ta.
NOM villagers to wolf NOM come COMP warning ACC do-PAST
'Taroo warned the villagers that the wolf was coming.'

(9) (Terada, 1990: 108-111)

a. Goal Subject:
*Hironaka hakase wa nooberu shoo no JUSHOO o shi-ta.
docter TOP Nobel prize GEN receiving ACC do-PAST
'Dr. Hironaka received a Nobel prize.'

b. Instrument Subject:
*Dainamaito ga gunjikichi no BAKUHA o shita.
dynamite NOM base GEN blasting ACC do-PAST
'Dynamite blasted the military base.'

(10)
a. VN = *Unaccusatives *Psycho-predicates, and certain (aspectual) types
b. *[PP VN]
c. [NP VN] = OBJ
d. [ø VN] = *OBJ
e. [EC VN]
<ext>
g. Agent [VN]-*o suru*

In the rest of the paper, I will attempt to account for all the facts listed in (10). I will show that *suru* imposes on the Pred NP an aspectual constrain that its event type can only be Activity (accounting for (10a,b)). I will then demonstrate that the *suru* construction is a Control Structure (accounting for (10e,g)) and that there are two types of *suru* control constructions: one is bi-predicational and the other is mono-predicational (accounting for (10c,d)).

2. Internal Structure of the Pred NP

To demonstrate that *aspect* plays a significant role in characterizing the *suru* constructions, I will examine the internal structure of the Pred NP. Unlike Grimshaw and Mester (1988) who are concerned with how many arguments can be realized *outside* Pred NP, I will be concerned with the internal structure of the Pred NP, which can contain at most one (non-null) argument.[1] My speculation is that the Pred NP is sensitive to the situation type of VN's. Based on Pustejovsky's (1992) Templetic Sub-event Analysis, I hypothesize that *suru* imposes an aspectual constraint on the Pred NP that only *Process* (Activity) can be its event type. Thus, the Pred NP is incompatible with *States* and *Transitions* (i.e. Accomplishments and Achievements). In other words, the Pred NP cannot contain any element which specifies a state or a natural end-point. Thus, as in (11), psycho VN's, whose event type is *State*, cannot head Pred NP's.

(11)
*Takashi wa Noboru no kooi ni [KANDOO] o shi-ta.
TOP GEN kindness to delight ACC do-PAST
'Takashi was delighted with Noboru's kindness.'

Also, as seen in (12), the VN's whose event type is *Transition* cannot head Pred NP's.

(12)
a.(Achievement)
*Sooridaijin ga [SHIBOO] o shi-ta.
prime minister NOM death ACC do-PAST
'The Prime minister died
b. (Accomplishment)
*Terorisuto ga [daijin no SATSUGAI] o shi-ta.
terrorist NOM minister GEN assassin ACC do-PAST
'Terrorists assassinated a minister.'

However, *Transition* type VN's could be allowed to head Pred NP's if they do not bring into the Pred NP's end-points which typically correspond to PP's, as in (13).

(13)
a. Taroo ga Tokyo ni [RYOKOO] o shi-ta.
NOM to travel ACC do-PAST
b. *Taroo ga [Tokyo e no RYOKOO] o shita.
NOM to GEN travel ACC do-PAST
'Taroo made a trip to Tokyo.'

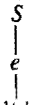
And, as is clear from (14), the VN's whose event type is *Process* have no problem in heading Pred NP's.

(14)
Taroo ga [kuruma no UNTEN] o shi-ta.
NOM car GEN driving ACC do-PAST
'Taroo drove a car.'

2.1. Application of Pustejovsky's (1992) Templetic Model

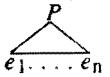
In accounting for Event Structure of predicates, phrases, and sentences, Pustejovsky (1992) postulates a representational model which consists of three different templates: *S*(tate)-template, *P*(rocess)-template, and *T*(ransition)-template which consists of a P-node denoting a process and an S-node denoting change of a state. Examples of these templates are listed from (15) to (17).[2]

(15) State:
a. The door is closed. (Pustejovsky, 1992: 57)
b. ES:



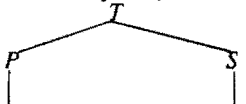
LCS': [closed(the-door)]
LCS: [closed(the-door)]

(16) Process:
a. Mary pushed the cart. (Pustejovsky, 1992: 59)
b. ES:



LCS': [act(*m*, the-cart) & move(the-cart)][3]
LCS: cause([act(*m*, the-cart)], [move(the-cart)])

(17) Transition (Accomplishment):
a. Mary built a house. (Pustejovsky, 1992: 60)
b. ES:



LCS': [act(*m*, *y*) & ¬house(*y*)] [house(*y*)][4]
LCS: cause([act(*m*, *y*)], become(house(*y*)))

2.1.1. Non-Problematic Cases

Examples from (18) to (20) show how Pustejovsky's templetic approach can be applied to accounting for the Event Structure of the Pred NP. I will provide no explanation for those non-problematic cases.[5] What is essentially shown by

these examples is that the Pred NP is compatible with a *P*-template but not with an *S*- or *T*-template.

(18) *State*:

a. * Hanako$_i$ ga [EC$_i$ Taroo no KENO] o suru.
NOM GEN hate ACC do
'Hanako hates Taroo.'

b. [EC$_i$ Taroo no KENO]

EC: S
|
e

LCS': [hate(*h*, *t*)]

(19) *Transition* (Accomplishment):

a. *Terorisuto$_i$ ga [EC$_i$ daijin no SATSUGAI] o shi-ta.
terrorist NOM minister GEN assassin ACC do-PAST
'Terrorists assassinated a minister.'

b. [EC$_i$ daijin no SATSUGAI]

EC: T
P S

LCS': [act(*t*, *m*) & ¬dead(*m*] [dead(*m*)]

(20) *Process*:

a. Taroo$_i$ ga [EC$_i$ kuruma no UNTEN] o shi-ta.
NOM car GEN driving ACC do-PAST
'Taroo drove a car.'

b. [EC$_i$ kuruma no UNTEN]

ES: P
$e_1 \ldots e_n$

LCS': [act(*t*, the-car) & move(the-car)]

2.1.2. Problematic Cases

A few problematic cases are discussed in this section. First, the event type of, what I call, RYOKOO(travel)-type VN's can be either Activity or Accomplishment, depending on whether their arguments which specify directional end-points are included in the event structure or not.[6] In other words, I assume that the activity and its associated end-point of these VN's are *detachable*. As in (21), this detachability accounts for why TRAVEL-type VN's can head Pred NP's if their Goal arguments are not realized inside Pred NP's.

(21)

a. Taroo$_i$ ga Tokyo ni [EC$_i$ RYOKOO] o shi-ta.
NOM to travel ACC do-PAST
'Taroo made a trip to Tokyo.'

b. EC: T
P <*P*, *T*>[7]
[EC$_i$ RYOKOO] Tokyo ni

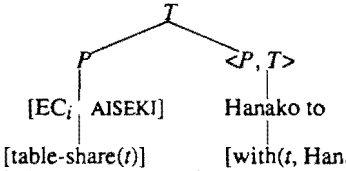
LCS': [travel(*t*)] [at(*t*, Tokyo)]

Second, although I represent, what I call, AISEKI(table-sharing)-type VN's in the same manner as TRAVEL-type VN's, as in (22), their Commitant arguments do not specify *natural* end-points.[8]

(22)

a. Taroo$_i$ ga Hanako to [EC$_i$ AISEKI] o shi-ta.
NOM with table-sharing ACC do-PAST
'Taroo shared a table with Hanako.'

b. EC:



Thus, their event compositions may appear to be irrelevant to *aspect*. However, Talmy's (1991) notion of Action Correlating enables me to account for their event composition in the same manner as TRAVEL-type VN's. Talmy (1991) claims that there are five types of events all of which have the same single semantic structure, as exemplified in (23).[9]

(23) Motion:

a. The bottle floated into the cave. (Talmy, 1991: 488)

b. [the bottle MOVED in to the cave] DURING WHICH [it floated]
Figure Activating Process Path Ground Supporting Event

Among the five event types, what is relevant to us is Action Correlating, an example of which is seen in (24).

(24) (Talmy, 1991: 506)

a. I played the melody together with him.

b. [I ACTed IN-CONCERT-WITH him] CONSTITUTED-BY [I played the melody]
Figure Activating Process Path Ground Supporting Event

An important thing in (24) is that the second agency, ***him***, can function as a Ground or an end-point in the same sense as the culminative point, *the cave* in (23). In other words, if we follow the spirit of Talmy's (1991) framework, both Commitant and Goal can be regarded as an end-point. Treating the Commitant of AISEKI 'table-sharing' as an end-point, my P-template hypothesis can account for why the AISEKI-type verbal noun can head a Pred NP if it does not realize the Commitant PP inside the Pred NP.

Third, what I call SHUURI(repair)-type VN's may be problematic.[10] These VN's are Accomplishments; thus they should assume a *T*-template which consists of a *P*-node denoting an activity and an *S*-node denoting change of a state brought about by such an activity. Importantly, these two sub-events are *non-detachable* (Smith, 1991). Despite the fact that these VN's have pairs of non-detachable sub-events, theys can head Pred NP's, as in (25).

(25)

Taroo ga [kuruma no SHUURI] o shi-ta.
NOM car GEN repair ACC do-PAST
'Taroo repaired the car.'

Thus, these VN's seem to constitute counter-evidence for my *P*-template hypothesis. However, I argue that they do not because when these VN's head Pred

NPs, they necessarily assume *Process* readings instead of *Transition* readings. Evidence for this process-reading is Perfective Paradox (e.g. Singh, 1991), which is exemplified by the semantic congruity of (26b) in contrast with the semantic incongruity of (26a).

(26)

a. VN-*suru*:

* Taroo wa kuruma o SHUURI-shi-ta ga SHUURI deki-nakat-ta.
TOP car ACC repair-do-PAST but repair-can-NEG-PAST

'Taroo repaired the car but (he) could not repair (it).'

b. VN-*o suru*:

Taroo wa [kuruma no SHUURI] o shi-ta ga
TOP car GEN repair ACC do-PAST but
SHUURI-deki-nakat-ta.
repair-can-NEG-PAST

'Taroo repaired the car but (he) could not repair (it).'

The reason why the unincorporated *suru* form has such Perfective Paradox is simple. The initial clause in (26b) does not, as part of its meaning, denote the state of a car having been repaired; rather it denotes the activity which is supposed to have led to its completion. This activity, however, did not reach its end-point; this failure was expressed by the second clause. In other words, unincorporated *suru* is able to force the Pred NP to assume a P-template reading. Consequently, the VN's, such as SHUURI 'repair' do not constitute counter-evidence for my *P*-template hypothesis.

3. Summary

The *P*-template imposed on the Pred NP can provide the *suru* construction with an essential characterization. First, being incompatible with (change of) a state, this *P*-template must have a syntactically overt Volitional Actor who can carry out the semantic content of the P-template; and this requirement is imposed as the Agent requirement for the matrix Subject. Second, because a PP-attachment brings about an event shift of *Transition*, the *P*-template accounts for why a PP cannot stay inside the Pred NP, a fact which Grimshaw and Mester (1988) hold as following from the first generalization in (6). Third, because a Theme argument need not incur an event shift, the *P*-template accounts for why Theme can be inside the Pred NP, the very fact which leads Grimshaw and Mester (1988) to claim (erroneously) that the third generalization in (6) involves the Thematic Role Hierarchy. Fourth, the *P*-template accounts for why even Theme cannot be inside the Pred NP when a VN specifies the event type of *Transition*.

4. Control

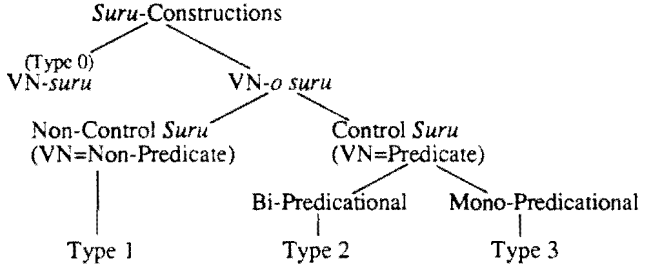
Showing that Grimshaw and Mester's (1988) first and third generalizations concern not Thematic Role or the Argument Structure of the Pred NP but Aspect or the Event Structure of the Pred NP, I will demonstrate that the second generalization in (6) has to do with the fact that the *suru* construction is a Control Structure (cf. Matsumoto, 1992). Prerequisites of this Control Hypothesis are (i) that *suru* is not thematically empty as Grimshaw and Mester (1988) claim and (ii) that the external argument of the VN which functions as an embedded predicate is not lexically suppressed as Grimshaw's (1990) A-adjunct Hypothesis advocates. To demonstrate that the *suru* construction is none other than a Control Structure, I will also examine the properties of the null-subject of the Pred NP and show that the null-subject has predominantly [+anaphoric] properties.

4.1. Classification of *Suru*-Constructions

(27) lists all the *suru* constructions; both the incorporated form (type 0) and the unincorporated forms (types 1, 2, and 3). As for type 1, although I do not provide evidence here, it involves neither result nominals nor complex event nominals but simple event nominals, which are non-predicational (cf. Grimshaw, 1990). As for type 2 and type 3, mono-predicational type 3 differs from bi-predicational type 2 in two respects. First, the Pred NP of type 3 does not realize any (non-null) argument inside its domain. Second, as seen in (28), the accusative-marked NP does not behave like a legitimate Object in that it fails to undergo various syntactic processes. These two facts suggest that the Pred NP of type 3 is not an independent syntactic constituent but part of a word-formation with *suru*.

(27)

a.



b.

(i) *Type 0*:
Ya ga mato ni MEICHYUU-suru.
arrow NOM target to hit-do
'An arrow hits a target.'

(ii) *Type 1*:
Taroo ga tenisu o suru.
NOM tennis ACC do
'Taroo plays tennis.'

(iii) *Type 2*:
Taroo$_i$ ga [EC$_i$ Ainu-go no KENKYUU] o suru.
NOM language GEN research ACC do
'Taroo studies the Ainu language.'

(iv) *Type 3*
a. Taroo$_i$ ga Tokyo ni [EC$_i$ RYOKOO] o shi-ta.
NOM to travel ACC do-PAST
'Taroo made a trip to Tokyo.'

(28)

(i) Scrambling:
*[EC$_i$ RYOKOO] o Taroo$_i$ ga Tokyo ni shi-ta.
travel ACC NOM to do-PAST
'Taroo made a trip to Tokyo.'

(ii) Passivization:
*[EC$_i$ RYOKOO] ga Taroo$_i$ niyotte Tokyo ni s-are-ta.
travel NOM by to do-PASS-PAST
'(lit.)A trip was made by Taroo to Tokyo.'

4.2. Evidence for Control

The main evidence for control has to do with the Projection Principle, as exemplified in (29).

(29)

a. *suru* (x (y))
Agent Theme

b. KENKYUU 'research'
(x (y))
Agent Theme

c. Taroo$_i$ ga [EC$_i$ Ainu-go no KENKYUU] o suru.
NOM language GEN research ACC do
'Taroo studies the Ainu-language.'

First, as for the Argument Structure of *suru*, we have already seen Terada's (1990) examples in (9) which suggest that *suru* licenses Agent as an external argument. Also, the Pred NP of type 2 behaves as a legitimate Object NP, as clear from (30), indicating thus that the NP is associated with the internal Theme argument of *suru*. Hence, *suru* must be associated with the Argument Structure of <Agent Theme>.

(30)

(i) Scrambling:
[EC$_i$ Ainu-go no KENKYUU] o Taroo$_i$ ga shi-ta.
language GEN research ACC NOM do-PAST
'Taroo studied the Ainu languge.'

(ii) Passivization:
[EC$_i$ Ainu-go no KENKYUU] ga Taroo$_i$ niyotte s-are-ta.
language GEN research NOM by do-PASS-PAST
'The Ainu language was studied by Taroo.'

Second, VN's are also associated with external arguments. In (31), the VN is prefixed by the Subject honorific, *go-*. The presence of *go-* indicates that the VN phrases must have Subjects (which may be *pro*). The obligatory presence of Subjects, in turn, suggests that at the level of Argument Structure, VN's are associated with lexically *unsuppressed* external arguments.

(31)

a. Sensei no seito no go-HIHAN.
teacher GEN student GEN HON-blame
'The teacher's blame of the student.'

b. *Seito no sensei no go-HIHAN.
student GEN teacher GEN HON-blame
'The student's blame of the teacher.'

c. *pro* seito no go-HIHAN.
student GEN HON-blame
'(some honorable)*pro*'s blame of the student.'

d. HIHAN 'blame' (x (y))
Agent Theme

The nominal adjunct clauses in (32) are another piece of evidence. When VN's are suffixed by aspectual markers, such as *chuu* 'while', arguments of VN's can be case-marked verbally. The presence of the nominative-marked external arguments in (32) suggests that the VN is associated with an external argument at the level of Argument Structure.

(32) (cf. Iida, 1987)
Hakase$_i$ ga Ainu-go o go-KENKYUU-*chuu*,
NOM language ACC HON-research-during
ichi-seito ga kenkyuu o boogai shi-ta.
one-student NOM research ACC sabotage do-PAST
'While the scholar had been studying the Ainu language, a student sabotaged his research.'

Thus, VN's are associated with external arguments and so is *suru*. The fact that out of these two external arguments, only one is phonologically realized is an indication that type 2 is a control structure.

4.3. Anaphoric Null-subject

Showing further that the type 2 construction involves control, I will examine the binding feature of the controlled null-subject. I will employ *coreferential possibility*, *split antecedent*, and *sloppy identification* as tests. These tests are listed from (33) to (35), all of which indicate the *anaphoric* nature of the controlled null-subject.

4.3.1. In Type 2

First, as for *coreferential* relationship, the controlled null-subject exhibits a prototypical characteristic of [+anaphor] in that, as seen in (33), it has the closest (Subject) argument as a controller while having no possibility of an arbitrary reading.

(33)
Hanako$_j$ wa [Taroo$_i$ ga [EC$_{i/*j/*k}$ Ainu-go no KENKYUU] o suru] to it-ta.
TOP NOM language GEN research ACC do COMP say-PAST
'Hanako said that Taroo was going to study the Ainu-language.'

Second, a *split antecedent* test also indicates that the controlled null-subject is [+anaphor]. The test I employ is a *kyoodoo*(joint)-test. The prefixization of *kyoodoo-* forces the null-subject of the VN to find a split antecedent. Unlike (34b), the possibility of a split antecedent is ruled out in (34a) where *kyoodoo-* is prefixed to the VN which heads a matrix Object; an indication of this is that the controlled null-subject of the Object Pred NP is an anaphor.

(34)
a. *Hanako$_i$ ga Taroo$_j$ ni [EC$_{i+j}$ [EC Ainu-go no KENKYUU] no
NOM to language GEN research GEN
kyoodoo$_{i+j}$-TEIAN] o shi-ta.
joint-proposal ACC do-PAST
'Hanako made to Taroo a joint-proposal (with Taroo) of studying the Ainu-language.'

b. Hanako$_i$ ga Taroo$_j$ ni [EC$_i$ [EC$_{i+j}$ Ainu-go no kyoodoo$_{i+j}$-KENKYUU]
NOM to language GEN joint-research
no TEIAN] o shi-ta.
GEN proposal ACC do-PAST
'Hanako made to Taroo a proposal of a joint-research (with Taroo) on the Ainu-language.'

The last test for the binding feature of the controlled null-subject is *sloppy identification*. As seen in (35), the type 2 *suru* construction does not allow a strict reading. That is *sore* 'that' in the second clause can refer only to the predicate but not the proposition of the Pred NP, providing further evidence for the [+anaphoric] status of the controlled null-subject.

(35)

a. Taroo$_i$ ga [EC$_i$ Ainu-go no KENKYUU] o si, Hanako mo sore o shi-ta.
NOM language GEN research ACC do too that ACC do-PAST
'Taroo studied the Ainu-language and so did Hanako.'

b. Taroo$_i$ ga murabito ni [EC$_i$ ookami ga kuru to no KEIKOKU] o si,
NOM villagers to wolf NOM come COMP GEN warning ACC do
Hanako mo sore o shi-ta.
too that ACC do-PAST
'Taroo warned the villagers that the wolf was coming and so did Hanako.'

4.3.2. In Type 3

Because of restructuring (Rizzi, 1982; Burzio, 1986), from the morpho-syntactic point of view the type 3 *suru* construction can be viewed as mono-predicational. A question to ask, is whether control is still retained in this type of *suru* construction? There are two tests, i.e., *double-honorific marking* and *sloppy identification*, which do not clearly indicate the presence of such a control structure because they are sensitive to word-formation. The other tests, however, suggest the presence of the control structure even in type 3. I will simply list these tests in (36).

(36)

(i) *Projection Principle*: An Indication of [+Control]

a. *suru* (x (y))
Agent Theme

b. RYOKOO 'traveling'
(x (y))
Agent Goal

(ii) *Double Dependence* (Burzio, 1986: 328-330): An Indication of [+Control]

???Moodooken$_i$ ga Tokyo ni [EC$_i$ RYOKOO] o shi-ta.
guide-dog NOM to travel ACC do-PAST
'A guide-dog made a trip to Tokyo.'

(iii) *Double Honorification*: Non-applicable

???Shachoo$_i$ ga Tokyo ni [EC$_i$ go-RYOKOO] o nas-are-ta.
president NOM to HON-travel ACC do-HON-PAST
'The president made a trip to Tokyo.'

(iv) *Coreferential Possibilities*: An Indication of [+Anaphoric Control]

Hanako$_j$ ga [Taroo$_i$ ga Tokyo ni [EC$_{i/*j/*k}$ RYOKOO] o suru] to it-ta.
NOM NOM to travel ACC do COMP say-PAST
'Hanako said that Taroo would make a trip to Tokyo.'

(v) *Split Antecedent*: An Indication of [+Anaphoric Control]

*Hanako$_j$ ga [Taroo$_i$ ga Tokyo ni [EC$_{i+j}$ RYOKOO] o suru] to it-ta.
NOM NOM to travel ACC do COMP say-PAST
'(lit.)Hanako said that Taroo would make a trip to Tokyo together.'

(vi) *Sloppy Identification*: Non-applicable[11]

???Taroo$_i$ ga Tokyo ni [EC$_i$ RYOKOO] o si, Hanako mo sore o shi-ta.
NOM to travel ACC do too that ACC do-PAST
'Taroo made a trip to Tokyo, so did Hanako.'

In sum, the controlled null-subject in type 2 and type 3 is an anaphor which should have the following feature specification.[12]

(37)

{[+θ-marked],[-Case], [+Governed (by *suru*)], [+Anaphoric]}

5. Conclusion

In this paper, after pointing out the problem with Grimshaw and Mester's (1988) Transfer Hypothesis, I have shown that *aspect* plays a significant role in characterizing the unincorporated *suru* construction. That is, by focusing on the internal structure of the accusative-marked Predicational NP, I have shown that this NP cannot contain any element which specifies a state or an end-point. In the second half of the paper, I have shown that the unincorporated *suru* construction is a control structure and that there are two types of control *suru* constructions: mono-predicational and bi-predicational constructions. Employing several tests, I have then shown that the controlled null-subjects in these constructions have predominantly [+anaphoric] properties.[13]

Endnotes

[1] Due to the limitation in space, I am not able to demonstrate that the internal structure of the Pred NP is *not* sensitive to *Case*, *Thematic Role*, and *Grammatical Function*.

[2] In these examples, LCS' is Pustejovsky's (1992) rendition of lexical conceptual structure and LCS is Dowty's (1979).

[3] The notation "&" signifies the simultaneity of the two co-joined events: Mary's action on the cart and the movement of the cart.

[4] In (17), *m*(Mary) acted on y(house) and this action brought about '¬house(y)' into the state of 'house(y)'.

[5] In these representations, I assume that the Pred NP has a controlled null-subject whose semantic content is provided by the coindexed matrix Subject.

[6] SHUCCHOO 'business-trip' and DORAIBU 'driving' are other examples of this type.

[7] The PP, <*P*, *T*> denotes a function from a process to a transition (Pustejovsky, 1992:63).

[8] KISU 'kiss', KAIGOO 'meeting', and SHOODAN 'negotiating' are other examples of this type.

[9] Five Event Types (Talmy, 1991: 480):

Motion:	e.g. 'The ball rolled *in*.'
Change of State:	e.g. 'The candle blew *out*.'.
Temporal Contouring:	e.g. 'They talked *on*.'
Action Correlating:	e.g. 'She sang *along*.'
Realization:	e.g. 'The police hunted the figure *down*.'

[10] KENCHIKU 'building' and SEKKEI 'designing' are other exmples for this type.

[11] The Pred NP is non-referential; hence, *sore* 'that' cannot refer to the NP.

[12] I assume that this controlled null-subject is PRO, which is base-generated at Spec NP position; hence it is [+θ-marked]. To avoid nominal case, PRO moves to Spec DP; hence it is assigned neither nominal case nor verbal case (i.e. [-Case]). Although PRO is not governed by an N since it moved out of the domain of the N; it is govened from outside by *suru*. Thus PRO is *governed*. This PRO always finds the subject of the immediately dominant clause as an antecedent; hence it is [+anaphor].

[13] Due to the limitation in space, I am not able to provide formal analyses of type 2 and 3 *suru* constructions. The analyses I have in mind treat *suru* as a control verb, which optionally involves restructuring. Besides restructuring, which is represented by Abstract Incorporation (Baker, 1988), my analyses crucially depend on the *P*(rocess)-template, Double-accusative-Constraint, and VP-adjunction, accounting for the *suru* constructions mostly in syntax.

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Temporal Adverbials in Japanese

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1. Introduction

In this paper, I examine Japanese temporal adverbial clauses, as exemplified in (1):

(1) Mary-ga [John-ga kuru-mae-ni] kaetta.
-nom -nom come-before left
'Mary left before John came.'

Miyamoto (1993) argues that there is Op-movement involved within temporal adverbial clauses, parallel to Larson's (1987, 1990) analysis of their English counterparts. A piece of evidence presented there for the Op-movement hypothesis comes from contrasts like the one in (2):

(2)a. John-ga [$_{ADV}$[Mary-ga [Bill$_1$-ga kurudaroo-to] yosoositeita]
-nom -nom -nom come-will-that predicted

-mae-ni] kare$_1$-o New York-de mikaketa.
before him -acc in saw
'John saw Bill$_1$ in NY [before Mary predicted that he$_1$ would come]

b. John-ga [$_{ADV}$[Mary-ga [$_{NP}$[Bill$_1$-ga kurudaroo-toyuu]
-nom -nom -nom come-will-that

uwasa]-o kiiteita]-mae-ni] kare$_1$-o New York-de mikaketa.
rumor -acc heard before him -acc in saw
'John saw Bill$_1$ in NY [before Mary heard the rumor that he$_1$ would come]

Crucially, (2a), but not (2b), allows the interpretation that John saw Bill before his scheduled arrival time, predicted by Mary. Observing the island effects in (2b), I concluded that operator(Op)-movement is involved within temporal adverbial clauses. For a detailed discussion of this topic, readers are referred to Miyamoto (1993). Now, I turn to the question of where these clauses are located structurally in the matrix clause. Hoji (1985) argues that temporal adverbial clauses are base-generated between the subject and the object. Koizumi (1991) shows that they adjoin to VP, based on evidence regarding whether or not they can be within the scope of negation.

In this paper, two pieces of evidence will be provided to support Koizumi's claim that temporal adverbial clauses adjoin to VP. The first evidence comes from what I call "the tense alternation phenomenon" in Japanese which is exemplified in (3):

(3) Mary-ga ?kuru/kita ato-ni Bill-ga kuru(koto-ni
-nom come/came after -nom come that

natteiru)
it is planned
'(It is planned that) Bill will come after Mary comes.'

In (3), although the two events described in the matrix clause and in the temporal adverbial clause are future events, the tense of the verb in the temporal adverbial clause can be either 'past' or 'non-past'. In contrast, English does not allow this alternation, as shown in (4):

(4) It is planned that Bill will come after Mary comes/*came.

Here, the question is: where does this contrast between English and Japanese come from?

The second piece of evidence I will present to support Koizumi's claim comes from the contrast exemplified in (5):

(5)a. Everyone$_1$ left before he$_1$ predicted that Mary would arrive.
(Munn, 1991)

b. daremo$_1$-ga [$_{PP}$[$_{CP}$pro$_1$ [$_{CP}$Mary-ga kurudaroo-to] yosoositeita]
everyone-nom -nom arrive -that predicted

-mae-ni] kaetta.
before left
'Everyone left before he predicted that Mary would arrive.'

The interpretation of interest is that for every x; x is a person, x left before Mary's scheduled arrival time, predicted by x. According to Munn (1991), this interpretation is absent in English. In contrast, it is available in Japanese. Then, there is another contrast between English and Japanese temporal adverbial clauses, which needs an account.

In the following section, the first contrast observed in (3) is discussed. Section 3 contains discussion on the latter contrast shown in (5). Interestingly, my accounts for these two contrasts suggest that Japanese temporal adverbial clauses are adjoining to VP. Considering this, I discuss some consequences of VP-adjunction of temporal adverbial clauses in Japanese in Section 4. Section 5 contains my concluding remarks.

2. Tense Alternation Phenomenon

2.1. Data to be Examined

The tense alternation phenomenon exemplified in (3) is not always permitted. If the tense of the matrix verb is past, then this phenomenon cannot be observed, as shown in (6). In this case, the tense of the temporal adverbial clause must be past.

(6) Mary-ga **kuru/kita ato-ni Bill-ga kita.
-nom come/came after -nom came
'Bill came after Mary came.'

The contrast between (3) and (6) shows that when the temporal adverbial clause is headed by *ato-de* 'after', the matrix tense must be non-past to order to observe the tense alternation in the temporal adverbial clause. In contrast, when the temporal adverbial clause is headed by *mae-ni* 'before', we observe a different restriction. Consider (7a,b):

(7)a. John-ga [Mary-ga kuru/?(?)kita mae-ni] (sude-ni) tuiteita.
-nom -nom come/ came before already arrived
'Before Mary came, John arrived.'

b. John-ga [Mary-ga kuru/**kita mae-ni] tukudaroo.
-nom -nom come/ came before will arrive
'Before Mary comes, John will arrive.'

Here, unlike (3) and (6), the tense of the matrix clause has to be 'past' to order to observe the tense alternation in the temporal adverbial clause. As seen in (7b), if the matrix tense is non-past, the tense alternation is not possible. Now, we can summarize the tense alternation possibilities as follows:

(8)

	matrix tense	
	past	non-past
before	yes	no
after	no	yes

I argue that the contrast observed in (8) follows from the analyses of tense put forth by Abe (1991), Enc (1985, 1987), Stowell (1993), and Zagona (1988, 1990, 1993), together with the hypothesis that temporal adverbial clauses can appear in VP.

2.2. The Analysis of Tense

Although I adopt Zagona's analysis of tense in this paper, I assume that any of the above four predicative analyses of tense can equally account for the

tense alternation phenomenon. Let me first illustrate the tense system for which Zagona argues.

(9) [ARG C [TP T [VP ...]]]

Zagona argues that tense is a two-place predicate taking the arguments; ARG and VP. ARG refers to the reference time and VP indicates the event time. T is realized based on the temporal ordering between the reference time and the event time. What is crucial here is that depending on the value of ARG, the value of T varies. If the reference time precedes the event time, T is realized as non-past. If the event time precedes the reference time, T is realized as past. Assuming that this predicative analysis of tense is correct, let me return to the tense alternation phenomenon.

I claim that the tense alternation phenomenon occurs when ARG of the temporal adverbial clause is bound by a different tense head, and thus, it refers to a different reference time. What are the possible T heads of the ARG in the temporal adverbial clause? The matrix T which denotes the matrix event time, and the matrix ARG (or the matrix C) which refers to the utterance time. Then, in order for ARG of the temporal adverbial clause to be bound by the matrix T or the matrix ARG (or the matrix C), there must be two positions available for the temporal adverbial clause to appear; namely, VP-adjunction and TP-adjunction. If the temporal adverbial clause is adjoining to VP, its ARG is bound by the matrix T. In this case, the temporal order is determined between the matrix event time and the event time of the temporal adverbial clause. On the other hand, if the temporal adverbial clause is adjoining to TP, its ARG is bound by the matrix ARG (or the matrix C). Then, the temporal ordering is determined between the utterance time and the event time of the temporal adverbial clause.

Let us examine temporal adverbial clauses headed by *mae-ni* as an illustration.

(10) Tense of the Temporal Adverbial Clause headed by *mae-ni* 'before'

	matrix tense	
	past	non-past
TP-adjunction	past	non-past
VP-adjunction	non-past	non-past

(11)a. [CP ARG [TP [ADV ARG ...][TP ...]] C]

or

(b. [CP ARG [TP [VP [ADV ARG ...][VP ...]] T]])

First, if the temporal adverbial clause is adjoined to TP, the ARG takes the utterance time as the antecedent, as shown in (11a). Thus, suppose that the event of the temporal adverbial clause happens before the utterance time. Then the T will be past. If this event takes place after the utterance time, it will be non-past. In contrast to TP-adjunction, VP-adjunction forces a different realization of tense.[1] In this case, the event time of the temporal adverbial clause is compared with the matrix event time, as illustrated in (11b). Here, the lexical property of *mae-ni* 'before' requires the matrix event to precede the adverbial event. Then, with respect to the matrix event time, the adverbial event time is always a future event. Hence, the adverbial T is realized as non-past. The crucial point is that whether or not the matrix event happens in the past (in other words, precedes the utterance time), because of the intrinsic property of *mae-ni* 'before', the T of the temporal adverbial is necessarily non-past. In the other situation where the matrix tense is non-past, the T of the temporal adverbial is always non-past also. This is because the event time of the adverbial is non-past, relative to either the utterance time or the matrix event time. Hence, a contrast arises between examples like (7a) and (7b).

Because of space limitations, I will not discuss examples like (6) which contain *ato-de* 'after'. However, the possibility of the tense alternation again follows from the adjunction site and the intrinsic property of *ato-de*, which requires the matrix event to follow the adverbial event.

In sum, I have shown that given the analysis of tense incorporating reference time, in conjunction with VP-and TP-adjunction of the temporal adverbial clause, the tense alternation phenomenon is nicely accounted for. I take this as evidence that temporal adverbial clauses can adjoin either to TP or VP. This also supports the analysis of tense incorporating reference time, put forth by Abe (1991), Enc (1985, 1987), Stowell (1993), and Zagona (1988, 1990, 1993).

3. Bound Pronouns within the Temporal Adverbial Clause

As shown in Section 1, there is an interesting contrast between English and Japanese temporal adverbial clauses with respect to the availability of bound pronouns in the temporal adverbial clause. Consider (5) again.

(5)a. Everyone$_1$ left before he$_1$ predicted that Mary would arrive.
(Munn, 1991)

b. daremo_1-ga [$_{PP}$[$_{CP}$pro$_1$ [$_{CP}$Mary-ga kurudaroo-to] yosoositeita]
everyone-nom -nom arrive -that predicted

-mae-ni] kaetta.
before left
'Everyone left before he predicted that Mary would arrive.'

Munn (1991) argues that the unavailability of the interpretation that for every x; x is a person, x left before Mary's scheduled arrival time, predicted by x is due to a violation of the Path Containment Condition (Pesetsky 1982, May, 1985). Assuming Larson's (1987, 1990) Op-movement analysis of the temporal adverbial clause, there is a chain created by movement of the temporal Op ((i) in (12)). (I assume that this Op originates in a TP-adjoined position.) If we further assume that a quantifier creates a chain with bound pronouns ((ii) in (12)), then these two chains cross each other, as illustrated in (12):

(12) [$_{IP}$everyone$_1$[$_{IP}$[$_{IP}$t$_1$ left][$_{PP}$before[$_{CP}$Op$_2$[$_{IP}$he$_1$[$_{CP}$t$_2$]]]]]]

(12) is thus correctly excluded by the PCC. Then the question is: why is its Japanese counterpart grammatical? If it created the same configuration, it should be wrongly excluded. This strongly suggests that (5b) forms a different structure. Suppose that Japanese temporal adverbial clauses can adjoin to VP. Then, the structure would be as follows:

(13) [$_{IP}$daremo$_1$[$_{IP}$t$_1$[$_{VP}$[$_{PP}$[$_{CP}$Op$_2$[$_{IP}$pro$_1$[$_{CP}$t$_2$]]] mae-ni] [$_{VP}$ kaetta]]]]

May (1985) shows that if the bound pronoun is A-bound (by the trace of the quantifier, for instance), it will not be counted as part of a chain relevant for the PCC. Given this assumption, he accounts for WCO violations.

(14)a.?*[$_{CP}$Who$_1$ does [$_{IP}$[$_{NP}$his$_1$ mother] [$_{VP}$love t$_1$]]]

b. [$_{CP}$Who$_1$ [$_{IP}$t$_1$loves his$_1$ mother]]

In (14a), the two chains (or paths) are (i)(NP, IP, CP) and (ii)(VP, IP, CP). These violate the PCC, since each contains a node not contained the other. On the other hand, in (14b), there is only one chain (or path), May argues. Since *his* is A-bound by the trace of the moved *wh*-phrase, it does not count as part of the chain relevant for the PCC. Given this, in (13), the tail of the chain relevant for the PCC is the trace of the moved quantified NP, and bound *pro* within the temporal adverbial clause does not count as part of this chain, since it is A-bound by the trace of the moved quantifier. Hence, two chains do not cross each other at all, as shown in (15):[2]

(15) [$_{IP}$daremo$_1$[$_{IP}$t$_1$[$_{VP}$[$_{PP}$[$_{CP}$Op$_2$[$_{IP}$pro$_1$[$_{CP}$t$_2$]]] mae-ni]

[$_{VP}$ kaetta]]]]

Hence, the PCC is irrelevant in (13), and it is grammatical. Therefore, this contrast between English and Japanese can be accounted for, given that temporal adverbial clauses are adjoined to VP. This further supports the claim that temporal adverbial clauses in Japanese can adjoin to VP.

4. Consequences

In this section, I examine the consequences which follow from the claim that Japanese temporal adverbial clauses can adjoin to VP.

First, Murasugi (1991, 1992) argues that temporal phrases can appear in a VP-adjoined position, based on the investigation of relative clauses in Japanese.

There is a clear contrast between relative clauses headed by locative/temporal phrases and those headed by manner/reason phrases with respect to island effects, as exemplified in (16a-d).

(16)a. [$_{NP}$[$_{IP}$[$_{NP}$[$_{IP}$e$_1$ e$_2$ mensetsu -o uketa] gakusei$_1$]-ga
job interview-acc received student -nom

minna ukaru] hi$_2$]
all of them pass day
'the day$_1$ that all of the students that received the job interview t$_1$ pass'

b. [$_{NP}$[$_{IP}$[$_{NP}$[$_{IP}$e$_1$ e$_2$ mensetsu -o uketa] gakusei$_1$]-ga
job interview-acc received student -nom

minna ukaru] kaigisitsu$_2$]
all of them pass conference room
'the conference room $_1$ that all of the students that received the job interview t$_1$ pass'

c.*[$_{NP}$[$_{IP}$[$_{NP}$[$_{IP}$e$_1$ e$_2$ kubi-ni nakka] hito$_1$]-ga minna
fired person-nom all

okotteiru] riyuu$_2$]
get angry reason
'the reason$_1$ that all of the person who is fired t$_1$ get angry'

d.*[$_{NP}$[$_{IP}$[$_{NP}$[$_{IP}$e$_1$ e$_2$ mondai -o toita] gakusei$_1$]-ga minna
problem-acc solved students -nom all

shiken-ni ochiru] hoohoo$_2$]
exam fail method
'the method$_1$ that all of the students who solved the problem t$_1$ fail the examination'

(Murasugi, 1991)

She argues that locative/temporal phrases are arguments of V or I, adjoining to VP, and being arguments, they can be replaced by *pro*. Thus, the resumptive *pro* strategy is available to them. On the other hand, manner/reason phrases are adjuncts, and cannot be replaced by *pro*. So, the resumptive *pro* strategy is unavailable to these phrases. The present study further supports the claim that temporal phrases, including temporal adverbial clauses, can appear in VP in Japanese.

Another consequence is that Japanese may not have AGRoP. Let me start with (17):

(17)*John-ga [otagai$_1$ -ga denwa-sitekuru-mae-ni]
-nom each other-nom telephoned before

Mary-to-Susan$_1$-o mikaketa.
and -acc saw
'(lit.) John saw Mary and Susan before each other telephoned.'

We have seen that when the tense of the temporal adverbial clause headed by *mae-ni* 'before' is non-past, it is in a VP-adjoined position. Then, the question arises as to why (17) is ungrammatical. There has been a debate concerning whether or not AGRoP exists in Japanese. For instance, Fukuhara (1993), Nemoto (1993) and Tada (1992, 1993) argue that Japanese has AGRoP. Suppose that Japanese has AGRoP. Then the LF representation of (17) would be (18):

(18) [$_{IP}$John [$_{AGRoP}$Mary & Susan [$_{VP}$[$_{ADV}$ ..each other...]
[$_{VP}$ ....]]]]

This is the ultimate LF representation, whether the object moves to AGRoP SPEC in syntax or in LF. In this configuration, the anaphor is bound by the moved object, thus, (18) would be expected to be grammatical. However, this prediction is not borne out. Apparently, there is a distinction between the object moving in syntax and the one raised in LF. The former makes the sentence grammatical, while the latter does not. This is demonstrated by the contrast between (18) and (19). (19) involves the scrambling of the object in front of the temporal adverbial clause, and is grammatical.

(19) John-ga [[Mary-to-Susan]$_1$-o]$_2$ [otagai$_1$ -ga denwa-sitekuru
-nom and -acc each other-nom telephoned

-mae-ni] t_2 mikaketa.
before saw
'(lit.) John saw Mary and Susan before each other telephoned.'

Given that Condition A is an anywhere condition, in the sense that it can be satisfied at any point of the derivation (Belletti and Rizzi, 1988), it is difficult to make a distinction between the movement of the object in syntax and the one in LF. However, two options seem to be available. One possibility is that in examples like (17), Condition A must be satisfied by S-structure for some independent reason. However, this position is at least conceptually undesirable under the minimalist research program (Chomsky, 1992). The second, and most promising approach seems to be that the object marker *o* is not a structural Case, hence, it is not licensed by SPEC-head agreement in AGRoP. Given this, (18) is not the correct LF representation for (17). Rather, (17), as it is, is the LF representation. In this configuration, the anaphor cannot be bound by the object, thus, (17) is correctly excluded. In contrast to (17), in (19), the object is overtly raised to a position structurally higher than the temporal adverbial clause. Thus, the object can bind the anaphor inside the temporal adverbial clause. (This analysis must assume that the position in front of the VP-adjoined temporal

adverbial clause is an A-position, thus it is qualified as an appropriate antecedent. Leaving aside the technical details, I assume with Saito (1992) and Tada (1993) that a VP-adjoined position can be considered an A-position.)

This analysis raises another question as to whether or not any contrast can be observed between the nominative object and the accusative object. Tada (1992, 1993) argues that the nominative object moves to AGRoP SPEC and is licensed by SPEC-head agreement. His evidence comes from the following contrast:

(20)a. John-ga migime -dake-ga tumu-re-ru. only > can
-nom left eye-only-nom close-can-present

b. John-ga migime -dake-o tumu-re-ru. can > only
-nom left eye-only-acc close-can-present
(Tada, 1992)

(20a) means that it is only his left eye that John can close, while (20b) means that one of the things that John can do is to close only his left eye. In other words, in (20a), the nominative object takes wide scope over the affix *re* which means 'can'. In contrast, in (20b), this affix takes wide scope over the accusative object. Tada argues that there is an AGRoP structurally higher than the position of *re*, and since the nominative object is licensed in SPEC of this AGRoP, its position is higher than *re* in LF.

Takahashi (1992) observes the same contrast in antecedent contained deletion (ACD). The following is an example of ACD in Japanese.

(21) [[Mary-ga [$_{VP}$e] yometa] muzukasii hon]-o$_1$ John-ga /mo
-nom could read difficult book-acc -nom/also

zibun-no kodomo-ni t_1 yometa.
self-gen child -to could read
'John could read the difficult book that Mary could to his child.'
(Takahashi, 1992)

Leaving aside the details, he argues that in order to avoid infinite regress, the phrase containing the variable must be raised by scrambling. However, he finds that in examples with a nominative object, even without scrambling, the sentence becomes better. Consider the contrast between (22a) and (22b):

(22)a.*John-ga /mo zibun-no kodomo-ni [[Mary-ga [$_{VP}$e]
-nom/also self-gen child -to -nom

yometa] muzukasii hon]-o yometa.
could read difficult book-acc could read
'John could read the difficult book that Mary could to his child.'

b.?John-ga /mo zibun-no kodomo-ni [[Mary-ga [$_{VP}$e]
-nom/also self-gen child -to -nom

yometa] muzukasii hon]-ga yometa.
could read difficult book-nom could read
'John could read the difficult book that Mary could to his child.'

(Takahashi, 1992)

According to Takahashi, it is easier to get the sloppy reading in (22b) than in (22a).

Bearing this contrast in mind, consider (23):

(23)a. *John-ga [otagai$_1$ -ga osietekureru-mae-ni]
-nom each other-nom told before

Mary-to-Susan$_1$-o wakatta (koto).
and -acc recognized (fact)
'(lit.) John could recognize Mary and Susan before each other told him.'

b.?*John-ga [otagai$_1$ -ga osietekureru-mae-ni]
-nom each other-nom told before

Mary-to-Susan$_1$-ga wakatta (koto).
and -nom recognized (fact)
'(lit.) John could recognize Mary and Susan before each other told him.'

As far as I can see, there is no clear contrast between (23a) and (23b). If this is true, then neither the nominative object nor the accusative object occupies a position structurally higher than the anaphor in the temporal adverbial clause. Hence, the anaphor cannot be bound in LF. This suggests that there may be no AGRoP in Japanese.

This in turn leads us to reconsider the examples in (20) and (22). It has been observed since Kuno (1973) that stative predicates assign nominative case.[3] In (20a), for instance, the stative potential affix assigns the nominative case to the object. This is shown since if you replace the verb-the potential affix complex by the simple verb *tumuru*, the nominative marker cannot attach to the object, as shown in (24) (Saito, 1993):[4]

(24) John-ga migime -dake-o /*ga tumutta
-nom left eye-only-acc/nom closed
'John closed only his left eye.'

Given this, we can explain the scopal facts in (19) in the following way. Suppose that in order for the object to receive nominative case, it has to be located in the projection of a potential affix. Suppose further that the nominative object is adjoined to this VP to receive nominative case. Then, it is outside the c-command domain of the potential affix. Hence, it is outside its scope, thus, it takes wide scope over the affix.

Also, in (22), it may be the case that the projection of the potential affix is structurally high enough for the nominative object to avoid infinite regress. Thus, examples like (20) and (22) show that the nominative object is situated structurally higher than the accusative object. However, whether this position is SPEC of AGRoP remains to be seen, since examples like (17) and (23a,b) cast doubts on the claim that Japanese has AGRoP.

5. Concluding Remarks

I began with two pieces of evidence showing that temporal adverbial clauses can adjoin to VP in Japanese. The evidence from the tense alternation phenomenon supports the predicative analysis of tense, which is argued for in Abe (1991), Enc (1985, 1987), Stowell (1993), and Zagona (1988, 1990, 1993). Also, I found an interesting contrast between English and Japanese temporal adverbial clauses with respect to the possibility of bound pronouns.

Then, I discussed two consequences of my proposal. First, this study further supports Murasugi's (1991, 1992) claim that temporal phrases can appear in VP. Second, I examined examples containing anaphoric binding, and suggested that the nominative object, as well as the accusative object, is not licensed in AGRoP by SPEC-head agreement. In addition, this supports the claim that VP-adjoined positions can be considered as A-positions (Saito (1992), Tada (1993)), not making use of AGRoP.

Notes

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[1] I assume that the Minimality Condition is operative in determining the value of the AGR in the temporal adverbial clause. For much relevant discussion, see Chomsky (1986), Chomsky and Lasnik (1991), and Rizzi (1990).

[2] For evidence that the temporal Op is involved in the temporal adverbial construction in Japanese, see Miyamoto (1993).

[3] To be precise, Kuno (1973) argues that this nominative case assignment takes place under government. For inadequacies of the approach incorporating government, see Tada (1992, 1993).

[4] Saito attributed this example to Murasugi (p.c.).

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Preverbal Subjects in VSO Languages

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1. Introduction

The VSO language discussed in this paper is Romanian. This language opted for the Null Subject Parameter and displays a free alternation between SVO/VSO word order. Current studies on Romanian grammar (Dobrovie-Sorin 1987, 1991, Motapanyane 1989) agree in considering VSO as an unmarked word order obtained through overt verb movement to inflection: the subject-DP occupies its base position, Spec,VP, whereas the verb moves out of VP, and lands in a functional head. Since marks of tense and agreement are discernable on the verbal form, it is assumed that the verb moves cyclically to T and Agr (Motapanyane 1989) or to the highest inflectional level (I-head) carrying both [+tense] and [+agr] features (Dobrovie-Sorin 1991).

The same studies disagree in accounting for the syntactic operations that derive SVO. Thus:
(i) Dobrovie-Sorin 1991 claims that SVO follows from left-dislocation of the subject to Spec,IP; then, **Spec,IP has a non-argumental status** and is compatible with other types of constituents undergoing left-dislocation.
(ii) Motapanyane 1989 presumes that SVO follows from NP-movement of the subject to Spec,IP, as commonly assumed for Romance or some Balkan languages (e.g. Greek); then, **Spec,IP is an argumental position**, compatible only with subjects.

This paper will support the second hypothesis. In order to demonstrate that Spec,IP has an A-status, diagnostic tests will be applied to all preverbal positions to which fronting is allowed. It will be shown, first, that several left-dislocated constituents co-occur in preverbal positions, and they observe a fixed hierarchy. Second, it will be shown that unmarked subjects do not compete with constituents marked as Focus, that undergo wh-movement to a preverbal position; the crucial argument in this sense comes from the fact that quantified NPs in subject position co-occur with quantified NPs marked as Focus. Finally, the A-status of Spec,IP is confirmed by constructions with raising verbs: the subject undergoes NP-movement vs. left-dislocation to matrix Spec,IP, which explains the obligatory subject-agreement on the matrix verb.

2. Data

2.1. The hierarchy of left-dislocated constituents

Constituents receive different readings according to their placement in Topic or Focus: Topic carries old information, and has little stress; Focus brings a new piece of information, and carries the main sentence stress. These two positions observe a fixed hierarchy, as shown in (1):

(1) a. Scrisorile$_i$, **oare** ieri le$_i$-a primit Ion? (sau astazi)?
letters-the Q yesterday them-has received John or today
'As for the letters, did John receive them yesterday or today?'

b. Ieri, **oare** scrisori a primit Ion? (sau colet)
yesterday Q letters has received John or parcel
'Yesterday, was it letters John has received or a parcel?'

c.*Ieri, **oare** scrisori$_i$ le$_i$-a primit Ion? (sau colet)
yesterday Q letters them-has received John or parcel

d. Scrisorile$_i$, ieri, **oare** le$_i$-a primit Ion?
letters-the yesterday Q them-has received John
'As for the letters, yesterday, did John receive them?'

e.*Oare scrisori ieri a primit Ion? (sau colet, astazi)
Q letters yesterday has received John or parcel today

Oare, an optional question morpheme for root yes/no interrogatives is placed in C. In relation to oare, Topic adjoins to CP, whereas Focus lands lower than C: is Focus adjoined to IP, in Spec,IP, or adjoined to the maximal projection of a lower functional head? For the time being, the data in (1) indicates that Topic and Focus in Romanian induce the syntactic operations defined in Cinque 1990 for Italian and Romance languages as follows:
(i) A DP in Topic is obligatorily referential, heads an A'-chain that includes a resumptive pronoun (1a), and yields for multiple adjunction (1d);
(ii) a DP in Focus can be non-referential (1b), it heads an A'-chain that disallows resumptive pronouns (1c) and multiple adjunction (1e).
The contrast between the conditions for chain formation in (i) and (ii) follows from different syntactic

operations at work: DPs in Topic are base generated in that position; DPs in Focus move to the respective position during the derivation. Thus, only DPs in Focus qualify as structural operators, undergoing wh-movement. Since (i) and (ii) capture the contrastive behaviour of DPs in Topic and Focus illustrated in (1), we extend Cinque's (1990) typology to Romanian and stress that only left-dislocation to Focus triggers an Operator-variable chain in syntax.

2.2. Preverbal subjects

In this section we consider the placement of preverbal subjects in relation to Topic and Focus. Unmarked subjects surface between Topic and Focus and co-occur with both, as shown in (2):

(2) a. Scrisorile, *Ion* ieri le-a primit. (nu astazi)
letters-the John yesterday them-has received not today
'As for the letters, John has received them yesterday, not today.'
b. Ieri, *Ion* scrisori a primit (nu colet).
yesterday John letters has received not parcel
'Yesterday, it was letters that John has received, not a parcel.'

Assuming that unmarked subjects move to Spec,IP, the landing site for focused DPs in Romanian must be situated lower. The definition of the exact position for Focus within IP is beyond the aim of this paper. For the time being, we presume that Focus adjoins to the projection of an I-head, lower than Spec,IP, in an analysis where the I-node is split in functional heads. The grammaticality of (2) indicates that subject movement to Spec,IP and left-dislocation to Focus must create chains of different types, since they coexist.
Note that preverbal subjects can also receive a marked reading. In (3a), the subject is marked as Topic; in this configuration, it enters multiple Topic and co-occurs with Focus. The facts in (3a) follow straightforward from the conditions on chains headed from Topic, as defined in Cinque 1990: the constituents in Topic do not qualify as structural operators, and the chains they head can co-occur and include resumptive pronouns, since no variables are involved.

(3) a. *Ion*, ieri, scrisori a primit, nu colet.
John yesterday letters has received not parcel
'As for John, yesterday, it was letters he has received, not a parcel.'

Conversely, when the preverbal subjects is marked as Focus, it can be preceded by Topic, as in (3b), but it does not enter multiple Focus constructions, as in (3c). The ungrammaticality of (3c) is expected under the analysis where dislocation to Focus involves wh-movement: two constituents in Focus create overlapping Operator-variable chains. Moreover, even when the fronted constituent does not entail a contrastive reading, it is still excluded when the marked subject is in Focus, as in (3d, e); this indicates that left-dislocation through movement in syntax always triggers an Operator-variable chain, irrespective of the landing site:

(3) b. Scrisorile$_i$, *Ion* le$_i$-a primit (nu Ana).
letters-the John them has received not Ann
'As for the letters, it was John who has received them, not Ann.'
c.*Scrisorile, *Ion ieri* le-a primit (nu Ana, astazi)
letters-the John yesterday them has received not Ann today
d.*Scrisorile, ieri *Ion* le-a primit (nu Ana)
letters-the yesterday John them has received not Ann
e.*Scrisorile, *Ion* ieri le-a primit (nu Ana)
letters-the John yesterday them has received not Ann

Comparing the conditions for subject placement in (2), with unmarked reading on the subject, and (3), where the subject is marked as Topic or Focus, it seems obvious that the syntactic operations fronting the subject are different for (2) and (3). More precisely, placement of the unmarked subject in Spec,IP allows for a different configuration than placement of the marked subject in Focus: only in the former configuration can the subject co-occur with all other left-dislocated constituents (i.e. both Topic and Focus), whereas the latter configuration restricts this co-occurrence.

2.3. Bare Quantifiers (Q-NP) in subject position

If Spec,IP was an A'-position, Q-NP movement to this position would create an Operator-variable chain, given the intrinsic [+operator] features of this class of nouns. Consequently, a concurrent Q-NP in Focus position should be excluded. Since the data show that the two positions (i.e. Spec,IP and Focus) co-occur when they are occupied by Q-NPs, as in (4b), we must conclude that one of the two positions has an A-status:

(4) a. *Altcineva* n-ar invita pe nimeni in aceste conditii.
someone else not would invite pe-nobody in these conditions
'Someone else wouldn't invite anybody in these conditions.'
b. *Altcineva* pe nimeni n-ar invita in aceste conditii.
someone else pe-nobody not would invite in these conditions
'There's no-one you would invite in these conditions.'
c.*Cine pe nimeni n-ar invita in aceste conditii?
who pe-nobody not would invite in these conditions

The word order in (4a) corresponds to the unmarked reading, where both preverbal subject and object positions are occupied by Q-NPs. In (4b) the object pe nimeni/'no-one' has been fronted to Focus. The ungrammaticality of (4c) shows that Q-NP fronting to Focus disallows other movements of the same type, as, for example, the wh-movement of the subject cine/'who' to Spec,CP. Therefore, altcineva/ 'someone else' in (4b) must occupy an A-position, that is the only way for this bare quantifier to avoid the formation of an Operator-variable chain and compete with the Q-NP pe nimeni/'no-one' in Focus. Since bare quantifiers display unrestricted alternation with other classes of nouns in Spec,IP, we draw the conclusion that Spec,IP is always an A-position.

The tests proposed in this section led to the final observation that Spec,IP has an A status when occupied by unmarked subjects. However, this conclusion does not cover the instances where subjects are marked as Focus, as illustrated in (3). Do those subjects land in the lower Focus position or in Spec,IP? In other words, would Spec,IP change its status according to the markedness on the subject? The tests proposed in the next section will show that this must not be the case, because Spec,IP enters into a local Spec-head relation with the functional head I in all configurations (i.e. whether the subjects are marked or not). Accordingly, subject-DPs marked as Focus must land into the same position, available to any other type of focused constituent, and adjoined to an IP level lower than Spec,IP.

3. NP-movement vs. left-dislocation

Constructions with raising verbs show that movement of the embedded subject to the matrix Spec,IP triggers obligatory agreement on the matrix verb:

(5) a. Se pare [**ca** studentii organizeaza o greva.]
REFL seems-3SG that students-the organize-3PL a strike
'It seems that the students are organizing a strike.'
b.*Studentii par [**ca** organizeaza o greva.]
students-the seem-3PL that organize-3PL a strike
the students seem that they organize a strike
c. Studentii par [a organiza o greva.]
students-the seem-3PL to organize-INF a strike
'The students seem to organize a strike.'
d. Studentii par [sa organizeze o greva.]
students-the seem-3PL sa-SUBJ.MARKER organize-3PL a strike
e.*Studentii par [**ca** sa organizeze o greva.]
students-the seem-3PL that sa-SUBJ.MARKER organize-3PL a strike

In (5a, b, c) NP-movement displays the restrictions known for the equivalent constructions in English. Thence, we could already conclude that subjects undergo NP-movement to the matrix clause and, therefore, matrix Spec,IP is an A-position. However, the paradigm goes further in Romanian, showing that NP-movement applies to finite complements as well, as in (5d), for reasons that must be independent from Case assignment; this observation invalidates the extension of the analysis for English raising verbs to Romanian. What are the conditions for subject movement to matrix when the complement contains a subjunctive verb? As shown in (5e), movement is ruled out in the presence of a lexical complementizer, that is usually optional with subjunctive complements in Romanian. When the complementizer is excluded, the sentence turns grammatical and NP-movement triggers double agreement, on the matrix and the embedded verb, as in (5d).

Further tests on movements from finite complements will show that the movement in (5) creates an A-chain, that requires strict locality, and thus differs from A'-chains, that can cross lexical complementizers:

(6) a. Cine$_i$ spuneai [**ca** a plecat t_i?]
who said-2SG that has-3SG left
who did you say that has left

b. Cine$_i$-ai fi vrut [**ca** sa plece t_i ?]
who would-2SG be liked that sa-SUBJ.MARKER leave-3SG
who would you have liked that leave

Romanian behaves like Italian (see Rizzi 1982) in that it allows for wh-movement of embedded subject across a lexical complementizer, that can precede either an indicative (6a) or a subjunctive complement clause (6b). In Rizzi's 1982 analysis, this is possible when the subject is extracted from a postverbal position, and Romanian is a VSO language. Comparing (5) and (6), it seems obvious that the ungrammaticality of (5) follows from the locality condition on A-chain formation, that is violated in the same configuration where the A'-chains in (6) are legitimate.

What happens to marked subjects in constructions with raising verbs? We resort again to tests with the interrogative yes/no morpheme <u>oare</u>, situated in C, to establish the level of adjunction for the marked subject:

(7) a. *Studentii*, **oare** se pare **ca** organizeaza o greva?
students-the Q REFL seems-3SG that organize-3PL a strike
'As for the students, is it likely that they are organizing a strike?'
b.***Oare** *studentii* se pare **ca** organizeaza o greva?
Q students-the REFL seems-3SG that organize-3PL a strike
c. **Oare** *studentii* organizeaza o greva?
Q students-the organize-3PL a strike
'Do the students organize a strike?'

Subjects marked as Topic adjoin to the matrix CP, as in (7a), and it does not affect the inflection of the raising verb, that remains impersonal. This is expected, since A'-chains can cross lexical complementizers and do not interfere with Spec,IP. Under the same assumption, left-dislocation of the subject to matrix Spec,IP in (7b), is excluded: it appears that subject movement must create an A-chain in a configuration like (7b), but not in (7a). (7b) is as ungrammatical as (5e), which would not be expected if Spec,IP could be either A or A', according to the intended reading. The unmarked interrogative in (7c) shows that <u>oare</u> does not have [+qu] properties, since it does not trigger verb-subject inversion. Therefore, the only reason for the ungrammaticality of (7b) is the placement of the left-dislocated subject.
Returning to the examples in (3), we can now say that

marked subjects land in Focus vs. Spec,IP, compatible only with unmarked subjects. Spec,IP has always an A-status and enters into a local relation with I-head, which renders subject agreement obligatory in a construction like (7b).

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Keres Laryngeal Accent

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Keres is an isolate, spoken in seven pueblos in north central New Mexico. The languages of the seven pueblos are closely related, though they manifest important differences. Certain of these differences allow the languages to be divided into two dialectal subgroups, east and west Keresan, east consisting of Cochiti, San Felipe, Santo Domingo, Zia, and Santa Ana, and west of Acoma and Laguna. The present analysis will focus on data from Santa Domingo (SD), as representative of the eastern group, Acoma (AC), from the western group, and Santa Ana (SA), which though usually grouped with the Eastern dialects can be said to occupy an intermediate linguistic position between the two groups in certain respects.

1.0 General Remarks on Keres Accent

In all the dialects word accent is marked by a system of pitch-accent. Accent is manifested not only as tone (high v́(:), falling v̂:) but also as several laryngeal features, namely glottal accent v̓ and breathy accent v̈.[1] Glottal accent consists of a glottal catch following the vowel nucleus which may be but is not always followed by an echo vowel of same quality as that immediately preceding the catch. Breathy accent is manifested as a long vocalic nucleus that begins voiced and ends devoiced. Acoma and Santo Domingo have high level tone, falling tone, and glottal accents while Santa Ana in addition to these types of accent is the only dialect to exhibit breathy accent. Examples from each dialect follow.[2]

(1)

AC	SD	SA	(Miller and Davis 1963)[3]
mʌ́iʔtʼa:na	mʔâiďana	mʔâiďana	'seven'
haʔpani	haʔbani	haʔbáni	'oak'
sʔí:sé	cʔí:sé	cʔí:se	'I filled it'
	čî:ďa	číďá	'kiva'
kusê:nʔiši	kû:senʔi	kúsé:nʔé	'his fur'
ʔíyâ:ní	ʔí:yani	ʔíyá:ni	'life'

The domain of accent in Keres is the left edge of the word. There may be more than one type of accent per word. These accents occur in such a distribution as to form a definite contour of the shape ⌐¬⌊__ .[4] Only

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[1] H. Valiquette(1990, p.c.) also reports a possible addition to this list, a 'glottal pause'.

[2] Following Davis(1964) a vowel with glottal accent or breathy accent is written without the length mark : here. Underlined vowels are voiceless. t = voiceless aspirated, d = voiceless unaspirated ď = palatal. The high central vowel is written ɨ for all dialects.

[3] Hereafter (MD1963).

[4] First noted in Valiquette(1990).

rarely are there found two accents separated by an unaccented syllable. This contour is defined by the distributional restrictions of the various accents. For example, in Santa Ana (i) neither glottal nor breathy accent may be preceded by an accentless syllable or falling tone (or low tone, see note 2), (ii) falling tone never precedes high tone, etc.

(2)	SA	dáw$^{?}$a$^{?}$ça	'moon'	(MD1963)
		k$^{?}$úyaìtį	'game animal'	
		híyâ:ni	'road'	

Not every syllable bears contrastive accent, and accentless syllables at the right edge of the word are subject to a well-defined process of final devoicing.[5] The two word edges therefore contrast maximally with regard to accent, with syllables at the left edge of the word bearing accent while those at the right edge are subject to this devoicing.

(3)	SA	ši$^{?}$d'i$^{?}$ta	'star'	(MD1963)
		qúk$^{?}$úmiši	'eight'	
		kúc$^{?}$avawa	'he is angry'	

2.0 Breathy Accent: Zuni Evidence

Miller and Davis(1963) present comparative data for three Keres dialects, Acoma, Santo Domingo and Santa Ana, listing a total of 441 cognate sets. SA breathy accent corresponds regularly to glottal accent in AC and falling tone in SD[6].

(4)	AC	SD	SA	(MD1963)
	ga$^{?}$ku	gâ:ku	gàku	'he bit him'
	séizeʂa	séizesu	séizèsu	'I dreamed'
	d'ai$^{?}$ci	d'âici	d'èici	'piñon pine'

Out of a total of 50 instances of SA breathy accent in the data, 47 cognate sets show this regularity. There are only three exceptions.[7] The question at hand is whether breathy accent is a further development in Santa Ana of a previous glottal or tonal accent, or whether the glottal and falling accents in the Acoma and Santo Domingo cognates have their origin in a general Keresan breathy accent.

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[5]There is some possible evidence for a contrastive low tone, however.

[6]For SD, only on first syllable, since SD has eliminated accent on all but initial syllable.

[7] Exceptions:

AC	SD	SA	
hâ:skani	háisgini	hàsgini	'bone'
dê:t'a	rê:d'a	rèd'a	'rabbit'
gísk$^{?}$a	gi:sk$^{?}$a	gisk$^{?}$a	'he drank'

Evidence to resolve this question comes not from the Keres languages themselves but rather from Zuni[8], a neighboring Pueblo language, also an isolate, spoken in northwest New Mexico. Zuni has borrowed several words from Keres that bear on the question of breathy accent, in one case crucially. Zuni *ǩyaššita* [9] 'fish' has been independently identified as a Keres loanword (Shaul 1982), cf. Keres AC *sǩʔaʔšu̲* S A *sǩʔàšį̲* SD *ǩʔâːšį̲* 'fish'. I have identified two more Keres loans. Zuni *ʔuwakya*, appears in Newman(1958) only as 'ceremonial relationship', but the fuller gloss in Bunzel(1932) 'great-grandson (religious term)' allows the connection to Keres to be made, cf. Keres AC *ʔúwaʔka̲* SA *ʔúwàka̲* SD *ʔúːwaka̲* 'baby'. The second example is Zuni *puːla* 'butterfly' (Nichols 1992) [appearing in Bunzel(1933) as *puːlakya*, see note 14], cf. Keres AC *búːrʔaiʔka̲* SD *búːrʔàika̲* SA *búːrʔaga* 'butterfly'.

Two rules of Zuni phonology are responsible for certain superficial differences between Zuni *ǩyaššita*[10] and the Keres forms. Zuni phonotactics prohibit consonant clusters word initially, hence *#sǩ- > #ǩ-. In addition, Zuni *k* and *ǩ* are automatically palatalized before the vowel *a*, therefore *k* > *ǩy*. The geminate *šš* in the Zuni form vs. single *š* in the Keres remains unaccounted for, however. Keres does not allow geminates[11], therefore it is hypothesized here that the Zuni geminate *šš* in *ǩyaššita* must be the result of the assimilation of two originally distinct items. The three Keres forms in the Miller and Davis(1963) data provide the possibilities. The SD form *ǩʔâːšį̲* is unlikely to represent the source of the Zuni form, since no phonological rule of Zuni motivates positing a change * V̂:c --> vcc. As for the AC form *sǩʔaʔšu̲* containing glottal accent, the cluster *ʔš* is permitted by Zuni phonotactics, e.g. *heʔšo* 'resin'. Had the word for 'fish' been borrowed with glottal accent, the Zuni form would have retained the glottal stop. This leaves SA *sǩʔàšį̲* as the remaining candidate. Here, in contrast to the AC and SD forms, there is motivation for deriving geminate *šš* in the Zuni form. Keres breathy accent is likely to have been heard by Zuni speakers as a postvocalic consonantal [h], for example Zuni *puhči* 'mushroom', *ʔahpi* 'urinate on'. An examination of Zuni syllable structure reveals that nowhere in the lexicon does the cluster **-*hš*- occur, however, and leads to the conclusion that the cluster **-*hš*- is excluded by Zuni phonotactics. Because of this synchronic restriction on the cluster**-*hš*- in Zuni, a rule *-hš- > -šš- can be postulated for the Zuni form of the Keres word *sǩʔàšį̲*. Possible supporting evidence for this conclusion is the fact that although in modern Zuni the cluster *-hs-* is permitted, for example *ʔuhsi* 'that one' (Newman 1958), recent fieldwork shows this

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[8]Zuni fieldwork was supported by grants from the Phillips Fund of the American Philosophical Society and the Jacobs Fund of the Whatcomb Museum Society, as well as by the Dept. of Anthropology, University of New Mexico. Special thanks to the Zuni Tribal Council.

[9]The final *-ta* is as yet unidentified. (SA *-ta̲* plural subject?)

[10]Devoicing of word-final vowels in Zuni is not marked here.

[11]Note the reduction in Keres of an underlying geminate -??- formed across a morpheme boundary: píˀ- + -âʔâːša̲ --> péːʔâːša̲ (i + a > e by general rule) 'let him close it'

cluster as well to be submitting to assimilation: *?uhsi* > *?ussi* (Nichols 1993a).

The geminate of *k'yaššita* therefore reveals that Zuni borrowed a Keres word containing breathy accent. Santa Ana is the only dialect that presently has breathy accent, and moreover is located geographically within the eastern Keres dialect group whereas Zuni lies entirely west of the Keres language area.[12] From this it can be concluded that either (i) breathy accent was more widespread among the Keres dialects than at present and went through subsequent changes resulting in the glottal and falling tone accents now observed in AC and SD, or (ii) Zuni may have borrowed *k'yaššita* before the several dialects split off from the main language group while it still had breathy accent. Either way, both AC glottal accent and SD falling tone in the 47 cognate sets mentioned above can be reconstructed as originating in breathy accent and not the reverse: *V̌ > AC v̰, SD V̂:.

The AC *V̌ > v̰ change may be explained as the falling together of the breathy and glottal accents, a change motivated by both accents being characterized by laryngeal articulations that disrupt voicing. The salient property of breathy accent for AC was therefore its voicelessness. SD, however, cued in on the phonetic H-L tone pattern of breathy accent accompanying the shift from voicing to voicelessness. Thus *V̌ in SD fell together with falling tone V̂:, *V̌ > V̂:. Evidence for the reality of this H-L tonal pattern for syllables with breathy accent comes from SA. The stem *zù-* 'go' has breathy accent when followed by a suffix beginning with a voiceless aspirated consonant. This accent changes to falling tone when followed by a nasal-initial suffix.

(5) SA a. zù-kų 'he went' (Davis 1964)
b. zû:-ne 'will go

The falling tone pattern of the SD cognates is thus accounted for.

2.1 Other Zuni Data

Before continuing, a brief word is necessary concerning the two other Zuni words identified here as Keresan in origin, *?uwakya* 'great-grandson (ceremonial term)' and *pu:la(kya)* 'butterfly'. Though the corresponding SA words both have breathy accent, unlike Zu. *kyaššita* neither of these other two Zuni words shows evidence of this accent. *-hk-* is a permitted cluster in Zuni, therefore one would not expect a geminate but rather that the *-h-* be retained in these words. Here, however, there are morphological and semantic motivations for the elimination of *-hk-* in favor of simple *-k-* in these borrowed words. There are two Zuni

[12]According to Walker(1967), citing Woodbury(1956),'Zuni and Acoma communities were separated by only some 25 miles from perhaps the early eighth century until the latter part of the fourteenth century, when the Acomas withdrew eastward to their present mesa-top and the Zunis moved westward from the El Morro district to the Corn Mountain-Hawikuh area.'

morphemes, *-h-* 'conversative causative' and *-kya* 'factual' which occur in productive combination. For example, Zu. *łakʷi-h-kya* 'he pulled it out', (*łakʷi-* 'be inserted'). Furthermore, stative roots may function as either noun or verb stems in Zuni. Hence a form borrowed as **?uwahkya* could potentially mean in Zuni 'he changed him from an *?uwa* into something else' (with *?uwa-* taken as a new root). Since there is a homophonous suffix *-kya* 'stative nominalizer'[13] (cf. *yato-na-kya* 'path, bridge' *yato-* 'go over'-*na* 'stative'), the form *?uwakya* (and likewise *pu:la(kya)*) can be accounted for by positing analogical elimination of the *-h-* , modeling the word on Zuni nominalizations in *-kya*. Such a change would avoid the confusion of a nominal form that would look to have the morphology of a conversative causative factual verb form. Zu. *?uwakya* and *pu:la(kya)*[14] are therefore not counterexamples to the hypothesis put forth above regarding the Keres source of Zuni *kʸaśśita*.

3.0 Origin of Breathy Accent

Language external evidence, namely Zuni borrowings from Keres has shown that breathy accent was once a more widespread phenomenon of Keresan than it is in its modern dialects. Language internal evidence takes the analysis one step further and suggests an origin for breathy accent itself, not surprisingly, the laryngeal voiceless fricative consonant [h].

Clues to the origin of breathy accent lie in general Keresan phonotactics. Since of the three dialects discussed here, only SA preserves breathy accent, a statement of SA phonotactics will be used. SA has long vowels but not geminate consonants. The only consonant clusters permitted in SA are of the form SC where S represents one of the fricatives [s, š, s̬][15] and C represents a voiceless, voiceless aspirated, or glottalized stop or affricate.[16] Such clusters occur both word-initially and medially. Examples of these clusters are given in (6).

(6)	SA	spá?ác'i̲	'mockingbird'	(MD1963)
		sč'ápa̲ka̲	'twilight'	
		k'án'ai?sd'u̲	'his father'	
		gúw'íski̲ca̲	'he scratched	

[13]To dispel any notion that because of this analyzability *?uwakya* might be Zuni in origin, it should be noted that there also seems to be a *-ka* noun suffix in Keres found with a certain subclass of animate nouns (Nichols1993b).

[14]The longer form *pu:lakya* is found only in Bunzel(1933) [occurring there as *p'u:lakä* and *p'ulakä;* I have normalized her transcription in the text of the paper]. In addition to the arguments just given, *pu:lakya* can be dismissed as counterevidence since Bunzel's transcriptions are extremely faulty, particularly where coda *h*,*?* or geminates are concerned, and should not be relied on for phonological detail. The form currently in use *pu:la* has apocopated the final syllable and therefore provides no evidence.

[15]But see note 23 and accompanying text.

[16]AC, SA and SD vary slightly as to restrictions on C, e.g. restrictions against *sč' in AC.

Although consonant clusters are highly restricted in Keresan, the fricatives {s, š, ṣ} are allowed in clusters. There is a fourth fricative, *h*, though in contrast with the others, *h* has a much more limited distribution. *h* occurs only word initially or, more rarely, intervocalically, never in a syllable's coda followed immediately by another consonant.

(7) SA há:múčuni 'toe' (Davis1964, MD1963)
zíuhima 'he believed him'

Segmental *h* and breathy accent v̀ are therefore in complementary distribution since breathy accent only occurs preceding a consonant. Furthermore, breathy accent only occurs before a subset of Keres consonants, those (non-glottalized) consonants which are represented by C in the formula SC, plus the (non-glottalized) fricatives.[17] For example:

(8) SA gùpi 'his forehead' (MD1963)
ʔìd'awa 'centipede'
héyàši fog'

If *h* and v̀ are taken together as a single distribution, they pattern identically to the other fricatives {s, š, ṣ}.[18] These distributional facts suggest that h and v̀ be reconstructed as the same type of element and more specifically suggest that breathy accent should be reconstructed as consonantal *h* in coda position. All the fricatives therefore behaved alike at one time in being permitted as the first consonant of a medial cluster.

There is additional evidence to support the claim that breathy accent originated in a segmental [h] in coda position. It was noted above that the stem *zù-* 'go' has breathy accent when followed by a suffix beginning with a voiceless aspirated consonant, (9)a, but falling tone when followed by a nasal-initial suffix, (9)b.

(9) SA a zù·ku 'he went' (Davis 1964)

b. zû:-ne 'will go'

As (9)b shows, the nasal effects full voicing of the partially voiceless stem vowel.[19] The result of this voicing is a long vowel v: indicating that a syllable bearing breathy accent is heavy. This is the expected case if the phonetic [h] in v̀ originated as a segmental consonant filling coda position of the syllable.

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[17]There is one exception: *-wàng* 'go hunting'.

[18]Except for word-initial clusters of course.

[19]Nasals have a similar effect on voiceless nuclei within the domain of the rule of final devoicing. Essentially, a nasal (or glide, liquid) in the penultimate syllable will block devoicing from spreading to that syllable (unless immediately preceded by a high short tone).

SA kaʔáuc'è:naca 'he chewed' (Miller and Davis 1963)
gúmud'uca 'he killed him'

This observation concerning the length of vowels bearing breathy accent carries greater weight when it is further observed that laryngeally accented syllables are not necessarily long. Unlike syllables with breathy accent, a glottal accented nucleus is short, as shown when the glottal accent dissimilates following a glottalized pronominal prefix in SA.

(10) č̓ + -u̓pe̲ --> čú̓pe̲ (Davis 1964)
2.sg.hort eat 'eat!'

ç + -u̓pe̲ --> çu̓pe̲
2.sg.dub eat 'maybe you ate'

4.0 Reanalysis?

Having established the origin of v̀ in segmental [h], one might well want to see evidence that a change in the grammatical status of the voiceless continuant has indeed taken place. For the change from segment to accent of this voicelessness is simply a reanalysis in situ with no concomitant phonological change. Needed is evidence from the synchronic grammar that phonetic [h] represents something other than a segmental consonant in coda position.

Firstly, there is the distributional fact that v̀ occurs within the accent contour described earlier. There is preliminary evidence that breathy accent is a primary word accent which will condition the spread of high tone onto preceding syllables that are underlyingly unaccented (Nichols 1993b). Secondly, certain Keres verb stems are preceded by a thematic adjunct (Davis 1964). All such thematic adjuncts bear a lexical accent, either v́(:), v̂:, v̓ or v̀.

(11) SA -á-šé 'be white' (Davis 1964)
-á:-múcu̲ '(have a) toe'
-â:-ni 'go, walk'
-a̓-čí:ni 'dance'
-à-ku̲ 'cry'

Finally, v̀ alternates with tonal and glottal accent in cetain verbal paradigms.

(12) SA a. sìka̲ 'I looked' (Davis 1964)
zígá 'he looked'

b. gùka̲ča̲ 'he saw him'
síuka̲ča̲ 'I saw him'

c. s̓ìku̲ 'I am located'
sa̓ku̲ 'you are located'

A problem arises, however, in that the above data may not be evidence of a breathy accent as such[20] since a second interpretation is possible, namely that the relevant forms contain a vowel with short high tone accent followed by segmental *h* . Furthermore, in Santa Ana breathy accent occurs only where an etymological *h* occurred[21], and has not been generalized to other contexts as one might expect to be the case for a grammaticalized accent. It is therefore problematic as to whether breathy accent is in fact a type of accent at all. Since the evidence in this section must be excluded because of its ambiguity, we must look elsewhere. The remaining evidence for reanalysis of segmental *h* as accent is at best only of an indirect sort, coming from the synchronic phonotactic restrictions on coda consonants and consonant clusters in Keres.[22]

5.0 Complex Onsets

The most likely mechanism responsible for bringing about the speculated change in grammatical status of [h] from segmental to accent is the reanalysis of all Keres medial clusters as complex onsets (recall that the only such clusters permitted in Keres are of the type -SC-). That is, S in the syllable coda was reanalyzed as part of the onset of the following syllable. That S is permitted to form part of a complex onset is demonstrated by the fact that SC clusters occur word-initially.

(14)	SA	st'ɨ́:cį́	'it is straight'	(Davis1964, MD1963)
		spíníní	'dwarf corn'	
		sč'ísą́	'six'	
		sgâw'ašį́	'rat'	

Furthermore, as described in grammars of Acoma (and Laguna) S fricatives assimilate to the following consonant, neutralizing point of articulation. ṣ appears before labial or palatal consonants followed by {a u ɨ}, otherwise š occurs.[23] This automatic assimilation suggests S is part of the following onset.

(15)	AC	špíníní	'dwarf corn'	(Miller 1965)
		št'ɨ́'ci	'it is straight'	
		y'a'ṣbá	'dough'	
		'íṣka	'one'	

[20]Thanks to Bill Poser for helpful comments that have been incorporated here.

[21]With one possible exception. In the verb stem -w'ànę 'go hunting' breathy accent occurs in an unexpected context, namely preceding a nasal consonant.

[22]It might be possible to add to this the fact that SA Keres also has sequences of the type ṾSC, where breathy accent is followed by a consonant cluster. If coda [h] does not instantiate a type of accent, it is then difficult to explain this singular instance in Keres of a tri-consonant cluster.

[23]Davis(1964) lacks a similar statement for Santa Ana. Only s appears in such clusters, though it is uncertain whether he is following the convention in Miller(1965) where s is used to denote the assimilating S.

Word-initial #SC clusters themselves may have provided the model for medial -SC- to be reanalyzed as an onset. Indeed, since there are no other clusters in Keres except SC clusters, the pressure for reanalysis according to #SC is likely to have been enhanced. Furthermore, the heavy restrictions on types of consonant clusters in Keres may stem from an ongoing trend toward increasing constraints on coda consonants. The elimination of S from the coda is in keeping with this trend and supports its reality as a historical process.

The role of this reanalysis in the genesis of a breathy accent has to do with the fact that although {h, s, š, ṣ} together make up the class of Keres fricatives, *h* differs radically in point of articulation from the three other fricatives. The reanalysis of coda fricatives {s, š, ṣ} as part of the following onset did not apply to *h* because of its point of articulation. *h* could not remain in coda position, however. Pressure for its removal was exerted by the increasing constraints against coda consonants posited for Keres, along with the reanalysis of S fricatives as onsets, the latter effectively removing the last class of consonants from coda position.

Since *h* could not be part of a complex onset, the voiceless consonant with vowel coloring was reanalyzed as an accent that devoiced the latter part of the vowel nucleus. Reanalysis of the sequence vh as an accent devoicing the vowel was perhaps abetted by the presence of voiceless vowels elsewhere in Keres. The devoicing of word-final vowels is an areal feature of the Southwest. This rule in SA Keres applies to a well-defined domain at the right edge of the word, (16)a. Certain word-internal vowels are also devoiced, (16)b.

(16)	SA a.	ku̯ˀpe̯	'he ate'	(Davis1964, MD1963)
		gúy̯ˀû:mˀi̯	'his arm'	
		šâ:wiṭi̯	'parrot'	
		gúkˀúmi̯ši̯	'eight'	
		síwáçaš̯a̯va	'I stirred it'	
	b.	y̯ˀáwˀa̯stí	'stick'	
		híçi̯skˀáwa	'willow'	

As a result of the movement of S into onset along with the reanalysis vh --> v̀, there are no consonants left in coda position anywhere in the language. Though we do not yet have evidence to reconstruct consonant clusters other than SC[24], the reanalysis discussed here argues for the reality in Keres of a trend toward the elimination of coda consonants and the creation of uniformly open syllables.

6.0 Reconstructing a Partial Chronology for Keres Accent

Finally, if reanalysis of [h] as accent did occur (recall from section 4.0 that the status of this phenomenon as accent is problematic), such a change was possible because glottal accent vˀ already existed as an accent

[24]Where S now includes *h*.

type in Keres. v̀ provided the model for a second non-tonal accent based on termination of voicing in the syllable nucleus. Consequently the postulation of v̀ as a model for the grammaticalization of v́ provides a partial chronology for the development of the Keres accentual system.[25]

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[25]Greenberg(1987) gives a 'Proto-Keresan' form **sk'aašɨh* 'fish' and lists the following as evidence of a Keresan-Caddoan connection.

Keres:	Santo Domingo	k'aašɨh
Caddoan:	Wichita	kaat$^{s^{o}}$a
	Pawnee	kat$^{s^{o}}$ixi

There are several problems with this 'Proto-Keresan' form, however. Though Greenberg states that his 'Proto-Keresan' forms are from Miller and Davis(1963), the latter have in fact **sk'ašɨ* for 'fish' and not Greenberg's **sk'aašɨh* . I suspect that Greenberg has based this reconstruction partly on Keres data from Swadesh(1967), the latter using final *-h* presumably to indicate final devoicing. Swadesh himself indicates a coda fricative in his reconstruction **sk'ahših* , which Greenberg seems to have ignored. Furthermore, the final *-h* notation is inappropriate since (i) there is no evidence for word-final consonants in Keres, and (ii) final devoicing is an areal feature in the Southwest. For now final devoicing in Keres should be reconstructed but with the appropriate caution. More importantly, however, Greenberg chooses a form from Santo Domingo, the most radically divergent of the Keres dialects, for comparison with Caddoan. SD has eliminated all accent except on the initial syllable and has reduced most of its SC clusters to C. The preceding discussion of Keres breathy accent has shown that such a comparison with Caddoan is inappropriate and that at least a Proto-Keresan **sk'ahšɨ* must be reconstructed.

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Against variability in the location of the feature Nasal

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1. Introduction

Two issues of recent concern in phonological theory are (i) the nature of a universally valid, feature geometrical theory, and (ii) the extent to which harmony processes (vowel harmony, nasal harmony, etc.) are blocked by segments of a predictable sort, that is, whether there is a theoretical basis to the observation in such systems that harmony is blocked by segments of some particular type X.

The starting point of this discussion is a recent proposal by Piggott (1992) that challenges the possibility of a universal feature geometry. Piggott proposes that the feature Nasal can be dominated either by the Soft Palate node (in languages such as Sundanese, Warao and Capanahua) or by the "Spontaneous Voicing" node, in languages such as Southern Barasano (Eastern Tucanoan). This new node which also figures prominently in works by Rice & Avery (1989) and Rice (1993) roughly corresponds to the traditional notion of "sonorant" (though voiced obstruents can be included in this category, on Rice's and Piggott's account). In this paper I argue that no such distinction or (quite undesirable) parametrization in the location of the feature Nasal is necessary, and that a theoretically simpler approach is both available and preferable.

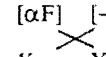
This alternative involves a challenge to certain recent claims of underspecification theory, however: I will argue that Nasal is a binary feature which is contrastively specified in the underlying representation, even in segments whose value for nasality is predictable from a configuration constraint of the form [+cons, -voice] -> [-nasal]. Under a contrastive approach to underspecification, blocking results from the constraint on crossing association lines only (Goldsmith 1976), and not from a constraint on the local application of rules (Archangeli & Pulleyblank 1986). I will argue that the locality constraint needs to be rejected if we want to ensure the viability of feature geometry as a universal model of feature organization.

2. Theoretical preliminaries

Two theories of blocking and transparency exist in current phonological theory, and they operate on different assumptions about the structure of the underlying representation. These are the contrastive (Steriade 1987, Clements 1988) and the radical (Archangeli & Pulleyblank 1986) approach to underspecification.

Contrastive underspecification is built on the premise that for every distinctive feature, both values [αF] and [−αF] are specified underlyingly. Under this assumption, the spreading of a feature value is arrested only by a segment that has the opposite specification for F. Spreading beyond such a segment is blocked due to the prohibition against crossing association lines:

(1) * [αF] [−αF] (Goldsmith 1976)



However, if a segment is unspecified for either value of the feature F, and unspecifiable because of a configuration constraint, it is transparent to the spreading of either [αF] or [−αF].

Radical underspecification, on the other hand, holds that only the unpredictable value [αF] of each feature is present underlyingly, while the predictable value is filled in by a redundancy rule after (and sometimes even before) the phonological rules of a language have applied. Since only [αF] is available underlyingly, spreading of this value cannot be blocked by a segment bearing [−αF]. The radical solution to blocking is to formulate a configuration constraint which prevents the association of [αF] with a particular class of segments. Under the condition that spreading applies only in a local fashion, these constraints account for the opacity of a segment.

(2) a rule can refer only to nodes that are adjacent
(Archangeli & Pulleyblank 1986)

To account for transparency effects, this approach crucially depends on a geometrical model of feature organization. A segment is transparent to the spreading of [αF] if it lacks the target node to which [αF] associates; i.e., transparent segments are unspecified for F underlyingly, as well as for the class node which dominates F.

I assume that the prohibition against crossing association lines is universal, and that the locality condition is not. I will further assume that an account that invokes the line crossing constraint must not appeal to locality. Although the two constraints achieve similar ends, wellformedness is a constraint on representations, whereas locality is a constraint on rules. Insofar as the goal of linguistic theory is to explain phonological phenomena in terms of representations, the locality constraint is unnecessary.

3 The data

3.1 Sundanese

Sundanese distinguishes between voiced, voiceless and nasal stops underlyingly, as shown in (3). The symbol H represents a laryngeal fricative that alternates between [+nasal] and [-nasal], and is thus unspecified for nasality underlyingly. The glottal stop [ʔ] which occurs in Sundanese surface forms is predictable and therefore not included in the follwing table.

(3)

p	t	c	k	
b	d	j	g	
m	n	ñ	ŋ	
		s		H
	l r			
w		j		

Vowel nasalization is predictable; any vowel to the right of a nasal consonant is nasalized, unless a supralaryngeal consonant or the glides /w/ and /y/ intervene. Sundanese thus has a rule of rightward Nasal spreading which operates in a feature-filling fashion. This rule will not be formalized here.

The following examples from Cohn's (1990) analysis of Sundanese are in broad phonetic transcription.

(4)				
	a.	$\tilde{V}\tilde{V}$	ñãũr	'say (active)'
	b.	$\tilde{V}h\tilde{V}$	mãh̃ãl	'expensive'
	c.	$\tilde{V}?\tilde{V}$	mũ?ãsih	'love (active)'
	d.	$\tilde{V}wV$	mãwur	'spread (active)'
	e.	$\tilde{V}yV$	nãjak	'sift (active)'
	f.	$\tilde{V}lV$	ŋũliat	'stretch (active)'
	g	$\tilde{V}rV$	mãrios	'examine (active)'
	h.	$\tilde{V}C_{[+voice]}V$	ŋõbah	'change (active)'
	i.	$\tilde{V}C_{[-voice]}V$	ŋãtur	'arrange (active)'
	j.	$\tilde{V}C_{[+cont]}V$	ŋĩser	'displace (active)'

Of particular interest to this discussion are examples (4b) and (4c) which show that laryngeal consonants are transparent to Nasal spreading, and examples (4f) through (4i) in which a supralaryngeal consonant blocks the spreading of nasality. The opacity of glides and [+continuant] segments is not central to this discussion and will not be addressed in this paper.

Essential to Piggott's account of these and similar data from Capanahua and Warao is the prohibition against crossing association lines. In order to correlate the opacity of supralaryngeal consonants with the line crossing constraint, an underlying three-way contrast among segments has to be assumed: segments can be either [+nasal], or [-nasal], or have no specification for nasality at all. If Nasal is a direct dependent of the root node, an underlying ternary contrast is sufficient to account for all the observed regularities. Piggott, however, proposes a more complex geometrical representation in which Nasal does not report directly to the root node, but is dominated by the articulator node "Soft Palate" (SP) which is present in all segments that are also specified for nasality, as shown in (5). Segments which are unspecified for nasality are also unspecified for SP. The SP node, like all articulator nodes, is monovalent.

(5)

nasal consonants:	oral consonants: (sl. obstruents & liquids)	other segments: (vowels & laryngeals)
root	root	root
|	|	
SP	SP	
|	|	
[+nasal]	[-nasal]	

Piggott suggests further that it is the Soft Palate node and not the feature Nasal which spreads in harmony systems of the Sundanese type. The Soft Palate node associates with all segments that are unspecified for this property (which is the same class of segments that is also unspecified for nasality), while spreading is blocked by any segment that is specified for SP.[1]

[1]Piggott apparently assumes that only SP nodes with a dependent feature [+nasal] (or [nasal]) spread. Segments which bear an underlying SP node plus [-nasal] specification (or simply an SP node) would then have no other purpose than to block SP spreading. I follow Piggott's policy in my summary, although it is not clear to me what his rationale is.

(6)

	ŋ	a	t	u	r	->	ŋ	a	t	u	r	[ŋātur]
root node	x	x	x	x	x		x	x	x	x	x	
	|		|		|		|	/	|		|	
SP node	x		x		x		x		x		x	
	|		|		|		|		|		|	
	[+N]		[-N]		[-N]		[+N]		[-N]		[-N]	

Alternatively, Piggott suggests that Nasal could be considered a monovalent or privative feature. Under a privative approach, however, we must allow supralaryngeal consonants and liquids to be specified for a bare articulator node SP, in order to derive the desired three-way contrast: nasal consonants are characterized by an SP node and the feature [nasal], oral consonants have an empty SP node, and segments for which nasality is redundant lack both. This assumption is by no means uncontroversial; considering that SP dominates only one terminal feature, it is unlikely that this assumption could ever be falsified.

(7)

nasal consonants:	oral consonants: (sl. obstruents & liquids)	other segments: (vowels & laryngeals)
root	root	root
|	|	
SP	SP	
|		
[nasal]		

(8)

	ŋ	o	b	a	h	->	ŋ	o	b	a	h	[ŋõbah]
root node	x	x	x	x	x		x	x	x	x	x	
	|		|			|	/	|			
SP node	x		x				x		x			
	|						|				
	[N]						[N]					

If Nasal is a privative feature, spreading must crucially involve the SP node and not the feature [nasal]. If [nasal] instead of SP spreads, any consonant that is unspecified for [nasal] would wrongly receive a specification for this feature, while vowels and laryngeals (lacking an appropriate landing site for [nasal]) would be transparent to [nasal] spreading. To insure that spreading is at the level of the SP node, Piggott proposes a maximal application principle which requires that "if a rule applies to a F α, the rule must apply to the node β dominating α, provided that β is an articulator node" (Piggott 1992: 39).[2] According to this principle, [nasal] and SP always spread conjointly ([nasal] riding "piggy-back" on SP), thus raising the question of whether two independent phonological units SP and [nasal] are motivated.

[2]This principle probably needs to be modified, since as it stands it would only allow the articulator node Coronal to spread, instead of the terminal feature [anterior]. However, even if modified, the maximal application principle seems to go counter the spirit of feature geometry, which is designed precisely in order to let terminal features spread independently of articulator features - indeed, one might argue that a terminal feature must spread independently of a class node in order to be recognized as a separate unit in the model.

Piggott's main reason for including such a node in the representation of nasal consonants is to account for the behavior of laryngeal stops. Unlike laryngeal fricatives, laryngeal stops do not nasalize, but are transparent to Nasal spreading.[3] According to Piggott, the laryngeal stop receives a specification for SP and its dependent feature [nasal] through the regular process of SP spreading. Laryngeal stops are thus targets in his framework and phonologically nasalized. Unlike other targets, however, the feature [nasal] cannot be realized on glottal stops, due to a surface level constraint which prevents the combination of this feature with the feature [constricted glottis]. Glottal stops thus have an SP specification (open velum), but due to the lack of egressive airflow in their production, [nasal] (nasal airflow) cannot be realized on this type of segment. Since lowering of the velum is a necessary condition for nasal airflow, the feature [nasal] depends on the SP articulator, as expressed by the structure in (7).

A careful review of the argument, however, shows that Piggott's account of laryngeal transparency is based on a mismatch between the phonological and phonetic levels of representation, rather than on the complex phonological structure he assumes. The essence of his argument is that laryngeal stops can be nasalized phonologically, but not phonetically. The transparency of laryngeal stops is therefore only apparent or surface-true. This type of explanation, however, can also be implemented if Nasal was a direct dependent of the root node: a laryngeal stop would receive a [+nasal] specification through spreading, which can however not be realized at the phonetic level, because of the already mentioned constraint. The behavior of laryngeal stops does therefore not provide any evidence for the existence of a Soft Palate articulator.

What considerations should ultimately guide the sub-grouping of features in a hierarchical model is well beyond the scope of this paper. Suffice it to say that while one might consider adopting the SP model for its commitment to monovalency, this goal could also be achieved in a different form; e.g., by assuming two monovalent features [nasal] and [oral] which are dominated by the root node. As long as a segment can be unspecified for either of these features, the desired range of contrast could be expressed, even without having to invoke a maximal application principle. Although it makes sense on phonetic and physiological grounds to assume a Soft Palate articulator, the case of the feature Nasal does not provide the most compelling evidence for an articulator-based model of feature geometry.

3.2 Southern Barasano

Southern Barasano (an Eastern Tucanoan language spoken in Colombia) differs from Sundanese in that nasality is distinctive in vowels; this is illustrated by the examples in (9), in which a nasal vowel follows a voiceless obstruent or fricative. Since nasalization is not predictable in this context, Nasal must be an underlying vowel feature. The data are from Smith & Smith (1971).

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[3]According to Cohn (1990: 66), glottal stops in Sundanese occur predictably between like vowels and at certain morphological boundaries. Cohn therefore assumes a lexical rule of glottal stop insertion. If glottal stops are inserted after Nasal spreading, their transparency derives from the relative ordering of these rules. Whatever the details of Sundanese, it should be noted that glottal stops are also transparent in languages in which they form part of the underlying consonant inventory. The following discussion is therefore not particular to Sundanese, but applies to glottal stops in general.

(9)	w̃ãtĩ	'demon'	wati	'going?'
	ỹũkã	'drink'	yuka	'vulture'
	kãmõkã	'rattle'	hikoro	'tail'
	mãᵗsã	'people'	weᵗsika	'above'

Southern Barasano and Sundanese also differ in their underlying consonant systems: nasality is distinctive in Sundanese consonants, but not in Southern Barasano consonants. Nasal stops always occur in the environment of nasal vowels. Voiced obstruents and liquids, on the other hand, are never found in this context, but only if surrounded by oral vowels. This distributional pattern suggests that nasal and oral stops are in complementary distribution in Southern Barasano.

(10)					
	a.		$\tilde{V}\tilde{V}$	ẽõñõ	'mirror'
	b.		$\tilde{V}h\tilde{V}$	mãh̃ãmã	'go up!'
	c.		$\tilde{V}\tilde{w}\tilde{V}$	--	
	d.		$\tilde{V}\tilde{y}\tilde{V}$	ãỹã	'snake'
	e.	*	$\tilde{V}\tilde{V}$		
	f	*	$\tilde{V}\tilde{r}\tilde{V}$		
	g.	*	$\tilde{V}C_{[+voice]}\tilde{V}$		
	h.		$\tilde{V}C_{[-voice]}\tilde{V}$	ỹũkã	'drink'
	i.		$\tilde{V}C_{[+cont]}\tilde{V}$	mãᵗsã	'people'
	j.		$\tilde{V}C_{[+nasal]}\tilde{V}$	mãñõ	'none'

(11)				
a.		VV	koeamĩ	'he washes'
b.		VhV	ahg̃re	'to play'
c.		VwV	kaĩwa	'chief'
d.		VyV	^{n}gahe^{d}ya	'another stream'
e.		VĩV	kaĩwa	'chief'
f.		Vr̃V	yir̃e	'to say'
g.		$VC_{[+voice]}V$	waba	'come!'
h.		$VC_{[-voice]}V$	yuka	'vulture'
i.		$VC_{[+cont]}V$	weᵗsika	'above'
j.	*	$VC_{[+nasal]}V$		

That nasality is predictable in consonants is further supported by the alternation pattern of the affixes in (12) and (13); these affixes begin with a nasal stop after a nasal base, and with an oral stop or liquid after an oral base.

(12)	idi-r̃e	'to drink'	ỹãŋõ-nẽ	'to speak'
	wa-r̃e	'to walk'	hũnĩ-n̈ẽ	'to hurt'

(13)	dyi-bï	'I did'	^{d}yi-kõã-mĩ	'I did completely'
	wa-bï	'I went'	ĩã-mĩ	'I saw'

Nasal consonants are thus not underlying segments of Southern Barasano:

(14)

p	t		k	
B	D		G	
	s			H
	R			
W		Y		

Capital letters symbolize segments that alternate between [+nasal] and [-nasal]. A summary of these alternations is given in (15). /R/ is realized as the nasal stop [n̆] in the environment of nasalized vowels, as [l̆] or [r̆] before the vowels /i/ and /o/, and as [r̆] elsewhere. /H/ and the glides /W/ and /Y/ have a nasal and an oral variant, whereas /B/, /D/, and /G/ each have a nasal, a prenasalized and an oral variant.

(15)

b/m/^{m}b	d/n/^{n}d		g/ŋ/^{ŋ}g	
				h/h̃
	r̆/l̆/n̆			
w/w̃		y/ỹ		

Before addressing the geometrical structure of Southern Barasano consonants, I would like to discuss the behavior of voiced obstruents and liquids. As already mentioned, voiced obstruents and liquids alternate between [+nasal] and [-nasal], depending on the context in which they occur. This is not surprising in light of the fact that Nasal is a redundant feature in Southern Barasano consonants which are thus unspecified for this feature underlyingly. Lacking any Nasal specification, they simply serve as targets for Nasal spreading. In Sundanese, by contrast, nasality is distinctive in consonants. Voiced obstruents and liquids are therefore specified as [-nasal] underlyingly (or SP on Piggott's account) and hence block Nasal spreading. The different behavior of Sundanese and Southern Barasano consonants is therefore correlated with the distinctive versus redundant status of the feature Nasal in these languages.

So far then, nothing stands in the way of transferring Piggott's earlier suggestion about the organization of nasality features to the Southern Barasano data:

(16)

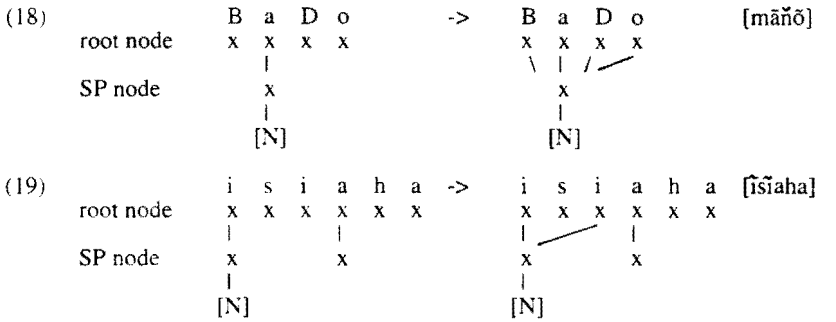
nasal vowels:	oral vowels:	consonants:
root	root	root
|	|	
SP	SP	
|		
[nasal]		

Nasal vowels are specified as SP and [nasal], while oral vowels are SP, and consonants are unspecified for either of these properties. If spreading is at the level of the SP node, then all consonants that are unspecified for SP underlyingly receive such a specification. The representation in (16), however, also entails that vowels can block SP spreading, since they are specified for SP. Contrary to Piggott's assertion, this is indeed the case. Smith & Smith (1971) give a number of examples in which a nasal vowel is followed by an oral vowel, suggesting that

at least among vowels there is a three-way contrast in nasality: SP and [nasal], SP, or no specification for either of these.[4]

(17)	õãkï	'a man'
	ã^{n}do	'here'
	nĩ^{t}se	'black'
	mãhã-ñia-ño	'place for going up'
	ĩsĩa-ha	'buttocks'

Examples of such unspecified vowels are contained in the following derivations:[5]



I will now turn to the phenomenon that leads Piggott to reject this geometrical structure for Southern Barasano. As illustrated in (9) and (10h), voiceless obstruents occur in the environment of nasal vowels, and are thus transparent to Nasal spreading. Under the assumption that spreading is not local, these examples have a straightforward account: there is a configuration constraint in effect which prevents the association of [nasal] with a voiceless segment: *[-voice, αnasal]. Voiceless consonants are therefore not eligible targets for Nasal spreading and will be skipped.

Piggott, however, seems to reject such a solution. Presuming locality, the only possible explanation for the transparency of voiceless stops is that they lack the structural node to which the spreading feature attaches. Thus, all targets of Nasal spreading (vowels, sonorants and voiced obstruents) must share some node

[4]To account for the examples in (17), one might be tempted to look for a connection between the opacity of vowels, on the one hand, and the morphological structure of these words, on the other. However, at least the first three examples are underived lexical items, which makes an explanation in terms of a derived environment effect untenable.

[5]In general, all segments in a morpheme agree in nasality. I assume that Nasal is a morpheme feature which is floating in the underlying representation. Nasal associates to the leftmost vowel in a morpheme before spreading rightward. The initial association rule and the spreading rule are not formalized here. I assume that the process of initial association has already taken place in the following derivations. I assume further that there is a constraint which requires all voiced consonants in the onset of a syllable to agree in nasality with the following vowel. The word-initial consonant in (18) therefore receives the specification [+nasal] by a bounded process of leftward spreading. The details of such an approach are laid out in detail in Noske (1993) for Tucano, another Tucanoan language, and will not be repeated here. I refer the reader to the discussion in that paper.

X, to the exclusion of voiceless obstruents. If Nasal attaches to this node instead of the root node, the transparency of voiceless stops follows from their lack of X-specification. The challenge of the Southern Barasano data lies in identifying this node. Since vowels, sonorants and voiced obstruents do not form a natural, phonological class, distinctive feature theory does not hold out a solution.

Piggott therefore suggests that the feature composition of these segments be modified: he argues that vowels, sonorant consonants and voiced obstruents in Southern Barasano are specified for the phonological feature "Spontaneous Voice" (SV). Spontaneously voiced segments have "a vocal tract configuration in which the vocal cords vibrate in response to the passage of air" (Piggott 1992: 48). This new feature replaces the traditional feature [sonorant], such that all vowels and sonorant consonants are SV universally. However, it is not a substitute for the laryngeal feature [voice]. In fact, Piggott suggests that the underlying representation of voiced obstruents can vary across languages: they can be either specified for SV, or for the laryngeal feature [voice]. Finally, to account for the transparency of voiceless stops, two additional assumptions need to be made: (i) Spontaneous Voice is a structural node, but not an articulator, and (ii) Nasal attaches to the SV node in languages in which voiced obstruents are specified for SV.

(20)

nasal vowels:	voiced obs. & son.:	voiceless obs.:
root	root	root
|	|	
SV	SV	
|		
[nasal]		

Since SV is not an articulator, [nasal] instead of SV can spread, without violating the maximal application principle. Voiceless stops, being unspecified for SV, are ignored by Nasal spreading, as shown in (22).

(21)

	B	a	D	o	->	m	a	n	o	[mãñõ]
root node	x	x	x	x		x	x	x	x	
	|	|	|	|		|	|	|	|	
SV node	x	x	x	x		x	x	x	x	
		|					\ | /		
		[N]					[N]			

(22)

	W	a	t	i	->	w	a	t	i	[w̃ãtĩ]
root node	x	x	x	x		x	x	x	x	
	|	|		|		|	|		|	
SV node	x	x		x		x	x		x	
		|					\ |		
		[N]					[N]			

The first question that needs to be raised in evaluating Piggott's proposal is what motivates the assumption that voiced obstruents are SV in Southern Barasano. There is clearly only a two-way contrast among Southern Barasano consonants underlyingly. As shown earlier in (14), voiceless stops contrast with voiced, non-nasal stops of the same place of articulation. This contrast involves

either the distinctive feature [voice], or [sonorant]. Which of the two features to specify underlyingly and which to declare redundant is a difficult choice to make. In the absence of any phonological evidence, the decision might have to be left open.

Piggott, however, opts for an analysis in terms of sonorancy (SV). Curiously though, his reasons are purely phonetic and not phonological in nature. He observes that voiced stops in Southern Barasano are in free variation with prenasalized stops if surrounded by oral vowels. Prenasalization appears to be obligatory in word-initial position.

(23)	waba	~	wa^{m}ba	'come!'
	^{m}bago	~	^{m}ba^{n}go	'eater'
	^{m}bedi	~	^{m}be^{n}di	'younger brother'
	^{n}diro			'grass hopper'

Since the issue of prenasalization is of considerable importance to Piggott's argument, it deserves a careful study. Smith & Smith (1971: 82) state that voiced stops have three variants: a nasal stop, an oral stop with lenis nasal onset, and an oral stop with optional non-lenis nasal onset. The nasal stop is found in the context of nasal vowels, while the other two segments are in free variation elsewhere. Contrary to this description, however, their examples show an oral stop in free variation with a prenasalized stop.

A survey of the remaining Tucanoan languages shows that free variation between a plain oral stop and a prenasalized stop is an exception, rather than the rule. In Northern Barasano (Stolte & Stolte 1971), Tuyuca (Barnes & Takagi 1976), Cubeo (Salser 1971), Tucano (West & Welch 1972), and Siriano (Nagler & Brandrup 1979), a prenasalized stop occurs between a nasal and an oral vowel, and sometimes in word-initial position. Prenasalization is therefore predictable through context, and should be accounted for by a spreading rule. The only Tucanoan languages in which oral stops are in free variation with prenasalized stops are Tatuyo (Whisler & Whisler 1976) and Southern Barasano.

Prenasalization in Southern Barasano is not contextually determined and thus not predictable phonologically. However, it is also not contrastive. Instead, it is entirely random and should therefore be handled by the phonetic component of grammar. For Piggott, however, this form of free variation is an instantiation of an underlying Spontaneous Voice specification in stop consonants. Although he admits that the phonetics of the feature Spontaneous Voice are complex, an optional nasal phase on a voiced stop is one of its correlates. In Sundanese, by contrast, plain oral stops do not vary freely with prenasalized stops. Since voiced stops in Sundanese are not specified for SV, we would not expect prenasalization (at least not as a correlate of SV).[6] Even if we agree with Piggott that optional prenasalization is correlated with the feature Spontaneous Voice, there seems to be a step missing in his analysis: we still need phonological evidence for considering voiced stops in Southern Barasano spontaneously voiced, instead of simply voiced.

The acoustic and articulatory properties of a segment clearly play a role in determining its feature composition. For example, there has to be a slight opening in the vocal tract for a sound to qualify as [+continuant]. Thus, while [f] would

[6]It is not entirely clear to me whether Piggott assumes SV to be a necessary or a sufficient condition for an oral stop to be in free variation with a prenasalized stop.

fall into this category, [p] would not. In this respect the phonetics of a segment inform the phonology. However, it is the phonology that ultimately decides whether this feature is present in the underlying representation or not. If a language does not exploit continuancy for phonological contrast, there is no reason to assume that [continuant] is one of its distinctive features, even if we find a fricative [f] at the surface. Similarly, if [f] is always in free variation with [p] in some language, while [p] contrasts with [b], [t] with [d], etc., we would assume an underlying contrast in the feature [voice]. That there is an instance of free variation does not affect this assumption; i.e., we would not conclude anything different about this language, even if the voiceless stop [p] did not vary freely with a fricative. The underlying representation of a segment is determined only on the basis of contrast; the exceptionally broad range in the realiztion of voiced stops in Southern Barasano, however, does not reflect on their underlying representation. The instances of free variation in Southern Barasano therefore cannot play a role in deciding what the feature composition of these segments is.

In conclusion, there is no phonological evidence for considering voiced stops sonorants or SV in Southern Barasano. However, there is also no evidence to the contrary. Hence, nothing stands in the way of our accepting Piggott's proposal.

The second suggestion Piggott makes is that Nasal is a dependent of the sonorancy feature SV. This assumption is justified by the fact that nasality is only contrastive in sonorants. Nasal segments are sonorants universally, a fact that has hitherto been expressed by the universal configuration constraint *[-son, +nasal]. The presence of the feature Nasal thus depends on the presence of the feature [+sonorant] or SV in a segment. This is an important insight about the phonological patterning of nasal segments, and should be expressed formally; whether directly by making Nasal a dependent of an SV node, or through a configuration constraint will be discussed next.

Since Nasal depends universally on the presence of sonorancy, we certainly do not expect Sundanese to form an exception. We can therefore transfer the proposal that Nasal depends on the SV node to the case of Sundanese. Assuming that voiced obstruents in this language are indeed obstruents and not sonorants or SV, only sonorant consonants and vowels have an SV specification underlyingly. If Nasal is dominated by the SV node, it will spread from SV node to SV node, as shown in (24). As a result, voiced and voiceless obstruents will be skipped by the spreading process. Lacking the SV node, they are not appropriate anchors for association with the feature Nasal.

(24)

	ŋ	o	b	a	h	->	ŋ	o	b	a	h	*[ŋōbāh]
root node	x	x	x	x	x		x	x	x	x	x	
	|	|		|			|	|		|		
SV node	x	x		x			x	x		x		
	|						| /				
	[N]						[N]					

There are two ways of dealing with this problem: (i) we can assume that SV is contained within the root node (following a suggestion by McCarthy (1988)), and that Nasal attaches directly to the root node. The dependency between Nasal and sonorancy would then not be expressed through the hierarchical organization of these features, but through a configuration constraint of the form [SV, nasal]. If we assume that spreading is local, voiceless stops and

voiced stops should block Nasal spreading. This solution is presented in (25). (ii) Alternatively, we could assume that all obstruents and liquids are specifed as [-nasal] underlyingly and block spreading by virtue of the line crossing constraint, as outlined in (26).

(25)

		SV	SV		SV			SV	SV		SV		
		|	|		|			|	|		|		
		ŋ	o	b	a	h	->	ŋ	o	b	a	h	[ŋõbah]
	root node	x	x	x	x	x		x	x	x	x	x	
		|						| /					
		[N]						[N]					

(26)

		SV	SV		SV	SV		SV	SV		SV	SV		
		|	|		|	|		|	|		|	|		
		ŋ	a	t	u	r	->	ŋ	a	t	u	r	[ŋãtur]	
	root node	x	x	x	x	x		x	x	x	x	x		
		|		|		|		| /		|			
		[+N]		[-N]		[-N]		[+N]		[-N]		[-N]		

In summary, to account for the Sundanese data we do not have to give up the assumption that Nasal depends on the presence of sonorancy or SV. In fact, the Sundanese data are quite compatible with this idea, except that SV cannot be a structural node, but must be contained within the root node.

Let us now turn back to Southern Barasano. If we assume that SV is one of the defining features of the root node, and if we assume further that voiced stops are sonorants in this language and thus specified as SV, they nasalize if surrounded by nasal vowels, as illustrated in (27). Voiceless stops, however, do not have an SV specification. Under the assumption that spreading is local, they block Nasal spreading. This is demonstrated in (28).

(27)

		SV	SV	SV	SV			SV	SV	SV	SV	
		|	|	|	|			|	|	|	|	
		B	a	D	o	->		m	a	n	o	[mãñõ]
	root node	x	x	x	x			x	x	x	x	
			|					\	|	/		
			[N]							[N]		

(28)

		SV	SV		SV			SV	SV		SV	
		|	|		|			|	|		|	
		W	a	t	i	->		w	a	t	i	*[wãti]
	root node	x	x	x	x			x	x	x	x	
			|					\	|		
			[N]							[N]		

However, if spreading is not local, the voiceless stop would be skipped by the spreading rule and we would obtain the desired result.

In conclusion, I have shown that both sets of data can be fully accounted for either under the assumption that Nasal is dominated by the Soft Palate articulator, or under the assumption that Nasal depends on the feature SV. The only assumption that we need to give up in order to account for both languages is that spreading is locally constrained.

The organization of Nasal either as a dependent of the SP node or the feature SV does not reflect two parameters of Universal Grammar, but two competing theories of feature organization. In the SP articulator model, the hierarchical organization of features reflects the phonetic and physiological facts of speech production. In the SV model, the hierachical organization of features reflects their phonological patterning. Which of the two models is accurate cannot be decided based on the data presented in this paper. However, unless we believe that languages differ in that some organize their features according to the articulators that are involved in their production, while other languages organize their features according to phonological criteria, one of the two models should do.

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RELATIVIZING CASE THEORY

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1. Introduction*

Two positions have been taken with respect to the status of the Case Filter[1] and the Visibility Condition[2] in Universal Grammar. Some scholars (see Chomsky and Lasnik (1991), for instance) claim the Case Filter can be reduced to the Visibility Condition, whereas others (see Raposo and Uriagereka (1990), for example) argue that these are separate well-formedness conditions in the theory of grammar. In this paper I will take the latter position and explore some of the consequences such a hypothesis has with respect to the types of Case available in Universal Grammar.

If the Case Filter is a PF condition on nominals independent from the (LF) Visibility Condition on arguments, there are four logical possibilities as to how a given Case K is able to make an element interpretable at the relevant level of representation, as shown in (1):

(1) a. K is active at PF and at LF ([+PF,+LF])
b. K is active neither at PF nor at LF ([-PF,-LF])
c. K is active at LF but not at PF ([-PF,+LF])
d. K is active at PF but not at LF ([+PF,-LF])

(1a) refers to the standard instances where nominal arguments are said to be assigned Case, yielding grammatical outputs, as in (2) below. In (2), both nominal arguments of the verb *see* are assigned Case: *John* receives nominative and *the bug*, accusative. Given that (2) is grammatical and, therefore, violates neither the Case Filter nor the Visibility Condition, we may say that the Cases assigned by the finite Infl and the verb in (2) are [+PF,+LF] Cases.

(2) John saw the bug.

(1b) is equivalent to lack of Case assignment. Thus, we can say that in (3) below, either the passivized verb does not assign Case to its complement (on the reasons for this, see section 3.2 below), or that the Case assigned by *destroyed* to *the city* is able to satisfy neither the Case Filter nor the Visibility Condition (it is a [-PF,-LF] Case). In both situations an ungrammatical result obtains.

(3) *It was destroyed the city by the enemy.

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[1] "*[$_N$ α], where α includes a phonetic matrix, if N has no Case" (Chomsky (1981:49), following J.-R. Vergnaud).

[2] "An element is *visible* for θ-marking only if it is assigned Case" (Chomsky (1986:94), following J. Aoun).

(1a) and (1b), therefore, have the same empirical coverage as the "classical" Case Theory, formulated in Chomsky (1981). If the possibilities (1c) and (1d) can be empirically motivated, the hypothesis that the Case Filter and the Visibility Condition are independent conditions will receive independent support. This is the line of reasoning I will pursue here.

The paper is organized as follows. In section 2 I propose that what Chomsky and Lasnik (1991) call "null Case" is an instantiation of the type of Case listed in (1c), a [-PF,+LF] Case, and then I discuss *wanna*-contraction and the distribution of PRO under this perspective. The discussion of the [+PF,-LF] type of Case in section 3 constitutes the bulk of the paper. It will be argued that the auxiliary ***have*** in English and the participial Agr head in Lithuanian assign a [+PF,-LF] Case, for they are able to license a participle affix only if it is not assigned a θ-role. In addition, it will be shown that the crosslinguistic variation with respect to the presence and distribution of [+PF,-LF] Case-marking auxiliaries in languages like English, Lithuanian and Italian follows from economy considerations prohibiting insertion of superfluous features in the course of a derivation. Finally, it will be claimed that Frisian infinitives provide morphological evidence for postulating a [+PF,-LF] type of Case. Some concluding remarks are then presented in section 4.

2. [-PF,+LF] Case

The Visibility Condition of Chomsky (1981:334) includes an undesirable disjunction. Every θ-chain except the one headed by PRO must be Case-marked:

> "Suppose that the position P is marked with the θ-role R and $C = (\alpha_1, \ldots, \alpha_n)$ is a chain. Then C is assigned R by P if and only if for some i, α_i is in position P and C has Case **or is headed by PRO**." [emphasis added, JMN]

Chomsky and Lasnik (1991:80) proposes that such a disjunction can be eliminated if PRO also receives Case. But since the Case that presumably licenses PRO does not license an overt NP, as shown in (4) below, Chomsky and Lasnik take it to be "a Case different from the familiar ones", referring to it as "null Case".

(4) a. It's necessary [$_{CP}$ [$_{AgrP}$ PRO [$_{Agr'}$ Agr [$_{TP}$ to leave early]]]]
b. *It's necessary [$_{CP}$ [$_{AgrP}$ Mary [$_{Agr'}$ Agr [$_{TP}$ to leave early]]]]

I would like to claim that the inventory of types of Case available in UG proposed in (1) provides us with the means to distinguish Chomsky and Lasnik's null Case from the more familiar types of Case, such as the ones assigned by finite Infl or by a transitive verb, for example. If Chomsky and Lasnik's null Case is taken to be in fact the type of Case listed in (1c) (a [-PF,+LF] Case), the contrast between (4a) and (4b) can be easily explained. In (4b), *Mary* satisfies the Visibility Condition, as does PRO in (5a), by being assigned a [+LF] Case by the infinitival Agr. (4b), however, violates the Case Filter, because *Mary* does not receive a [+PF] Case. By contrast, PRO in (4a) vacuously satisfies the Case Filter, if we assume that it does not have a representation at PF.[3]

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[3] Under such an approach, PRO contrasts with *pro* in that the latter is lexically specified as having a representation at PF and, therefore, must be assigned a [+PF] Case. Admittedly, until a better understanding of the representation of null elements at PF is achieved, such a distinction

With the four-way distinction of types of Case proposed in (1), therefore, the Visibility Condition may simply require that a thematic chain be Case-marked and the appropriate type of Case which this chain should be assigned ([±PF,±LF]) will depend on the morphological nature of its head.

2.1. [-PF,+LF] Case and *Wanna*-Contraction

This approach also provides a simple explanation for the different behavior of PRO and variables with respect to *wanna*-contraction constructions. As is well known, variables block *wanna*-contraction, whereas PRO does not:

(5) a. Who$_i$ do you want PRO to greet t_i?
b. Who do you wanna greet?
(6) a. Who$_i$ do you want t_i to greet Mary?
b. *Who do you wanna t_i greet Mary?

In both (5) and (6), the operator-variable chain receives a [+PF,+LF] Case from the verbs *greet* and *want*, respectively, whereas the chain headed by PRO in (5) is assigned a [-PF,+LF] Case by the infinitival Agr. Assuming that *wanna*-contraction is a PF phenomenon, the variable in (6) blocks contraction, because it receives a [+PF,+LF] Case and, therefore, is "active" at PF. By contrast, since PRO does not have a representation at PF, it does not interfere with *wanna*-contraction or any process that takes place at this level.

2.2. Distribution of PRO

The restricted distribution of PRO in *LGB* was believed to follow from the PRO Theorem. In the present analysis, the absence of PRO in what corresponds to *LGB*'s governed domains follows either from the lack of the relevant Case or from an "overload" of Case.

Consider a construction like (7) below, for example. Under the assumption that passive verbs do not assign Case to their object (see section 3.1 below), PRO in (7) violates the Visibility Condition, for it receives a θ-role, but no [+LF] Case.

(7) *It$_{expl}$ was greeted PRO by John

Let us now consider constructions where PRO receives a [+LF] Case, but the resulting sentence is still ruled out, as exemplified by (8) below. Since the Agr head of finite clauses assigns a [+PF,+LF] Case (see discussion above), PRO in (8) satisfies the Visibility Condition and the sentence should be well formed.

(8) *PRO left

I propose that (8), however, violates the Principle of Full Interpretation (see Chomsky (1986:98)). It was claimed above that PRO has no representation at PF. If so, when PRO is assigned a [+PF,+LF] Case by the Agr of the finite clause in (8), there is no nominal element at PF to bear the [+PF] Case feature. Hence, although Case-assignment to PRO in (8) satisfies the Visibility Condition, it also

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between PRO and *pro* is stipulative. However, it is, at most, as stipulative as current accounts. In Chomsky and Lasnik's (1991:78-80) theory, for instance, the fact that PRO must receive null Case, whereas *pro* must receive "regular" Case, does not follow from anything.

leaves a [+PF] Case feature stranded at PF. Under the plausible hypothesis that such a feature can only receive an interpretation when associated to a nominal element, (8) yields a violation of the Principle of Full Interpretation.

If this is right, we predict that if a language has an independent bearer for the [+PF] feature in sentences analogous to (8), PRO is allowed to receive Case from the Agr head of a finite clause. This prediction is borne out by "impersonal *si/se*-constructions" in Romance, as exemplified by the Portuguese sentence in (9):

(9) Aqui se trabalha bastante.
here SE works hard
'Here people work hard.'

Having observed that the semantic restrictions on impersonal *se*-constructions are the same as the ones associated with PRO (see Cinque (1988), among others), Raposo and Uriagereka (1993) propose that these constructions involve a PRO in the subject position, which is prevented from being governed by the clitic *se*. Although I will follow Raposo and Uriagereka in assuming a PRO in these constructions, I will depart from them with respect to the role ascribed to the clitic *se*. Under the perspective of the present analysis, the clitic *se* of impersonal constructions is just a [+PF] Case bearer. PRO in (9), for instance, can receive a [+PF,+LF] Case from Agr without giving rise to a violation of the Principle of Full Interpretation, because the clitic *se* can bear the [+PF] Case feature. In fact, since it is a nominal clitic, *se* not only can, but must receive a [+PF] Case in order to comply with the Case Filter.

Evidence for this approach comes from constructions like (10) below, in which the clitic *se* is attached to a transitive verb yielding a slight change in meaning, which need not concern us here:

(10) a. João utilizou (*d)aqueles documentos.
b. João se utilizou *(d)aqueles documentos.
João (SE) utilized of-those documents
'João used those documents.'

(10a) shows that the verb *utilizar* licenses its nominal object without resorting to the dummy preposition *de*. In the terms adopted here, *utilizar* assigns a [+PF,+LF] Case to its object. When *se* is added, the insertion of the dummy case marker becomes necessary, as shown in (10b). Since the clitic *se* must receive a [+PF] Case, when a dummy Case-marker is not inserted in (10b), a Case Filter violation arises because either the clitic or the object NP does not receive a [+PF] Case.[4]

The last construction I would like to examine in this section involves instances where PRO apparently can receive a [-PF,+LF] Case by the Agr head of

[4] Interestingly, some verbs that underwent a historical change that deleted the so-called "inherent *se*" came to license their object without the help of a preposition, as illustrated in (i):

(i) a. O rei assinou-se nos documentos. (Old Portuguese)
the king signed-SE on-the documents
b. O rei assinou os documentos. (Modern Portuguese)
the king signed the documents
'The king signed the documents.'

an infinitival clause, but the result is still ungrammatical, as exemplified in (11):

(11) *I consider [$_{AgrP}$ PRO to be intelligent]

(11) can be accounted for if complement clauses must also satisfy the Visibility Condition. If so, the infinitival clause of (11) must be Case-marked by *consider* in order to be visible at LF. Assuming that the infinitival clause of (11) is an AgrP, the Case assigned by the matrix verb percolates down to the Agr head. By being in a spec-head configuration, PRO and the Agr head will have to agree with respect to ϕ-features. The problem that then arises is that PRO ends up receiving a [+PF,+LF] Case through spec-head agreement. Since PRO does not have a representation at PF, the [+PF] Case feature assigned to it does not have a bearer at PF and, therefore, a violation of the Principle of Full Interpretation will arise.

Other constructions disallowing PRO can be accounted for in similar ways. But given that their examination requires a more detailed discussion of the internal structure of non-finite projections and their subcategorization, which would go beyond the scope of this paper, I will now move on to the discussion of the possibility mentioned in (1d): a [+PF,-LF] Case.

3. [+PF,-LF] Case

In order to empirically motivate a [+PF,-LF] Case, we need a test like the one represented in (12), where a certain Case K is able to license a nominal element only if it is not assigned a θ-role:

(12) a. [$K_{\text{Case-assigner}}$ $X_{([-V,+N],\ -\theta\text{-role})}$]
b. *[$K_{\text{Case-assigner}}$ $X_{([-V,+N],\ +\theta\text{-role})}$]

I claim that such a configuration arises in English (see Nunes (1993a)) and Lithuanian participle constructions (see Nunes (1994)), as shown below.

3.1. Participle Constructions in English

Baker, Johnson and Roberts (1989) propose that the passive morpheme *-en* in English is an argument base-generated as the head of Infl, as represented in (13) below, where *θe* stands for external θ-role. Based on Roberts's (1987) proposal that the "passive" *-en*, exemplified in (13a), and the "perfective" *-en*, exemplified in (14a), are in fact instances of the same morpheme,[5] Nunes (1993a) extends Baker, Johnson and Roberts's representation for passive sentences to perfective constructions, as shown in (14b):

(13) a. The car was stolen.
b. [the car]$_i$ was [$_{IP}$ -en$_{\theta e}$ [$_{VP}$ steal- t_i]]
(14) a. John had stolen the car.
b. John$_i$ had [$_{IP}$ -en [$_{VP}$ t_i steal- the car]]

If this is correct, we have to explain why *-en* behaves like an argument in

[5] As Roberts (1987:40) observes, "the combination of either *-en* [the "passive" or the "perfective" *-en*; JMN] with a verb-stem triggers exactly the same phonological form in all instances, including suppletions and lexical gaps".

(13), as argued by Baker, Johnson and Roberts, but not in (14), where it does not receive θ-role.[6] Following a suggestion by Jaeggli (1986, fn. 6), according to which an element must be N-like to carry Case and θ-role, Nunes (1993) proposes that the participle morpheme is a [-V,+N] element and, as such, a possible θ-role bearer.[7] Evidence for taking the participle affix as [-V,+N] element comes from the fact that in languages with overt agreement, participial verbal forms may take nominal agreement markers, as illustrated by the Portuguese sentence in (15) (see also the Lithuanian sentence in (22) below):

(15) As meninas não foram vistas
the-fem-pl girl-fem-pl not were-3pl seen-fem-pl
'The girls were not seen.'

To say that an element must be N-like to receive Case and θ-role, however, does not entail that an N-like element must be a thematic argument. Expletives are a good example of this. Although they cannot be assigned a θ-role, they must be Case-marked.[8] Based on these considerations, Nunes (1993a) claims that, as opposed to true referential expressions, which must be associated with a θ-role, the participle affix is assigned a θ-role only when forced to by the θ-Criterion. Thus, *-en* acts as an argument in (13b), since there is no element in specifier of VP to bear the external θ-role of the verb, but not in (14b), given that the two θ-roles of *steal* are assigned to the chains (*John*$_i$, t_i) and (*the car*).[9]

Let us now turn to the question of how the participle morpheme satisfies the Case Filter. Roberts (1987) proposes that in sentences like (13a), *-en* is Case-marked by the main verb, which triggers the movement of the object NP, since the auxiliary *be* is not a Case-assigner; in sentences like (14a), on the other hand, *-en* is Case-marked by the auxiliary *have*, which allows the main verb to Case-mark its object. Nunes (1993a) points out, however, that if this were the whole story, a sentence like (16) should be ambiguous between the two readings of (17):

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[6] For Roberts (1987:41), *-en* is a clitic that either forms a θ-chain with a phrase that moves from subject position to VP in passives, or forms a θ-chain with the subject, Infl and the auxiliary *have* in perfective constructions. As will become clear, the account to be developed here differs from Roberts's analysis on various points.

[7] This proposal shares with Roberts (1987) and Baker, Johnson and Roberts (1989) the intuition that *-en* is nominal in some sense. However, it does not commit itself to the potentially problematic claim that "*-en* is syntactically a clitic but phonologically an affix" (Baker, Johnson and Roberts (1989:223)).

[8] Another example is provided by the clitic *se* in Portuguese, as discussed in section 2.2. Although *se* must receive a [+PF] Case due to its nominal properties, it may not receive a θ-role.

[9] Passive sentences involving an "agent *by*-phrase" like (i) below require further comment. For the purposes of the present discussion, I will follow Baker, Johnson and Roberts (1989) in assuming that when the participle affix receives a θ-role, it may form a kind of "clitic doubling chain" with the agent *by*-phrase, represented in (ib) through the coindexation with the index θe. This amounts to saying that even when the agent *by*-phrase is present, there is no element in the specifier of VP, which forces VP to assign its external θ-role to *-en*:

(i) a. The cake was eaten by Peter.
b. [the cake]$_i$ was [$_{IP}$ -en$_{\theta e}$ [$_{VP}$ eat [by Peter]$_{\theta e}$]]

(16) It had eaten the meat.
(17) a. It_i had [$_{IP}$ -en [$_{VP}$ t_i eat- the meat]]
b. *It_{expl} had [$_{IP}$ -$en_{\theta e}$ [$_{VP}$ eat- the meat]]

In (17a) the external θ-role is assigned to the referential pronoun *it* in the specifier of VP, which raises to the specifier of Infl in order to get Case; therefore, the participle affix is assigned no θ-role in accordance with the θ-Criterion. On the other hand, in the absence of an element in the specifier of VP to bear the external θ-role in (17b), the θ-Criterion requires that it be assigned to the participle affix, and an expletive is then inserted in subject position. This structure would mean something like 'the meat had been eaten'.

(17) is in fact an instantiation of the abstract configuration described in (12): the auxiliary *have* is a Case-assigner that licenses only nominal elements that are not θ-marked. From the contrast between (17a) and (17b), Nunes (1993a) concludes that the auxiliary *have* assigns a [+PF,-LF] type of Case.[10] Thus, the participle affix in both (17a) and (17b) satisfies the Case Filter by being assigned a [+PF] Case by *have*. Since the participle affix of (17a) is not θ-marked, it vacuously satisfies the Visibility Condition at LF. By contrast, the participle affix of (17b) violates the Visibility Condition because it receives a θ-role, but no [+LF] Case.

3.2. Participle Constructions in Lithuanian

It has been claimed in the literature (see Timberlake (1982), Baker, Johnson and Roberts (1989), among others) that, beside standard passives with transitive verbs, Lithuanian also has impersonal passives of unergative, unaccusative and raising verbs, and even impersonal passives of standard passives. Nunes (1994) argues that such an analysis is mistaken, and that what has been taken to be an impersonal passive in Lithuanian is much closer to perfective constructions in English than to real passive constructions.

More specifically, Nunes (1994) claims that the present participle morpheme *-m-* and the past participle morpheme *-t-* in Lithuanian, similarly to *-en* in English, are nominal elements that head a projection of TP. By being nominal elements, the Lithuanian participle morphemes are also possible θ-role bearers. Thus, when there is no element in the specifier of VP to be assigned the external θ-role, the θ-Criterion forces the assignment of this θ-role to the participle affix, yielding a passive construction. In this respect, there is no structural difference between English and Lithuanian passives. Lithuanian differs from English, however, in that what corresponds to the "agent *by*-phrase" in English passives (see fn. 9) does not require the insertion of a preposition, as shown in (22) (from Timberlake (1982)):

(22) Krištolinis sietynas buvo mano pirk-t-as.
chandelier-nom/m/sg was I-gen buy-part-nom/m/sg
'The chandelier was bought by me.'

Nunes (1994) accounts for this difference by proposing that Lithuanian participle morphemes, like regular nouns, assign genitive Case to their specifiers.

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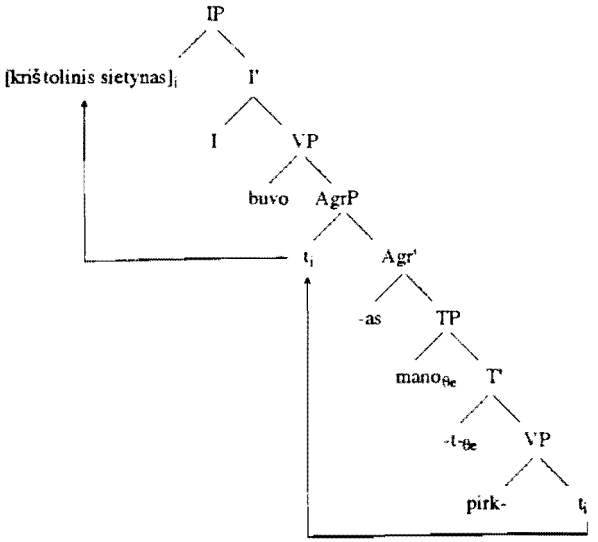
[10] I will leave for future research a discussion of the compatibility of the present analysis with Freeze's (1992) idea, adopted in Kayne (1993), that *have* should be analyzed as an instance of *be* to which a preposition has been incorporated.

Evidence for this proposal is provided by the specific genitive form that certain pronouns take in participle constructions. According to Timberlake (1982, fn. 2), 1st person sg., 2nd person sg. and reflexive pronouns distinguish two genitive forms: one used to express possession, and the other used for complements of verbs or prepositions. *Mano* and *manęs*, for example, are the "possessive" and the "verbal/prepositional" genitive forms of the 1st person sg. pronoun, respectively. As we can see in (22), it is the possessive genitive that is used to express the agent of a passive. This is exactly what we should expect if possessive genitive is assigned by nouns and if the participle affix is a [-V,+N] element. The passive sentence in (22) is thus be represented as in (23) (irrelevant details omitted):

(23)



Since there is no element in the specifier of VP in (23) to receive the external θ-role, this θ-role is assigned to the participle morpheme *-t-* heading TP, which, as a nominal element, is a possible θ-role bearer. The participle affix forms a type of clitic doubling chain with the agent phrase *mano* (see fn. 9) and assigns genitive Case to it. After the verb raises to the head of TP, it assigns its Case to the participle affix; the object then moves to matrix subject position, where it receives nominative Case from the matrix Infl.[11]

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[11] The movement of the object to the specifier of AgrP across the specifier of TP in (23) complies with the Shortest Movement of Chomsky (1992:24). After the verb moves to the head of TP, and the complex V-T subsequently moves to the head of AGRP in (23), the minimal domain (see Chomsky (1992:16)) of the chain ([V-T]$_j$, t_j) is {spec/AgrP, spec/TP, VP}. Given that the specifier of AgrP and the specifier of TP are in the same minimal domain, they are equidistant targets of movement for the object NP. Thus, movement of *krištolinis sietynas* ('the chandelier') across *mano* ('by me') in (23) is a licit operation, rather than constituting an instance of super-

In this approach, the availability of apparent impersonal passives like (24) below (from Timberlake (1982)) follows from the participle morphemes' ability to assign Case to their specifiers. In (24), the verb is unaccusative; therefore, the participle affix in (24) receives no θ-role, and the object receives no Case in its position. *Vaiko* ('the child') then raises to the specifier of TP, where it is assigned genitive Case by the participle morpheme, as represented in (25):

(24) Vaiko serga-m-a.
child-gen/m/sg be-sick-part-nom/nt/sg
'(Evidently) the child is sick.' (from Timberlake (1982))

(25) $[_{AgrP}\ [_{Agr'}$ -a $[_{TP}$ vaiko$_i$ $[_{T'}$ -m- $[_{VP}$ serga- t_i]]]]]

Still to be addressed is the way the participle morpheme is Case-marked in (25). As a nominal element, the participle affix must receive Case in order to comply with the Case Filter. Given that the verb *sergti* is unaccusative, the most appealing candidate as a source of Case for the participle morpheme in (25) is the Agr head. Let us then suppose that the participial Agr in Lithuanian is a Case-assigner. If this is true, we have to explain why the object NP in (23) cannot be Case-marked in the specifier of the participial Agr, making further movement to the specifier of matrix IP unnecessary. Also, if the participial Agr head were able to Case-mark the participle affix of (23), the main verb would then be free to assign accusative to its object. However, this is not possible, as shown in (26):[12]

(26) *Mano pirk-t-a krištolinį sietyną.
I-gen bought-part-nom/nt/sg chandelier-acc/m/sg
'The chandelier was bought by me.'

Here we have another instance of the configuration in (12). The participial Agr head is able to Case-mark the participle affix of (25), but not the participle affix or the object NP of (23). The crucial difference between these nominal elements is that only the participle affix of (23) is not θ-marked. We may thus say that the participial Agr in Lithuanian also assigns a [+PF,-LF] Case (see Nunes (1994)). Although the participle affix in (26) satisfies the Case Filter by being assigned a [+PF,-LF] Case by the participial Agr head (as does the affix of (25)), it violates the Visibility Condition: it is θ-marked, but does not receive a [+LF] Case.

3.3. Distribution of [+PF,-LF] Case-Assigners in Participle Constructions

The approach pursued in sections 3.1 and 3.2 provides a principled account for the differences among languages like English, Lithuanian and Italian with respect to the existence and distribution of a *have*-like auxiliary in participle constructions. Let us assume that the auxiliaries *be* and *have* are tense bearers inserted in the course of a derivation. Let us further assume that economy considerations, along the lines of the Principle of Full Interpretation, prevent insertion of superfluous features in a derivation. If so, all things being equal, *be* is

raising (see Nunes (1994), for details).

[12] On the reasons why (26) cannot have an "active" reading, with the subject raising from the specifier of VP to the specifier of TP and the verb assigning accusative to its object, see Nunes (1994).

preferred over *have*, since it is the least specified auxiliary. A particular grammar will resort to a *have*-like auxiliary only if there is no available PF Case-marker.

A [+PF,-LF] Case-assigning auxiliary is thus blocked in Lithuanian "impersonal passives" and required in English "perfective constructions", because participial Agr is a [+PF,-LF] Case-assigner in Lithuanian, but not in English (by hypothesis), as illustrated in (27) and (28):

(27) a. Vaiko serga-m-a.
child-gen/m/sg be-sick-part-nom/nt/sg
'(Evidently) the child is sick.'
b. $[_{AgrP}\ [_{Agr'}\ \text{-a}_{[+PF,-LF]}\ [_{TP}\ \text{vaiko}_i\ [_{T'}\ \text{-m-}\ [_{VP}\ \text{serga-}\ t_i\ ]]]]]$

(28) a. The child has arrived.
b. $[\text{the child}]_i\ \text{has}_{[+PF,-LF]}\ [_{AgrP}\ \text{Agr}_{[-PF,-LF]}\ [_{TP}\ \text{-en}\ [_{VP}\ \text{arrive-}\ t_i\ ]]]$

Even in languages that do have a [+PF,-LF] Case-assigning auxiliary, this type of auxiliary should be used, according to the economy strategy mentioned above, only as a last resort device. This is what presumably rules out a passive sentence like (29) below in English. In (29), *-en* is assigned a θ-role and therefore it must be visible at LF. It can only be assigned (a [+PF,+LF]) Case by the main verb, because *have* does not have a [+LF] Case to assign. Since in (29) *have* is not playing any role that could not be played by *be*, the least specified auxiliary, it is blocked from appearing, and *be* is inserted, as shown in (30):

(29) a. *The book had bought.
b. $*[\text{ the book }]_i\ \text{had}_{[+PF,-LF]}\ [_{AgrP}\ \text{Agr}_{[-PF,-LF]}\ [_{TP}\ \text{-en}_{\theta e}\ [_{VP}\ \text{bought}\ t_i\ ]]]$

(30) a. The book was bought.
b. $[\text{ the book }]_i\ \text{was}_{[-PF,-LF]}\ [_{AgrP}\ \text{Agr}_{[-PF,-LF]}\ [_{TP}\ \text{-en}_{\theta e}\ [_{VP}\ \text{bought}\ t_i\ ]]]$

Languages like Italian provide an interesting piece of evidence for the present analysis. Italian differs from Lithuanian in having a *have*-like auxiliary, but also differs from English in requiring a *be*-like instead of a *have*-like auxiliary in participle constructions with unaccusative verbs (see Burzio (1986)):

(31) Gianni è/*ha arrivato.
Gianni is/has arrived
'Gianni arrived.'

If the four-way distinction of types of Case proposed in (1) is on the right track, terms like *unaccusative* (with the meaning 'incapable of assigning Case') should also be relativized with respect to the Case Filter and the Visibility Condition. In principle, we could have [-PF,-LF], [+PF,-LF] or [-PF,+LF] "unaccusative" verbs. Disregarding the last option for the present purposes, let us suppose that there is a parameter that classifies "unaccusative" verbs of a language either as [-PF,-LF] or [+PF,-LF] Case-assigners. Let further assume that English chooses the former setting, whereas Italian chooses the latter.

Thus, since the [-PF,-LF] Case-assigner *arrive* in English cannot license the participle affix, a sentence like (28a) above requires the insertion of the [+PF,-LF] Case-assigning auxiliary *have* in order to comply with Case Filter, as represented in

(28b). Since the verb *arrivare* in Italian, on the other hand, is a [+PF,-LF] Case-assigner, it is able to license the participle affix in (31). Economy considerations then block the insertion of the [+PF,-LF] Case-assigning auxiliary *avere* and the least specified auxiliary *essere* (a [-PF,-LF] Case-assigner) is inserted, as shown in (32) (details omitted):

(32) Gianni$_i$ è$_{[-PF,-LF]}$ [$_{IP}$ -to- [$_{VP}$ arriva-$_{[+PF,-LF]}$ t$_i$]]

This proposal predicts that, since *be* and *essere* are [-PF,-LF] Case-assigning auxiliaries, their perfective forms should be associated with the [+PF,-LF] Case-assigning auxiliaries *have* and *avere*, respectively, since *be* and *essere* would not be able to license their own participle morphemes. Although this prediction is borne out it English, as shown in (33a) and represented in (33b) (details omitted), it is contradicted by Italian, as shown in (34) (from Burzio (1986)):

(33) a. Mary has been accused.
b. Mary$_i$ has$_{[+PF,-LF]}$ [$_{IP}$ -en [$_{VP}$ be-$_{[-PF,-LF]}$ [$_{IP}$ en$_{\theta e}$ [$_{VP}$ accuse- t$_i$]]]]

(34) Maria è stata accusata.
Maria is been accused
'Maria has been accused.'

However, rather than posing a problem, (34) actually provides an interesting piece of morphological evidence for the analysis pursued in this section. Postma (1993) observes that in languages like Italian, Occitan, Balearic Catalan, Sardinian, Dutch, German and Swiss French, which allow a sequence analogous to *be been*, as exemplified by the Italian sentence in (34), the participial form always involves a suppletive form of the verb. As we can see in (34), for instance, the root *ess-* of the verb corresponding to *be* in Italian is suppleted with the root *sta-* in the participial form. This type of allomorphy is straightforwardly accounted for by the present proposal. Recall that (34) would represent a counterexample for the analysis developed here only if the two instances of the verb *essere* had the same properties in terms of Case-marking. But given Postma's crosslinguistic generalization, we may take the suppletive form of (34) in Italian (and in the other languages) to be a [+PF,-LF] Case-assigning root, as represented in (35):

(35) Maria$_i$ è$_{[-PF,-LF]}$ [$_{IP}$ -to [$_{VP}$ sta-$_{[+PF,-LF]}$ [$_{IP}$ -ta$_{\theta e}$ [$_{VP}$ accusa- t$_i$]]]]

In (35), the upper participle affix complies with the Case Filter by being assigned a [+PF,-LF] Case by the root *sta-*. Given that insertion of the auxiliary *avere* to bear the finite inflection in (35) would bring with it a superfluous [+PF] Case feature, it is blocked by economy considerations, and the least specified auxiliary root is inserted.

The allomorphy exemplified by the Italian sentence in (34), therefore, provides evidence for the distinction of types of Case proposed in (1), in that it allows us to distinguish [-PF,-LF] from [+PF,-LF] Case-assigning roots. In the next section, we examine constructions in which [-PF,-LF] Case-marked nominal elements are morphologically distinct from their [+PF,-LF] counterparts.

3.4. Frisian Infinitives

Based on the fact that bare infinitives in Romance can only appear in Case-marked positions, Raposo (1986) proposes that the infinitival morpheme in Romance is a [-V,+N] element, which needs to be Case-marked in order to satisfy the Case Filter. Extending Raposo's proposal, Nunes (1992, 1993b) argues that English has a null infinitival morpheme with the features [-V,+N]. This nominal morpheme can satisfy the Case Filter by being assigned Case by a matrix verb or by the preposition *to*, which is taken to be a dummy Case-marker. In a sentence with a perception verb like (36a) below, for instance, the matrix verb assigns its Case to the infinitival TP and the Case percolates down to the infinitival head. The infinitival head can then "share" this Case with the NP in its specifier through spec-head agreement, as represented in (36b), where ø stands for the null infinitival morpheme (see Nunes (1992, 1993b) for detailed discussion):

(36) a. I saw Mary leave.
b. I saw $[_{TP}$ Mary$_i$ $[_{T'}$ ø $[_{VP}$ t$_i$ leave-]]]

As opposed to perception and causative verbs, modals and dummy *do* can license the infinitival head but not an NP in its specifier, as shown in (37) below. Based on contrasts such as the one between (36b) and (37b), Nunes (1992) claims that modals and dummy *do* are also [+PF,-LF] Case assigners.

(37) a. Mary$_i$ may $[_{TP}$ t$_i$ $[_{T'}$ ø $[_{VP}$ t$_i$ leave]]]
b. *There/it$_{expl}$ may $[_{TP}$ Mary$_i$ $[_{T'}$ ø $[_{VP}$ t leave]]]

Interesting morphological evidence for this view is provided by Frisian infinitives. According to Reuland (1981), Frisian has two infinitival forms, one ending in *schwa /n/*, which is used as complement of a main verb, and the other ending in *schwa*, which is used as complement of an auxiliary verb, as respectively exemplified in (38) below. Given the discussion above, Nunes (1992) suggests that if Frisian infinitives are to be analyzed along the lines proposed for English, *schwa* may be taken to be the morphological realization of a [+PF,-LF] Case and *schwa /n/*, the morphological realization of a [+LF,+PF] Case:

(38) a. dat er [Gurbe rinnen/*rinne] hearde
that he Gurbe walk heard
'that he heard Gurbe walk'
b. dat Gurbe rinne/*rinnen woe
that Gurbe walk wanted
'that Gurbe wanted to walk'

4. Conclusion

Case Theory has distinguished elements which assign or are assigned Case from elements which do not assign or are not assigned Case. In this paper, I have tried to show that this binary distinction ([±Case]) should in fact be relativized in terms of the Case Filter and the Visibility Condition, yielding a four-way distinction of types of Case: [+PF,+LF] Case, [-PF,-LF] Case, [-PF,+LF] Case and [+PF,-LF] Case. I argued that such a relativization is well supported empirically, lending support for the hypothesis that the Case Filter and the Visibility Condition are independent well-formedness conditions in the theory of grammar.

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INTENSIONAL VERBS, TENSE STRUCTURE AND PRONOMINAL REFERENCE

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1. Introduction*

Hornstein (1990:164) notes that interclausal coreference between a pronoun in an embedded clause and the subject of an embedding clause depends on the tense of the matrix and embedded clause. He points out that the sequence past-past licenses such a coreference relation, but the sequence past-present does not:[1,2]

(1) a. John$_i$ thought that he$_i$ was fat.
b. *John$_i$ thought that he$_i$ is fat.

Interestingly, interclausal coreference also depends on the type of

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[1] Hornstein (1990) uses (1) as a counterexample to Enç's (1987) claim that the contrast in (i) below (Enç's (47)) provides evidence for the her proposal that present tense must get out of the scope of past tense at LF. He argues that the contrast between (ia) and (ib) cannot be due to movement of the embedded clause at LF blocking binding, since the contrast in (1) shows that even coreference is not allowed in this configuration:

(i) a. Every child$_i$ said that he$_i$ was tough.
b. *Every child$_i$ said that he$_i$ is tough.

[2] At first sight, the disjoint reference effect in (1) seems similar to an opacity effect found in Romance subjunctive clauses, where the subject of an embedded subjunctive clause must be disjoint in reference with the matrix subject, as exemplified by the Portuguese construction in (ia) below (see Chomsky (1981:142, fn. 45), Raposo (1985), Kempchinsky (1986), among others). By contrast, such a disjointness effect does not arise if the pronoun of the embedded clause is in object position, as shown by the Portuguese sentence (ib):

(i) a. *Ana$_i$ quer que pro$_i$ visite Maria
Ana wants that (she) visit-subj Maria
'Ana wants to visit Maria.'
b. Ana$_i$ quer que Maria a$_i$ visite.
Ana wants that Maria her visit-subj
'Ana wants Maria to visit her.'

The coreference restriction shown in (1), however, differs from the Romance disjointness effect exemplified by (i) in that it affects both embedded subjects and objects, as illustrated in (ii):

(ii) a. *John$_i$ thought that he$_i$ is fat.
b. *John$_i$ thought that Mary likes him$_i$.

embedding verb. As can be seen by the contrast between (1) and (2), verbs of communication like *say*, as opposed to epistemic verbs like *think*, allow coreference regardless of the tense of the embedding and embedded clause:

(2) a. John$_i$ said that he$_i$ was fat.
b. John$_j$ said that he$_i$ is fat.

This paper provides an account for the contrast between (1) and (2). In addition, we offer an analysis which explains the interaction between *de se* and non-*de se* readings (see Castaneda (1966), Lewis (1979), Chierchia (1990), Higginbotham (1992)) with the pronominal coreference patterns of (1) and (2).

The paper is organized as follows: in section 2, we present Hornstein's (1990) analysis of the Sequence of Tense Rule. Section 3 recasts the generalization about the difference between *think*- and *say*-type verbs in terms of the Sequence of Tense Rule of Hornstein. In section 4, we note that the contrast between (1a) and (1b) holds only under the *de se* reading of the pronoun. In order to account for the difference between *think*- and *say*-type verbs and their interaction with *de se* and non-*de se* readings, we rely on Chierchia's (1992) Dynamic Binding Theory, which is briefly reviewed in section 5. We present our analysis in section 6, claiming that the different behavior of these verbs in allowing interclausal coreference follows from their distinct dynamic representation: THINK takes a propositional variable outside its scope, whereas SAY takes a propositional variable inside its scope. Finally, in section 7, we present evidence for this analysis from the interpretation of definite descriptions under *say*- and *think*-type verbs.

2. Hornstein's (1990) Sequence of Tense Rule

Hornstein (1990) develops a neo-Reichenbachian analysis of the tense structure of a clause, taking it to be the set of relations between temporal points: the relation between an S point (usually, the utterance time) and an R point (the reference time), and the relation between the R and an E point (the time of the event). In Hornstein's system, the structures of the basic tenses of English are as in (3) below, where the linear order of the S, R and E points reflects their temporal order. If two points are separated by a line, the leftmost point is interpreted as temporally preceding the other point. If two points are separated by a comma, they are interpreted as contemporaneous:

(3)	S,R,E	present
	E,R_S	past
	S_R,E	future
	E_S,R	present perfect
	E_R_S	past perfect
	S_E_R	future perfect

The event described by an embedded complement clause may be temporally evaluated with respect to the utterance time (henceforth, the independent reading), as in (4) below, where Peter's sickness takes place at the time of the utterance of the whole sentence. The event of the embedded clause may also be evaluated with respect to the event time of the subcategorizing verb (from now on, the Sequence of Tense, or SOT reading), as in the reading of (5) where the sickness takes place at the time of saying. The possibility of these two readings is formalized in

Hornstein's theory by means of an optional rule (the Sequence of Tense Rule, henceforth SOT Rule) that links the S point of the embedded tense structure to the E point of the embedding tense structure so that they are interpreted as contemporaneous. If the rule applies, the SOT reading is derived. If it does not, the unlinked S-point is identified as the utterance time by default, deriving the independent reading

(4) John said that Peter is sick.

(5) John said that Peter was sick.

The sentence in (5) is in fact temporally ambiguous (see Comrie (1985), among others). Its embedded clause may be temporally evaluated with respect to the matrix event (the SOT reading) or with respect to the utterance time (the independent reading). Hornstein argues that under the SOT reading, the embedded clause of (5) actually has present tense structure, the same tense structure as the embedded clause of (4). According to Hornstein, the past tense morphology in (5) is a reflex of the evaluation of the present tense embedded clause with respect to the past event in the matrix clause. Thus, the tense structure of (4) is represented as in (6), and the two readings of (5) as in (7); the SOT reading in (7a) and the independent reading in (7b):

(6) E,R_S

S,R,E

(7) a. E,R_S
|
S,R,E

b. E,R_S

E,R_S

3. Interclausal Coreference and the SOT Rule

The contrast between (1a) and (1b) can now be recast in terms of the SOT Rule: interclausal pronominal coreference with verbs like *think* is possible just in case the embedded clause undergoes SOT. This becomes clearer when we examine the contrast between (8a) and (8b) below, with the tense structures represented in (9a) and (9b), respectively. The use of the future tense avoids the ambiguity of the past-under-past sequence discussed above, for *would* and *will* are unambiguously associated with the SOT and independent readings, respectively.

(8) a. John$_i$ thought that he$_i$ would travel soon.
b. *John$_i$ thought that he$_i$ will travel soon.

(9) a. E,R_S
|
S_R,E

b. E,R_S

S_R,E

Verbs like *say*, however, allow coreference regardless of whether or not the embedded clause undergoes SOT:

(10) a. John$_i$ said that he$_i$ would travel soon.
b. John$_i$ said that he$_i$ will travel soon.

4. Extending and Qualifying the Data

At this point we want to qualify the contrast between (1) and (2) and between (8) and (10). Take (1b), for example, repeated below in (11), which was taken to be ruled out. To be precise, (11) is only unacceptable if John holds a self-belief, i.e., if the sentence is taken under a *de se* reading (see Castaneda (1966), Lewis (1979), Chierchia (1990), Higginbotham (1992)).[3] Suppose, for instance, that John has lost his memory and so does not recognize himself in a recent picture that he is looking at. If he thought that the person he saw in the picture was fat, we may felicitously utter (11) to describe this situation.

(11) John$_i$ thought that he$_i$ is fat.

In order to see this contrast more clearly, consider Higginbotham's (1992:86-87) case of "the unfortunate man":

> "a certain war hero (...) suffers from amnesia and (...) remembers nothing of his wartime experiences. Suppose that this unfortunate person (hereafter referred to as 'the unfortunate' or 'the unfortunate man') reads a book about the war he was in, and among other things in the book is a detailed account of his own exploits, which clearly exhibit extraordinary valor. As we learn much about other people from books, enough at any rate to say in common speech that we have beliefs *about* them, so he learns enough about himself to have beliefs about himself".

With this situation in mind, let us examine the sentences below:

(12) a. The unfortunate$_i$ thought that one day he$_i$ would become the president.
b. The unfortunate$_i$ thought that one day he$_i$ will become the president.

(13) a. The unfortunate$_i$ said that one day he$_i$ would become the president.
b. The unfortunate$_i$ said that one day he$_i$ will become the president.

All of the sentences above admit a non-*de se* reading in the context provided by Higginbotham. In addition, all but the sentence in (12b) admit a *de se* reading in a different context, where the unfortunate does hold a self-belief. The generalizations that arise from this picture are the following: (i) a non-*de se* reading is independent from the type of intensional clause-taking verb and from the temporal status of the embedded clause; (ii) with verbs like *think*, a *de se* reading for the pronoun is possible only if the embedded clause undergoes SOT, whereas

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[3] Although the contrast between the *de se* and the non-*de se* reading for (11), for instance, is clear, the sentence is still marginal under the non-*de se* reading. Since what is relevant for our purposes is the contrast between the *de se* and the non-*de se* readings, we will ignore the marginality of the non-*de se* reading here.

verbs like *say* allow a *de se* reading regardless of whether or not the clause containing the pronoun undergoes SOT.

In the next sections, we will briefly review Chierchia's (1992) Dynamic Binding Theory, extended in Nunes and Thompson (1993) to encompass interclausal relations, upon which we will build an account for the generalizations discussed above.

5. Chierchia's (1992) Dynamic Binding Theory

Based on the analyses of Stalnaker (1979) and Groenendijk and Stokhof (1991), Chierchia (1992) develops a dynamic version of Discourse Representation Theory called Dynamic Type Theory. According to this theory, the contribution of the semantics of a sentence involves placing constraints on stretches of discourse yet to come. Thus, the context-changing character of a sentence S is conceived of as [S' ∧ p], where S' is the truth-conditional content of S and *p* is a propositional variable that acts as a place holder for possible continuations of S.

The discourse representation of a sequence of sentences "S_1 S_2", for example, is as in (14) (Chierchia's (46)):

(14) $[S_1' \wedge p] + [S_2' \wedge p] = [S_1' \wedge p][S_2' \wedge p] = [S_1' \wedge S_2' \wedge p]$

The meaning of the discourse sequence "S_1 S_2" is computed by replacing the propositional variable of S_1 by the dynamic truth conditional representation of S_2.

With this apparatus, Chierchia accounts for the different binding behavior of universal and existential quantifiers in cross-sentential binding, as illustrated in (15) below, in terms of the position of the propositional variable with respect to the scope of the quantifier. Simply put, Chierchia proposes that the propositional variable is placed inside the scope of existential quantifiers and outside the scope of universal quantifiers, as represented in (16). The dynamic representations of (15a) and (15b), for instance, are as in (17) and (18), respectively. At the discourse level, the pronoun of (15a) can be bound by the quantifier, as shown in (17), since it ends up within the scope of the quantifier when the clause containing it replaces the propositional variable. However, when the quantifier is universal, as in (15b), the following clause will end up outside the scope of the quantifier when it replaces the propositional variable, as shown in (18):

(15) a. Someone$_i$ arrived. He$_i$ was/is handsome.
b. *Everyone$_i$ arrived. He$_i$ was/is handsome .

(16) a. $\exists[\ldots \wedge p]$
b. $\forall[\ldots] \wedge p$

(17) $\exists x[x \text{ is a person} \wedge x \text{ arrived} \wedge p] + [x \text{ was/is handsome} \wedge p]$
$= \exists x[x \text{ is a person} \wedge x \text{ arrived} \wedge x \text{ was/is handsome} \wedge p]$

(18) $\forall x[\ x \text{ is a person} \rightarrow x \text{ arrived}\ ] \wedge p + [\ x \text{ was/is handsome} \wedge p\ ]$

$= \forall x[\ x \text{ is a person} \rightarrow x \text{ arrived}\ ] \wedge x \text{ was/is handsome} \wedge p$

5.1. Interclausal Quantifier Binding

Nunes and Thompson (1993) note that quantifier-binding into an embedded clause is sometimes sensitive to the tense relation holding between the matrix and embedded clause. Both existential and universal quantifiers allow quantifier-binding into SOT embedded clauses. However, they differ with respect to binding into temporally independent embedded clauses, where they show the same pattern that they exhibit in cross-sentential binding (cf. (15)), as shown below:

(19) Someone$_i$ said he$_i$ would/will travel soon.
(20) Everyone$_i$ said he$_i$ would/*will travel soon.

While existential quantifiers allow binding into an embedded clause regardless of whether the embedded clause has undergone SOT, universal quantifiers require the embedded clause to undergo SOT in order for binding to take place.

Nunes and Thompson (1993) extend Chierchia's theory to account for the data in (19) and (20), by proposing the following: (i) a propositional variable is introduced by an unlinked S point (in Hornstein's (1990) terms, an S point which has not undergone SOT); (ii) the propositional variable is replaced by a *temporally independent structure*, including both independent sentences (as in Chierchia (1992)) and temporally independent clauses; and (iii) temporally dependent clauses are generated in the complement position of the subcategorizing verb, whereas temporally independent clauses are paratactic constructions in an appositive relation with the null object of the subcategorizing verb (see Torrego and Uriagereka (1993)).

According to this proposal, the embedded clauses of (19) and (20) with the *would*-sequence do not introduce a propositional variable because their S points are linked to the matrix E point. The SOT sequences of (19) and (20), therefore, have only the propositional variable associated with the matrix clause. Given that the embedded SOT-clauses of (19) and (20) are not temporally independent, they do not replace the propositional variable associated with the matrix clause, which is scope-related to the quantifier. Hence, the possibility of binding into an SOT clause regardless of the type of quantifier follows from the fact that the SOT-clause containing the pronoun always remains within the scope of quantifier in the embedding clause, as shown in (21a) and (21b), which represent the SOT-sequences of (19) and (20), respectively:

(21) a. $\exists x[\ x \text{ is a person} \wedge x \text{ said that } x \text{ would travel soon} \wedge p\ ]$
b. $\forall x[\ x \text{ is a person} \rightarrow x \text{ said that } x \text{ would travel soon}\ ] \wedge p$

By contrast, temporally independent clauses are associated with a propositional variable by virtue of having an unlinked S point. They will therefore replace the propositional variable of the matrix clause, and their own propositional variable will provide the position for the next sentence in the discourse to fill in for. Successful binding into a non-SOT embedded clause will then depend on the

dynamic binding properties of the quantifier. After the embedded clause fills in for the propositional variable associated with the matrix clause, the relevant pronoun will fall inside the scope of an existential quantifier, but outside the scope of a universal quantifier. The dynamic representations of the non-SOT counterparts of (19) and (20), therefore, are as in (22) and (23),where *e* is a constant that stands for the null object of *say*, and "≡" stands for an identificational predicate:[4]

(22) $\exists x[\ x \text{ is a person} \wedge x \text{ said } e \wedge [\ e \equiv \text{that } x \text{ will travel soon }] \wedge p\ ]$

$= \exists x[\ x \text{ is a person} \wedge x \text{ said } e \wedge e \equiv \text{that } x \text{ will travel soon }]$

(23) $\forall x[\ x \text{ is a person} \rightarrow x \text{ said } e \wedge [\ e \equiv \text{that } x \text{ will travel soon }]] \wedge p$

$= \forall x[\ x \text{ is a person} \rightarrow x \text{ said } e\ ] \wedge e \equiv \text{that } x \text{ will travel soon}$

6. Analysis

6.1. The Dynamic Representation of Intensional Verbs

The different behavior of existential and universal quantifiers concerning interclausal binding which was discussed in the previous section is similar to the difference between verbs like *say* and *think* with respect to allowing a *de se* reading for a pronoun in a complement clause, as seen in section 4. Existential quantifiers and verbs like *say* allow the relevant interclausal relation regardless of the temporal status of the embedded clause. On the other hand, universal quantifiers and verbs like *think* are more restrictive in that they only allow the relevant interclausal relation if the embedded clause undergoes SOT.

We propose then that verbs like *think* and *say* involve a dynamic representation parallel to universal and existential quantifiers, respectively, as represented in (24):

(24) a. THINK [...] ∧ p
b. SAY [... ∧ p]

The question that now arises is why these verbs should have a dynamic representation. Let us suppose that, as intensional operators, these verbs may optionally assign a value to pronouns within their scope. If a pronoun has its value assigned by an intensional verb, it will be interpreted *de se*, i.e., the subject of the verb holds a self-belief regarding the state of affairs ascribed to the pronoun. If a pronoun does not receive a value from an intensional verb, it receives a (speaker-controlled) non-*de se* interpretation by default. With this hypothesis in mind, let us examine the data presented in section 4.

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[4] The readings represented in (22) and (23) are parallel to "someone$_i$ said this: that he$_i$ will travel soon" and "*everyone$_i$ said this: that he$_i$ will travel soon", where the direct object position is filled with a demonstrative.

6.2. Interclausal Coreference Involving Temporally Independent Clauses

Let us reconsider the sentences in (12b) and (13b), repeated below in (25), which have a non-SOT clause embedded under the verbs *think* and *say*, respectively:

(25) a. The unfortunate$_i$ thought that one day he$_i$ will become the president.
b. The unfortunate$_i$ said that one day he$_i$ will become the president.

Combining the proposal by Nunes and Thompson (1993) discussed in section 5.1 with the hypothesis raised in the previous section, the dynamic representations of (25a) and (25b) are as in (26) and (27):

(26) the unfortunate$_i$ THOUGHT[e $\wedge$ [e $\equiv$ that one day he$_i$ will become the president $\wedge$ p]] $\wedge$ p

|_____↑

= the unfortunate$_i$ THOUGHT[e] $\wedge$ e $\equiv$ that one day he$_i$ will become the president $\wedge$ p

(27) the unfortunate$_i$ SAID[e $\wedge$ [e $\equiv$ that one day he$_i$ will become the president $\wedge$ p] $\wedge$ p]

|_____↑

= the unfortunate$_i$ SAID[e $\wedge$ e $\equiv$ that one day he$_i$ will become the president $\wedge$ p]

The embedded clauses of (25) are associated with a propositional variable, given that their S points are unlinked. After the embedded clause replaces the propositional variable associated with the matrix clause, the pronoun will fall outside the scope of THINK and inside the scope of SAY, as represented in (26) and (27). Thus, only SAY is able to assign a value to the pronoun, since only SAY has the pronoun within its scope. If it does, (25b) receives a *de se* reading; otherwise, a non-*de se* reading is assigned by default. (25a), on the other hand, can only have the non-*de se* reading, because the pronoun is outside the scope of THINK.

6.3. Interclausal Coreference under SOT

According to the approach outlined above, the dynamic representations of the sentences in (12a) and (13a), repeated below in (28), are as in (29) and (30), respectively:

(28) a. The unfortunate$_i$ thought that one day he$_i$ would become the president.
b. The unfortunate$_i$ said that one day he$_i$ would become the president.

(29) the unfortunate$_i$ THOUGHT[that one day he$_i$ would become the president] ∧ p

(30) the unfortunate$_i$ SAID[that one day he$_i$ would become the president ∧ p]

Since the S points of the embedded clauses of (28) are linked to the E point of the matrix clause, the embedded clauses are not associated with a propositional variable. Given that the embedded clauses do not then qualify to fill in for the propositional variable associated with the matrix clauses, at the discourse level they remain inside the scope of both THINK and SAY, as represented in (28) and (29). Both verbs can thus fix the value of the pronoun in their scope. If they do, the sentences of (28) receive a *de se* reading; if they do not, the default rule assigns them a non-*de se* interpretation.

7. Some Evidence from Definite Descriptions

Additional evidence for the proposal offered here of the distinction between *say*-like and *think*-like verbs with respect to interclausal coreference comes from data involving nominal descriptions controlled by the subject of these verbs or by the speaker. Let us make the plausible assumption that the assignment of a *de se* or a non-*de se* reading for a pronoun is an instance of the general process of subject-control *versus* speaker-control of definite descriptions. If so, we predict that the tense restrictions governing subject-control and speaker-control of definite descriptions embedded under verbs like *think* and *say* are the same as the restrictions that regulate *de se* and non-*de se* readings, respectively.

In order to test this prediction, imagine the following situation. Bill believes that two particular people are spies, one American and one Russian, and refers to them as "the American spy" and "the Russian spy". Furthermore, he believes that the person he thinks is the American spy will meet the person he thinks is the Russian spy. He tells this to the speaker, who knows that these two people are not spies; they are in fact her friends John and Mary. The question then is: Which tense sequences can the speaker use in order to felicitously refer to those two people from Bill's or her own perspective?

Let us start by considering the sentences in (31):

(31) a. Bill thought that the American spy would meet the Russian spy.
b. Bill thought that John would meet Mary.
c. Bill said that the American spy would meet the Russian spy.
d. Bill said that John would meet Mary.

In (31a) and (31c), Bill is responsible for the descriptive content of the embedded noun phrases *the American spy* and *the Russian spy*, whereas in (31b) and (31d), the speaker is responsible for the content of the descriptions *John* and *Mary*. All of these sentences are felicitous utterances in this situation, as predicted by our analysis. Since the embedded clauses of (31) are temporally dependent on the matrix clauses, they will be within the scope of both THINK and SAY, as represented in (32)-(35) below. If the intensional operator fixes the value of the embedded definite descriptions, a subject-controlled reading arises, as in (32) and (34); otherwise, the default value assignment gives rise to the subject-controlled reading, as in (33) and (35):

(32) Bill THOUGHT[that the American spy would meet the Russian spy] ∧ p

(33) Bill THOUGHT[that John would meet Mary] ∧ p

(34) Bill SAID[that the American spy would meet the Russian spy ∧ p]

(35) Bill SAID[that John would meet Mary ∧ p]

Consider the sentences in (36), by contrast:

(36) a. Bill thought that John would meet the Russian spy.
b. Bill thought that the American spy would meet Mary.
c. Bill said that John would meet the Russian spy.
d. Bill said that the American spy would meet Mary.

None of the sentences in (36) are felicitous in the context sketched above. Nothing that was said so far, however, prevents sentences involving SOT embedded clauses from having "mixed" readings, where some definite descriptions are assigned a value by the intensional operator, and others are assigned the default value. The sentences in (36) thus lead us to the conclusion that value assignment to the definite descriptions in a clause must be uniform, i.e., an intensional operator either fixes the value of all the definite descriptions in its scope, or it does not fix any. This entails that if the rule of default (subject-controlled) value assignment is triggered, it applies to all the definite descriptions of a clause. This conclusion is corroborated by non-SOT clauses under *say*-like verbs such as the ones in (37), which are also not felicitous in the relevant context:

(37) a. Bill said that John will meet the Russian spy.
b. Bill said that the American spy will meet Mary.

Let us now examine data involving temporally independent embedded clauses:

(38) a. Bill thought that the American spy will meet the Russian spy.
b. Bill thought that John will meet Mary.
c. Bill said that the American spy will meet the Russian spy.
d. Bill said that John will meet Mary.

Let us first consider the constructions involving the verb ***think***. Since the embedded clauses of (38a) and (38b) are temporally independent, they fill in for the propositional variable associated with the matrix clause, as represented in (39) and (40), respectively:

(39) Bill THOUGHT[e ∧ [e ≡ that the American spy will meet the Russian spy ∧ p]] ∧ p

|_____↑

= Bill THOUGHT[e] ∧ e ≡ the American spy will meet the Russian spy ∧ p

(40) Bill THOUGHT[e ∧ [e ≡ John will meet the Mary ∧ p]] ∧ p

|_____↑

= Bill THOUGHT[e] ∧ e ≡ John will meet Mary ∧ p

The analysis developed here, therefore, provides a straightforward explanation for why (38a) is not felicitous in the relevant context, as opposed to (38b). Given the context above, the descriptive content of the NPs *the American spy* and *the Russian spy* in (38a) should be controlled by the subject of the matrix clause and, therefore, should have their values fixed by THINK. However, after the embedded clause replaces the propositional variable at the discourse level, it falls outside the scope of THINK, as shown in (39), and the subject-controlled reading is not permitted. The definite descriptions of the embedded clause of (38b), on the hand, are compatible with the fact that, in accordance with the representation in (40), they only receive a subject-controlled reading.

Finally, let us examine the sentences in (38c) and (38d), which are both felicitous in the present context. According to our analysis, this is so because the embedded clause falls inside the scope of SAY after it replaces the propositional variable associated with the matrix clause, as represented in (41) and (42), respectively:

(41) Bill SAID[e ∧ [e ≡ that the American spy will meet the Russian spy ∧ p] ∧ p]

|_____↑

= Bill SAID[e ∧ e ≡ that the American spy will meet the Russian spy ∧ p]

(42) Bill SAID[e ∧ [e ≡ that John will meet Mary ∧ p] ∧ p]

|_____↑

= Bill SAID[e ∧ e ≡ that John will meet Mary ∧ p]

Since the embedded clauses of (41) and (42) are within the scope of SAY, the definite descriptions they contain may either have their value fixed by SAY or by the default rule. This thus enables (38c) to be a felicitous utterance under a subject-controlled interpretation for the definite descriptions in the embedded clause, and (39d) to be a felicitous utterance under the speaker-controlled interpretation.

8. Conclusion

Think-type and *say*-type verbs behave differently in that *think*-type verbs seem to require temporal dependency in order for coreference to hold between their matrix subject and a pronoun in their complement clause, while *say*-type verbs do not. We have observed that the coreference relation is actually ruled out for *think*-type verbs only on the *de se* reading of the pronoun.

Utilizing Chierchia's (1990) Dynamic Binding Theory as extended in Nunes and Thompson (1993), we proposed that epistemic verbs like *think* and communication verbs like *say* differ in their dynamic representation: THINK takes a propositional variable outside its scope and SAY takes a propositional variable inside its scope. Assuming that a *de se* reading for the pronoun can only arise if an intensional operator fixes the value of the pronoun in its scope, a pronoun in a clause embedded under *think*-type verbs receives a *de se* reading just in case the embedded clause undergoes SOT. If, on the other hand, the embedded clause is temporally independent, it replaces the propositional variable associated with the matrix clause, falling outside the scope of THINK and blocking a *de se* reading. The pronoun then can only receive a non-*de se* (speaker-controlled) reading by default.

Say-type verbs, on the other hand, admit both a *de se* and a non-*de se* reading for an embedded pronoun regardless of the temporal status of the embedded clause. Whether or not the embedded clause replaces the propositional variable associated with the matrix clause, it always ends up within the scope of SAY, allowing the value of the pronoun to be determined by SAY or by the default rule.

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Covert Incorporation and Excorporation in Periphrastic Causatives in Korean

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1. Introduction

Korean has periphrastic or analytical causative constructions, which employ the causative verb *ha* 'do':

(1) Toli-nun Mina-eykey/lul/ka ttena-key ha-ess -ta
-Top -Dat /Acc/Nom leave-Comp do-Perf-Decl
'Toli made Mina leave.'

It is to be noted in (1) that, unlike in the counterpart constructions in English and Italian, in Korean the causee NP can be Nominative or Accusative or Dative.

PC constructions like (1) apparently have a bi-clausal structure in that the complementizer *-key* separates the matrix verb and the embedded clause. H-S. Choe (1988), however, claims that the constructions exhibit mono-clausal properties as well as bi-clausal properties. Her claim is based on the behavior of negative polarity items (NPIs) in Korean, which require a clausemate negation. Let us look at (2):

(2) Toli-nun Mina-eykey/lul/ka amwuto manna-key haci anihaessta
-Top -Dat /Acc/Nom anybody meet-Comp do not did
'Toli did not make Mina meet anybody.'

In (2), the NPI *amwuto* is in the embedded object position, and the negative morpheme is in the matrix clause. Although the clausemate requirement for the NPI seems to be violated, example (2) is grammatical. To account for the grammaticality of (2), Choe proposes that at covert syntax (Logical Form), the matrix and the embedded clause in PC constructions are restructured into one clause. This restructuring operation, Choe claims, makes it possible for the NPI in (2) to obey the clausemate requirement.

Along the lines of Choe's research, this paper further investigates into mono- and bi-clausal properties of PC constructions. In specific, we first demonstrate that PC constructions are like 'verb-of-opinion' constructions containing verbs like *mit-* 'believe' in that both constructions are bi-clausal at overt syntax (S-structure). Then, we provide more evidence for mono-clausal properties of the constructions other than the NPI related fact above. Raising a problem with Choe's restructuring analysis, we account for mono-clausal properties of PC constructions by proposing that at covert syntax, the embedded verb incorporates to the matrix causative verb and then the matrix causative verb excorporates out of the complex verb formed.

2. Bi-clausal properties of PCs in Korean

In this section, we demonstrate that the complement clause of the matrix causative verb *ha-* in PC constructions has a 'full-clause' structure, like that of 'verb-of-opinion' constructions. That is, the complement clause of PC constructions contains not only a complementizer but also inflections or a sentential negation, which occur independently of the matrix clause.

First, the matrix and the embedded verb each can have the inflectional honorific marker *si-*, which appears when a subject NP refers to a socially respected person, as in (3):

(3) sensayngnim-un apenim-kkey/lul/i o -si -key
teacher -Top father-Dat /Acc/Nom come-Hor-Comp
ha-si -ess -ta
do-Hor-Perf-Decl
'Teacher made his father come.'

Example (3) shows that the embedded verb can be inflected independently of the matrix verb.

Second, if Nominative Case in Korean is assigned by finite tense features as argued by M-K. Park (to appear), the possibility of the causee NP being Nominative Case marked indicates that besides the matrix clause, the complement clause of PC constructions can contain a present tense marker, which is nonovert in Korean. 1)

Third, the matrix and the embedded clause each can have a sentential negation, as in (4):

(4) Mina-nun [Toli-eykey/lul/ka ttena-ci ani-ha-key]
-Top -Dat /Acc/Nom leave-Nm not do-Comp
haci ani-haessta
do not-did
'Mina did not make Toli not leave.'

We have so far seen that the complement clause of PC constructions has a 'full-clause' structure in that it can contain the complementizer, inflections, and the sentential negation. However, these properties do not necessarily infer that PC constructions are bi-clausal at overt syntax. This is because we may conjecture that the embedded verbal complex and the matrix verb in PC constructions, which are adjacent at overt syntax, have already formed a complex verb after the first's raising to the latter, and this overt raising might account for mono-clausal properties of the constructions. The following examples, however, clearly indicate that this conjecture is not right:

(5)a. Toli-ka *Mina-eykey/lul/ka chayk-ul ilk-key* haessta
-Nom -Dat/Acc/Nom book-Acc read-Comp did
'Toli made Mina read a book.'

b. *Mina-eykey/lul/ka chayk-ul ilk-key* Toli-ka [ ] haessta

In (5b), the causee NP and the embedded verb complex are scrambled, leaving the matrix causative verb behind. The separability of the embedded verbal complex

from the matrix causative verb shows that they do not form a complex verb at overt syntax.

3. Mono-clausal properties of PCs in Korean

We now turn to consider the mono-clausal properties of PCs, which are attested in the behavior of negative polarity items, additional wh-effects, and scope interaction. First, H-S. Choe (1988) observes that NPIs should be licensed by a clausemate negation. Let us look at the examples in (6):

(6)a. Toli-nun Yenghi-eykey [Mina-ka amwuto mannaci
-Top -Dat -Nom anyone meet
ani-hass-tako] malhayssta
not-did-Comp said
'Toli said to Yenghi that Mina didn't meet anybody.'

b. * Toli-nun Yenghi-eykey [Mina-ka amwuto mannass-tako]
-Top -Dat -Nom anyone met-Comp
malhaci ani-haessta
say not-did
'Toli didn't say to Yenghi that Mina met anybody.'

In (6a), the NPI *amwuto* co-occurs with the negative element *ani* in the same clause, satisfying the clausemate requirement. In (6b), however, the NPI is in the embedded clause and the negation is in the matrix clause. (6b) is ungrammatical, due to a violation of the clausemate requirement for NPIs.

As mentioned before, however, PC constructions show different behavior from 'verb-of-opinion' constructions with respect to NPIs. Consider the examples in (7), which are taken from H-S. Choe (ibid.):

(7)a. Toli-nun Mina-eykey/lul/ka amwuto mannaci
-Top Mina-Dat /Acc/Nom anybody meet
ani-ha-key haessta
not-do-Comp did
'Toli made Mina not meet anybody.'

b. Toli-nun Mina-eykey/lul/ka amwuto manna-key haci anihaessta
-Top Mina-Dat /Acc/Nom anybody meet-Comp do not did
'Toli did not make Mina meet anybody.'

In (7a), the NPI *amwuto* is a clausemate of the negation. In (7b), the clausemate requirement for NPIs appears not to be obeyed, because the NPI and the negation are in different clauses. The sentence is, however, judged grammatical. This shows that the matrix and the embedded clause in PC constructions behave like one clause.

Besides the behavior of NPIs, additional wh-effects further evidence the mono clausal property of PC constructions. Let us look at the example in (8):

(8) *ne-nun [[way Toli-ka pro muwes-ul sacwun] salam]-ul chac-ni
you-Top why Toli-Nom what-Acc bought person-Acc look for-Q
'Q you are looking for [a person [for whom Toli bought what why]]

In (8), the adjunct wh-phrase *way* 'why' is inside of the relative clause. The covert movement of this adjunct wh-phrase to the Q morpheme in the matrix clause will induce an ECP violation, due to the islandhood of the intervening relative clause. Saito (1992) and Sohn (1993), however, note that in Japanese and Korean, if an additional wh-phrase occurs in higher position than the adjunct wh-phrase, a sentence improves substantially as in (9). Example (9) is resulted in after the object wh-phrase within the relative clause in (8) is scrambled within the clause:

(9)? ne-nun [mwues-ul$_i$ way Toli-ka pro t_i sacwun]
you-Top what-Acc why Toli-Nom bought
salam-ul chac-ni
person-Acc look for-Q
'Q [you are looking for [a person [for whom Toli bought
what why]]]

To account for such grammatical improvement, Saito proposes that the adjunct wh-phrase can move out of the island after adjoining to the higher argument wh-phrase.

Unlike clause-internally scrambled wh-phrases as in (9), however, Saito (1992) also observes that long-distance scrambled wh-phrases cannot save the adjunct wh-phrase in island contexts. Look at (10):

(10)a. * ne-nun [[way pro Toli-eykey [Mina-ka mwues-ul
-Top why -Dat -Nom what-Acc
sass -tako] malhan] salam]-ul chac-ni
bought-Comp said person-Acc look for-Q
'Q [you are looking for [a person [who said to Toli
[Mina bought what] why]]]

b. ?* ne-nun [[mwues-ul$_i$ way pro Toli-eykey [Mina-ka t_i
sasstako] malhan] salam]-ul chac-ni

In (10a), the adjunct wh-phrase within the relative clause cannot be saved by the lower wh-phrase. What is interesting in view of the facts we have just seen in (9) is that scrambling of the object wh-phrase before the adjunct wh-phrase in (10b) does not affect grammaticality. Hence there is a contrast between (9) and (10b). The difference between them is that in (9), the preposed wh-phrase has undergone clause-internal scrambling, whereas the wh-phrase in (10b) has undergone clause-external or long distance scrambling. On the basis of this contrast, Saito (1992) argues that clause-internally scrambled wh-phrases which are in A-position can save the adjunct wh-phrase, whereas long distance scrambled wh-phrases which are in A'-position cannot save it. This amounts to saying that the adjunct wh-phrase can only adjoin to the wh-phrase in A-position but not to the one in A'-position, due to the requirement of antecedent government. The trace of the adjunct wh-phrase can be antecedent governed from an A-adjoined position but not from an A'-adjoined position. 2)

Given these considerations, let us return to PC constructions in (11).

(11)a.* ne-nun [way pro Mina-eykey/lul/ka mwues-ul sa-key
-Top why -Dat/Acc/Nom what-Acc buy-Comp
han] salam-ul] chac-ni
did person-Acc look for-Q
'Q [you are looking for [a person [who made [Mina buy
what] why]]]

b. ne-nun [[mwues-ul$_i$ way pro [Mina-eykey/lul/ka t_i sa-key
han] salam-ul] chac-ni

In (11a), the adjunct wh-phrase within the relative clause cannot be saved by the lower wh-phrase. When, however, this embedded wh-phrase is scrambled before the adjunct wh-phrase, the former can save the latter as in (11b). The grammaticality of (11b) indicates that the seemingly long distance scrambled wh-phrase in PC constructions behaves like a clause-internally scrambled one. This constitutes evidence for the mono-clausal property of PC constructions.

Scope interaction facts further show that PC constructions have mono-clausal property. Let us look at (12):

(12)a. nwukwunka-ka motun sensayngnim-ul mannassta (some > every)
someone-Nom every teacher-Acc met
'Someone met every teacher.'

b. motun sensayngnim-ul$_i$ [nwukwunka-ka t_i manna-ess-ta]
(some >,< every)

Sentence (12a) is not ambiguous, with the QP in subject position taking scope over the QP in object position. However, if the object QP is scrambled over the subject QP, the sentence (12b) gets ambiguous readings. This shows that scrambling induces scope ambiguity (Hoji (1985) among others).

Unlike clause-internal scrambling, however, as observed by Oka (1989) for Japanese, long distance scrambling of an embedded QP over a matrix QP does not cause scope ambiguity in Korean:

(13)a. nwukwunka-ka Yenghi-eykey [Mina-ka motun sensayngnim-ul
someone-Nom -Dat -Nom every teacher-Acc
mannassta-ko] malhayssta (some > every)
met -Comp said
'Someone said to Yenghi that Mina met every teacher.'

b. motun sensayngnim-ul$_i$ [nwukwunka-ka Yenghi-eykey [Mina-ka
t_i mannassta-ko] malhayssta] (some > every)

In (13a), the matrix subject QP takes scope over the embedded object QP. Though the embedded object QP is scrambled over the matrix subject QP, scope relation does not change in (13b), unlike in (12b). On the basis of the contrast between (12b) and (13b), Murasuki and Saito (1992) argue that only clause-internal scrambling which can be an instance of A-movement induces scope ambiguity whereas long distance scrambling which is always A'-movement does not.

Turning to PC constructions, we note that, unlike in 'verb-of-opinion' constructions, long-distance scrambling of an embedded object QP over a matrix subject QP in the constructions does change scope relation, as shown in (14):

(14)a. nwukwunka-ka [Mina-eykey/lul/ka motun sensayngnim-ul
someone-Nom -Dat/ACC/Nom every teacher-Acc
manna-key] haessta (some > every)
meet-Comp did
'Someone made Mina meet every teacher.'

b. motun sensayngnim$_i$-ul [nwukwunka-ka [Mina-eykey/lul/ka t_i
manna-key] haessta] (some >,< every)

In (14a), the existential quantifier takes scope over the universal quantifier. In (14b), however, seemingly long-distance scrambling of the embedded universal quantifier over the matrix existential quantifier induces scope ambiguity. This scope interaction attests that long distance scrambling of an embedded object before a matrix subject in PC constructions behaves like clause-internal scrambling. This provides further evidence for the mono-clausal property of PC constructions.

4. Choe's (1988) restructuring analysis and its problems

As mentioned before, to account for the mono-clausal property of PC constructions with resect to NPIs, H-S. Choe (1988) proposes that the categorial defectiveness of the causative verb *ha* triggers restructuring at Logical Form (LF) in these constructions. Choe's proposal works well to account for the grammaticality of (7b), which is repeated below:

(7)b. Toli-nun Mina-eykey/lul/ka amwuto manna-key haci anihaessta
-Top Mina-Dat /Ac /Nom anybody meet-Comp do not did
'Toli did not make Mina meet anybody.'

After restructuring at LF, the NPI in embedded object position in (7b) is rendered a clausemate with negation in the matrix clause, obeying the clausemate requirement.

Choe's restructuring analysis, however, has the following problems. First, her analysis wrongly rules in examples like (15). In (15), the NPI appears in the matrix subject position, while negation appears in the complement clause:

(15) *amwuto Mina-eykey/lul/ka ttenaci mos-ha-key haessta
anybody -Dat/Acc/Nom leave not-do-Comp did
'*Anybody made Mina not come.'

Choe's restructuring analysis predicts that example (15) is grammatical. But that is not the case.

The same situation as in (15) arises when a Dative causee NPI appears with negation in the complement clause, as in (16): 3)

(16) ?* Mina-nun amwu-eykey-to ttenaci mos-ha-key haessta
-Top anybody-Dat-to leave not-do-Comp did
'* Mina made anybody not leave.'

Examples (15) and (16) clearly show that in PC constructions, NPIs in the matrix clause are not licensed by negation in the complement clause, though NPIs in the complement clause are licensed by negation in the matrix clause as in (7b).

The second problem with Choe's analysis is that she did not address the question of why the restructuring operation in PC constructions should occur at covert syntax. We will show why this kind of covert operation is forced to apply in PC constructions.

5. Analysis

Departing from Choe's restructuring analysis, we propose a covert verb raising analysis to account for the mono clausal properties of PC constructions. In specific, we maintain that the embedded verb in PC constructions raises up to the matrix causative verb at covert syntax and this covert verb raising is responsible for the mono-clausal properties we have seen above.

First, we claim that verb raising does not occur at overt syntax in Korean. This claim is based on the fact that Korean has 'ha'-support, which is a counterpart of 'do'-support in English. Consider (17):

(17) Toli-ka o-ci ani-ha-ess-ta
-Nom come-Nm not-do-Perf-Decl
'Toli did not come.'

In (17), the verb does not raise at overt syntax. Adopting Chomsky's (1992) 'minimalist' program and his checking mechanism, we claim that this is due to the weak inflectional features of Korean. Thus, in the following affirmative sentence (18) corresponding to (17), the verb is assumed to exit the lexicon as a fully inflected form and stay in situ in its position at overt syntax, the amalgamated form being subject to the morphological checking procedure at covert syntax:

(18) Toli-ka o-ess-ta
-Nom come-Perf-Decl
'Toli came.'

One question that could be raised is whether the main verb in (17) raises to the inflectional elements at covert syntax. We claim that it does. Then, what forces its raising to the higher inflectional elements? Within the 'minimalist' framework we assume, all movement is driven by morphological requirements only. However, it is hard to find any morphological reason for the lower main verb in (17) to raise to the higher inflected auxiliary verb at covert syntax. This is because we cannot say that the lower verb is generated with inflectional features; if it were, in overt syntax it should surface with such features, which is not the case. Here, we claim that the higher auxiliary verb *ha-* is an covert LF affix.4) Thus, the LF suffix *ha-* should be morphologically supported, which we assume is made possible by raising of the lower main verb to the auxiliary verb *ha-*. Without raising, the affix would remain as a 'stranded' one, which is an illegitimate LF object. Following Lasnik (1993), we regard raising of the lower main verb to the higher auxiliary verb *ha-* as an instance of 'enlightened self interest'.

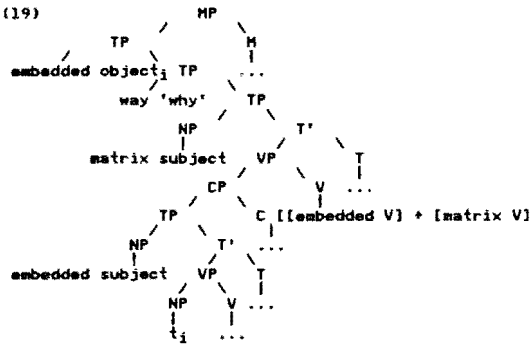
Turning to PC constructions, we maintain that the embedded verb complex to be checked for its inflectional features at covert syntax through verb raising is subject to further raising to the matrix causative verb. This incorporation of the embedded verb to the matrix verb is forced to be postponed until LF, because, otherwise, it would violate the Principle of Procrastination (Chomsky (1992)), which dictates that covert movement is favored over overt movement. Due to

weak inflectional features in Korean, the embedded verb complex in PC constructions is raised to have its inflectional features checked at covert syntax, and, accordingly, its raising to the matrix causative verb occurs at that level of representation. 5)

Logically, a question arises what initiates raising of the embedded verb complex to the higher matrix verb. To address this question, we suggest that the matrix causative verb *ha-* in Korean is a syntactic affix (cf. Zubizarreta (1985); Choe (1988); Guasti (1992)). Thus, it should be supported by some syntactic element, which we assume is made possible by adjunction of the embedded verb complex to it.

Given these considerations, covert verb raising is considered to allow PC constructions to have a mono-clausal structure at covert syntax, though they have a bi-clausal structure at overt syntax. To make the picture clear, let us reconsider mono-clausal properties of PC constructions. First, we saw above that, with additional wh-effects and scope interaction, seemingly long distance scrambling of the embedded object in PC constructions to the matrix clause behaves like clause-internal scrambling. That is, it can be A-movement, while long distance scrambling of the embedded object in 'verb-of-opinion' constructions is always A'-movement. Suppose, as shown in (19), that the embedded object is scrambled to the sentence initial position, and that the embedded verb complex incorporates to the matrix causative verb:

(19)



In (19), raising of the embedded verb complex neutralizes the barrierhood of the intervening categories, especially the embedded IP/CP pair which have been claimed to block A-movement. Thus, the embedded object scrambled to the sentence-initial position of the matrix clause in PC constructions can be in A-position, after raising of the embedded verb complex to the matrix causative verb at covert syntax. This is why seemingly long-distance scrambling of the embedded object in PC constructions behaves like clause-internal scrambling.

Now, we turn to the behavior of NPIs in PC constructions we have noted in section 3 and 4. Before we go directly into it, we first sketch up a licensing condition for NPIs in general in Korean. It is well known that an NPI should co-occur with a negative element within a same clause, as in (20) and (21):

(20) Toli-nun amwukesto mek-*(ci ani-ha)-essta
-Top anything eat- not-do -Perf-Decl
'Toli did not eat anything.'

(21) * Toli-nun Yenghi-eykey [Mina-ka amwuto manass-tako]
-Top -Dat -Nom anyone met -Comp
malhaci anhassta
say not did
'Toli did not say to Yenghi that Mina met anybody.'

The clausemate requirement for NPIs is obeyed in (20), while it is not in (21). To account for the contrast of the type shown between (20) and (21), we propose the following condition: 6), 7)

(22) In Korean, an NPI must be head-governed at covert syntax by a negative element.

Under the condition (22), let us look at (23), which is the LF representation of (20):

(23) [$_{MP}$ [$_{TP}$ Toli-ka [$_{NegP}$ [$_{VP}$ amwukesto t'] t''] t'''] t'''']
[mekci anihaessta]]

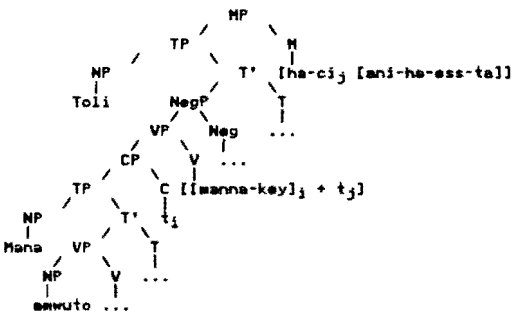
In (23), we assume that the verb moves up to the head of Mood Phrase (MP) to have its inflectional features checked. This covert verb raising makes it possible for the negative marker to head-govern the NPI within the object position. In (21), however, the negative marker in the matrix clause cannot head govern the NPI in the embedded object position. This is so regardless of verb movement within the matrix clause and the complement clause because such verb movement cannot give a proper context for head government.

Now, let us turn to the behavior of NPIs in PC constructions. We reintroduce (7b) below.

(7)b. Toli-nun Mina-eykey/lul/ka amwuto manna-key haci anihaessta
-Top Mina-Dat /Acc/Nom anyone meet-Comp do not did
'Toli did not make Mina meet anybody.'

In (7b), the NPI is in the embedded object position, and the negation is in the matrix clause. The LF representation of (7b) will be like (24):

(24)



In (24), the embedded verb complex raises to the matrix causative verb, enabling the negative morpheme in the matrix clause to head govern the NPI in the em-

bedded clause. Specifically, head government of the NPI in the embedded object position by the matrix negative element is made possible by Baker's (1988) Government Transparency Corollary, which states that a category which has an item incorporated into it governs everything which the incorporated item governed in its original structural position.

Let us move on to a more intriguing case (15):

(15) *amwuto Mina-eyeky/lul/ka o-ci mos ha-key haessta
anybody -Dat /Acc/Nom come not do-Comp did
'*Anybody made Mina not come.'

One might ascribe the ungrammaticality of (15) to the possibility that the embedded Neg morpheme blocks raising of the embedded verb complex to the matrix causative verb at covert syntax. There is, however, evidence barring us from taking this idea. Look at the examples in (25), which display additional wh-effects even when the embedded clause in PC constructions contains negation:

(25)a.* ne-nun [[way pro Mina-eykey/lul/ka mwues-ul sa-ci
-Top why -Dat /Acc/Nom what-Acc buy
mos-ha-key han] salam-ul] chac-ni
not-do-Comp did person-Acc look for
'Q you are looking for [a person [who made [Mina not buy
what] why]]'

b. ? ne-nun [[nwues-ul$_i$ way pro [Mina-eykey/lul/ka t$_i$
sa-ci mos-ha-key] han] salam-ul] chac-ni

In (25a), the lower embedded wh-phrase cannot save the higher adjunct wh-phrase in the PC construction within the relative clause. When, however, we scramble the embedded wh-phrase over the adjunct wh-phrase as in (25b), the sentence improves considerably. The improvement shown in (25b) strongly indicates that verb movement, which is responsible for mono-clausal properties in PC constructions, occurs even when there is a neg morpheme in the complement clause.

An alternative way of explaining the ungrammaticality of (15) is to suppose that when the embedded verb complex raises to the matrix causative verb, it does not carry negation with it. However, based on the facts related to Verb Reduplication constructions, we argue that a verb raises along with negation. The Verb Reduplication constructions like (26) shows that a verb can be reduplicated after the topic marker.

(26) Toli-ka ka-ki-nun ka-ass-ta
-Nom leave-Nm-Top leave-Perf-Decl
'It is true that Toli left, but ...'

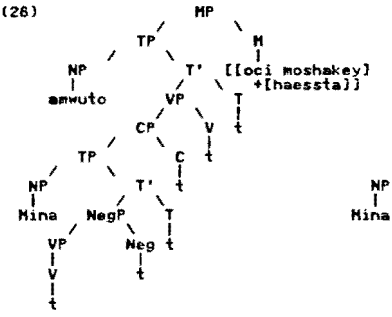
To account for verb reduplication in Korean, Kang (1988) proposes, following Koopman (1984), that the lower verb replaces the higher verb at LF, because the higher verb is semantically vacuous. One interesting fact as regards Verb Reduplication constructions is that a verb can be reduplicated along with the Neg morpheme, as shown in (27):

(27) (?) Toli-ka ka-ci anh-ki-nun ka-ci anh-haassta
-Nom leave-Nm not-do-Nm-Top leave-Nm not-did
'It is true that Toli did't leave, but ...'

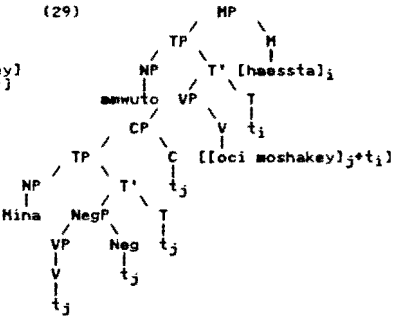
If the covert verb replacement is correct, examples like (27) constitutes evidence that at LF, a verb raises along with the Neg morpheme.

If the neg morpheme moves together with a verb, why can't the neg morpheme license the NPI in the matrix subject position in (15)? After the embedded verb complex along with negation in (15) raised up to the head of matrix MP, we would have the structure (28).

(28)



(29)



Then, the licensing configuration obtains for the NPI in the matrix subject position. At this point, we have to ask whether (28) is really the structure we get at covert syntax. Rejecting the structure (28), we claim that the embedded verb complex only moves up to the matrix verb adjoined position. More specifically, the embedded verb complex incorporates up to the matrix verb position and then the matrix verb moves out of the complex verb via excorporation (cf. Guasti (1992)). Thus, we have the LF configuration for (15) as in (29) instead of (28). In this configuration, the NPI in the matrix clause has no way to be licensed. The motivation for this approach can be sought for in the economy considerations. Intuitively, incorporation of the embedded verb is motivated to morphologically support the defective matrix causative verb 'ha'. By incorporating to the matrix causative verb, the embedded verb completes its purpose. Then, there is no need for the embedded verb complex to undergo further movement. However, the matrix verb still has some features to be checked off. Thus excorporation of the matrix verb out of the complex verb formed also seems to be motivated theoretically.

To sum up, in this paper we tried to resolve the tension in the PC constructions caused by the dual nature of them by proposing that there is a covert incorporation of the embedded verb up to the matrix verb followed by excorporation of the matrix verb out of the amalgamated unit. The proposed analysis seems to well account for the characteristics of the PC constructions noted in the literature.

Notes

1. The perfective aspect marker *ess* cannot appear in the complement clause of PC constructions:

(i) Toli-ka Mina-ka/lul/eykey ttena-(*ess) -key ha -ess -ta
-Nom -Nom/Acc/Dat leave-(*Perf)-Comp make-Perf-Decl
'Toli made Mina (*have) leave.'

This is due to the fact that *ess* in the complement clause of (i) renders the embedded situation time prior to the matrix situation time. The causative verb, however, requires that the embedded situation time coincide with the matrix situation time.

2. Look at Sohn (1993), where a principled account is given to this generalization.

3. If a sentence contains a Nominative or Accusative NPI instead of a Dative causee NPI as in (16), it becomes grammatical, as follows:

(i). Mina-nun amwuto ttenaci mos-ha-key haessta
-Top anybody leave not-do-Comp did
'Mina made anybody not leave.'

This contrast between (i) and (16) indicates that Nominative or Accusative causee NPs are generated within the complement clause, whereas Dative causee NPs are generated as part of the matrix clause. Thus, the clausemate requirement for NPIs can be satisfied only in (i), but not in (16).

4. This is along the lines of Chomsky's (1992) proposal that *there* in English is an LF affix. See Chomsky (1992) and Lasnik (1993) for details.

5. Our hypothesis predicts that if verb raises at overt syntax, the embedded verb complex in causative constructions raises to the matrix causative verb at overt syntax. In fact, Guasti (1992) maintains that in Italian, where verb raises at overt syntax, the embedded verb complex in causative constructions raises to the matrix causative verb *fare* at overt syntax. On the other hand, Stowell (1991) argues that in English, where verb raises at covert syntax, the embedded verb complex raises at covert syntax to the matrix causative verb *make*. Korean is assimilated to English.

6. Another way of capturing the relation between an NPI and a negative element may be to assume that an NPI is licensed by a Spec-head relation with a negative element at covert syntax (cf. Ohasi (1992)). There is, however, evidence which militates against this assumption. First, Rizzi (1991) shows that a reason adverbial is generated higher than the projection of NegP, on the basis of so-called 'weak island effects.' Look at the following contrast (B-Q. Chun (1984); Y-J. Jung (1991)):

(i) Mina-ka way/*ettehkey chwum-ul chwuci anhass-ni
-Nom why/*how dance-Acc dance not-Q
'Why/How did Mina not dance?'

As in (i), unlike the reason adverbial *way* 'way,' the manner wh-adverbial *ettehkey* 'how' cannot appear in a negative sentence. On the basis of this contrast, Jung (1991) (a la Rizzi (1991)) maintains that the negative marker blocks LF movement of the manner wh-adverbial which is generated below it. The negative marker, however, does not prevent LF movement of the reason wh-adverbial simply because the latter is generated above the projection of the negative marker (NegP).

Given these considerations, let us look at the following case:

(ii) na-nun amwulen iywu-lo-to Yenghi-lul kkwucici anh -kess-ta
I-Top any reason-for -Acc scold not do-will-Decl
'I will not scold Yenghi for any reason.'

In (ii), the reason adverbial which is an NPI co-occurs with the negative marker. Under the 'Spec-head licensing' account of NPIs, the sentence (i) is predicted to be ungrammatical because the reason adverbial NPI should undergo lowering to Spec of NegP below it, which is prohibited. Under our account, however, such a problem does not arise because covert verb movement raises and head-governs it

7. We assume the following definition of head government, which is modified from Rizzi (1990: 6):

(i) X c-commands Y.
(X = A, N, P, V, Agr, T, Neg)
(ii) No barriers intervenes.
(iii) Relativized Minimality is respected.

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THE DEVELOPMENT OF A RECURSIVE-CP STRUCTURE IN WELSH

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0. INTRODUCTION*

Modern Welsh like most Celtic languages has VSO ordering in declarative sentences (1). However, when Welsh speakers wish to emphasize or focus a constituent XP, they move it to Spec-CP (2); this creates the "focus sentence."[1]

(1) **Dysgais i Ysbaeneg yn Seville.**
taught-1s I Spanish in Seville
I taught Spanish in Seville.

(2) a. $[_{CP}$ **Fi**$_i$ **a** $[_{AgrSP/IP}$ **ddysgodd** t_i **Ysbaeneg**]]
I rel-C SM-taught-3s Spanish
It was me who taught Spanish.

b. **Yn Seville y dysgais i Ysbaeneg**
In Seville rel-C taught-1s I Spanish
It was in Seville that I taught Spanish.

Further, Welsh speakers can embed these focus sentences under a special complementizer *mai* or *taw* (3)[2] That is, *mai* and *taw* are special complementizers which subcategorize for focus-sentence CP's and head recursive CP's.

(3) **Credodd Dafydd** $[_{CP}$ **mai** $[_{CP}$ **fi a ddysgodd Ysbaeneg**]]
believed David that I C SM-taught-3s Spanish
David believed that it was me who taught Spanish

There is still much debate to whether a CP may be directly embedded under another CP, and if so, under what conditions (Watanabe, 1993; Iatridou and Kroch, 1992). One of the goals of this paper is to show that the Welsh *mai/taw* construction is a case of CP recursion. The other goal is to trace the the development of this construction to an embedded cleft-copula construction in Middle Welsh. At this stage, these cleft structures were embeddable as normal

[1]In the glosses, "SM" stands for the soft mutation one of a series of processes where the initial consonant of a Welsh word changes according to its morpho-syntactic environment. The soft mutation turns voiceless stops to voiced stops; voiced stops to fricatives except /g/ which deletes; /m/ to /v/ and voiceless liquids to voiced liquids.

[2]The use of *mai* and *taw* depends on the dialect with *mai* being used in the North, and *taw* in the South.

*I would like to thank Sam Epstein, Erich Groat, Mark Hale, John Koch and especially Höski Thráinsson for their insightful comments, and, as ever, all mistakes are my own.

AgrSP (or IP) fragments, but when the copula-cleft construction was lost, the embedded form of 'to be' was reinterpreted as a special complementizer calling for a focus order sentence (CP).

The first section of the paper explains the historical background of Welsh and some of its grammatical features. The next section is a detailed analysis of focus sentences and embedded focus sentences. It shows that the fronted XP is in Spec-CP so that embedding these sentences constitutes CP recursion. This is followed by the section tracing the development of the modern focus sentence and CP recursion from the Middle Welsh copula cleft construction.

1. WELSH LANGUAGE FACTS

1.1 Dialects of Welsh

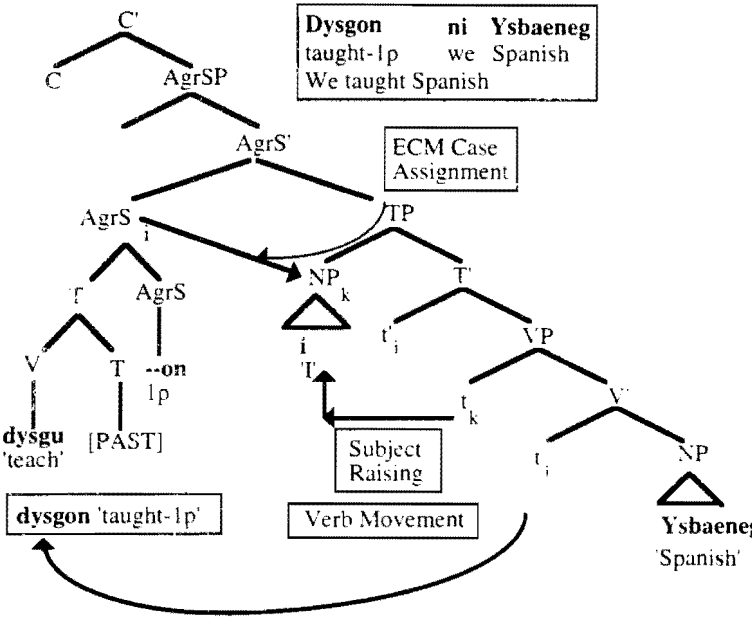
Currently, Modern Welsh exists in two registers: Literary Welsh, based on the language in the 1588 Welsh Bible, and Colloquial Welsh, the spontaneous spoken form. Colloquial Welsh can be further subdivided into a Southern dialect and a Northern dialect which are mutually intelligible. The Welsh used in this paper is mostly Southern Colloquial, though the spelling errs towards Literary Welsh.[3] The stage before Literary Welsh is Middle Welsh (12th-14th) centuries.

1.2 The VSO Sentence

Both Modern Welsh and Early Welsh are basically VSO while Middle Welsh is V2 with VSO ordering in embedded clauses (Evans, 1964; Pyatt, 1993). I assume that VSO ordering is due to incomplete subject raising (Pyatt, in press, 1993) (4). The analysis assumes VP-internal subjects (Koopman and Sportiche, 1988) and the split of IP into the functional categories Tense Phrase (TP) and Subject Agreement Phrase (AgrSP) (Pollock, 1989; Chomsky, 1993).

[3]The grammar I base Colloquial Welsh on is *Gramadeg Cymraeg Cyfoes* (Uned Iaith Genedlaethol, 1976).

(4) Derivation of Welsh VSO Order



As the tree in (4) shows, the verb raises to AgrSP through TP in order to receive its verbal morphology. The subject, for whatever reason, raises only to Spec-TP instead of Spec-AgrSP and is left to the right of the verb at S-Structure. Pyatt (in press), following Sproat (1985), assumes that the reason for incomplete subject raising is that Welsh must assign nominative case to the right at case assignment. Pyatt argues that the appropriate mechanism is Exceptional Case Marking from AgrS to the subject in Spec-TP (4).[4]

1.3 Affirmative Particles

Both Colloquial and Literary Welsh use various particles to mark neutral, affirmative declarative sentences in certain contexts. One particle is *yr* and it is used only in front of forms of *bod* 'to be'. In Literary Welsh, *yr* is shortened to *y* before consonants, otherwise it surfaces as *yr* (5).

[4]Any 'X' (for X^0) represents the zero-level category of an XP

(5) a. **Yr ydych (chi) yn Seville**
aff are-2p you-pl in Seville
All of you are in Seville.

b. **Y mae Branwen yn Seville**
aff is Branwen in Seville
Branwen is in Seville

In Colloquial Welsh, *yr* contracts *r* before vowels, otherwise it deletes (6).

(6) a. **Rydych chi yn Seville**
aff-are-2p you-pl in Seville
All of you are in Seville.

b. **Mae Branwen yn Seville**
aff-is Branwen in Seville
Branwen is in Seville

In Colloquial Welsh only, verbs other than *bod* 'be' may be proceeded by *fe* in Southern Welsh or *mi* in Northern Welsh (7). Both particles trigger a change called the soft mutation (SM) which causes the initial consonant of the following word to change in the following pattern: voiceless stops and voiceless liquids to voiced stops and liquids, voiced stops to fricatives and /m/ to /v/. Hence after *fe* or *mi*, for the verb *dysgais* 'taught-1s' the first consonant /d/ changes to the fricative /ð/, spelled as '*dd*'.

(7) **Fe/mi ddysgais i Ysbaeneg** (South/North)
aff (S/N) SM-taught-1s I Spanish
I taught Spanish

Both *y(r)* and *fe/mi* are in complementary distribution with complementizers like *os* 'if' (8), so I am therefore assuming that they are in C position. This fits the semantics of a complementizer which is partially to signal the nature of the clause - affirmative in this case.

(8) a. **Os ydych/*rydych chi yma.**
If are-2p/*aff-are-2p you-pl here
If all of you are here.

b. **Os /*os fe/*os mi dysgaist ti Ysbaeneg yn wir**
If *if aff taught-2s you Spanish truly
If you truly taught Spanish.

2. THE FOCUS ORDER IN MODERN WELSH

2.1 The Problem of the Landing Site

Many languages signal the focusing of a constituent XP by fronting it, but the landing site for fronted XP is not always clear. The prime candidates are usually Spec-CP (Chomsky, 1986), Spec-IP (or Spec-AgrSP) (Baltin, 1982) or the specifier of a special Focus Phrase (Hale, 1993). If both Welsh Wh-words and focused XP's move to Spec-CP, then the syntactic and morphological signals for Wh-Movement should also be present for Focus Movement. This section will show that there are several morphological and syntactic characteristics shared by Welsh Wh-Movement and Focus Movement.

2.2 Fronting of Subject

In Wh-questions and focus sentences, when the subject is moved to Spec-CP, the verb obligatorily takes default third-person singular agreement.[5] Furthermore, the particle *a*, which triggers soft mutation, may come between the fronted constituent and the inflected verb (9)[6]. Since *a* and the the Wh-word *pwy* 'who' co-occur (9a), *a* cannot be a Wh-operator in Spec-CP.

(9) a. **Pwy$_i$ a ddysgodd** t_i **Ysbaeneg?**
Who rel SM-taught-3s Spanish
Who taught Spanish?

b. **Fi$_i$ a ddysgodd/*ddysgais** t_i **Ysbaeneg.**
I rel SM-taught-3s/*1s Spanish
It was me who taught Spanish

c. **y menywod$_i$ [Ø$_i$ a ddysgodd/*ddysgan** t_i **Ysbaeneg]**
the women OP C SM-taught-3s/*3p Spanish
the women who taught Spanish

---

[5]There is not enough space here to explain why there is obligatorily default agreement when the subject NP moves to Spec-CP, but the answer may be that the subject skips Spec-AgrSP and so cannot trigger agreement. Agreement in Welsh VSO sentences themselves is not triggered by Spec-head agreement, but by the adjunction of a pronominal N to the AgrS-T-V complex (Pyatt, in press).

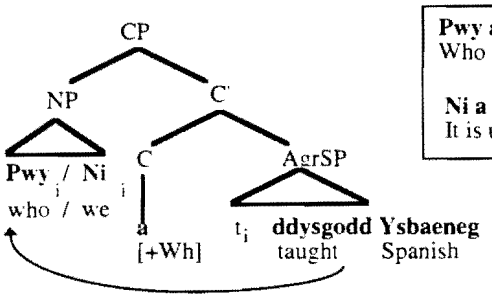
[6]The appearance of the particle *a* itself is optional in Colloquial Welsh, but soft mutation on the verb is always present which means that there is at least a null particle.

This particle is in complementary distribution with the affirmative C's *y(r)* and *fe/mi* (10), so I analyze *a* as a [+Wh] C.[7]

(10) **Fi$_i$** **a/ *fe a / *mi a / *a fe / *a mi** **ddysgodd** **Ysbaeneg.**
I rel / *aff rel / *rel aff SM-taught-3s Spanish
It was me who taught Spanish

In addition, *a* 'rel-C' is in the expected position that an overt [+Wh] complementizer would be in a Wh-question, between the Wh-word in Spec-CP and the rest of the sentence within AgrSP. Since *a* is a complementizer and the fronted constituent of a focus sentence is precedes it, the focused XP must also be in Spec-CP. The structure for Wh-questions and focus sentences is shown below (11).

(11) Welsh Movement to Spec-CP



Pwy a ddysgodd Ysbaeneg?
Who taught Spanish?

Ni a ddysgodd Ysbaeneg
It is us who taught Spanish.

2.2 Fronting of Other Constituents

In Wh-questions and focus sentences, the movement of XP's from the same position will trigger similar morphology. If the direct object of a VSO sentence is moved, then the relative complementizer *a* intervenes between the fronted direct object and the verb (12).

(12) a. **Beth$_i$ a ddysgaist** **ti** t_i **yn Seville?**
What rel-C SM-taught-2s you in Seville
What did you teach in Seville?

b. **Ysbaeneg$_i$ a ddysgais** **i** t_i **yn Seville.**
Spanish rel-C SM-teach-1s I in Seville
Spanish is what I taught in Seville.

[7]Hendrick (1988) also identifies *a* as a complementizer, and not a Wh-operator.

With any other constituent, the relative complementizer is *y(r)* (contracted to *y* or *r-*) instead of *a* is used, but the *y(r)* does not trigger the soft mutation (13-14). This *y(r)* is also used as an affirmative particle before 'to be' (Section 1.2). If the fronted XP started out from the direct object position of a periphrastic sentence, then *yr* is also used (13). The difference between the two complementizers must correlate with distance between Spec-CP and the XP in Wh-Movement and not any kind of A/A' asymmetry.[8]

(13) a. **Beth rwyt ti'n ei ddysgu** (vs. 12)
What aff-are you'Pr Acc-3sm SM-teach
What are you teaching in Seville?

b. **Ysbaeneg rydw i'n ei ddysgu**
Spanish aff-am I'Pr Acc-3sm SM-teach
Spanish is what I am teaching in Seville.

(14) a. **Ble y dysgaist ti Ysbaeneg?**
Where aff taught-2s you Spanish
Where did you teach Spanish?

b. **Yn Seville y dysgais i Ysbaeneg.**
In Seville aff taught-1s I Spanish
Seville was where I taught Spanish.

Again the parallelisms between the focus sentence and Wh-question show that fronted XP's must both move to Spec-CP.

2.3 Embedded Focus Order

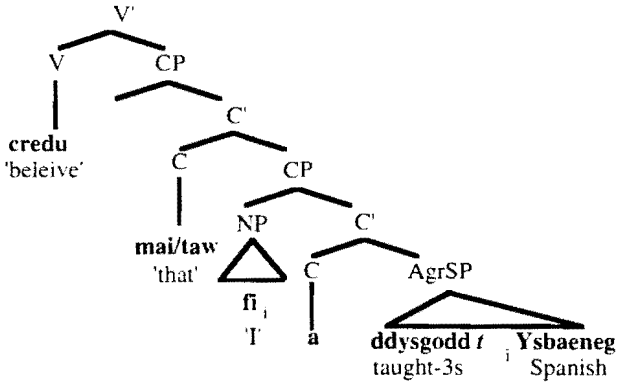
As was shown earlier, a focus sentence may be embedded under *mai* (North Welsh) (15) or *taw* (South Welsh) (16). The proposed structure is shown in (17).

(15) **Credodd Ifan [$_{CP}$ mai [$_{CP}$ fi a ddysgodd Ysbaeneg]]**
believed-3s Evan that-C I rel-C SM-taught-3s Spanish
Evan believed that it was me who taught Spanish

(16) **... [taw [yn Seville y dysgaist ti Ysbaneg]]**
that in Seville aff taught-2s you Spanish
... that Seville was where you taught Spanish.

[8]In the gloss, 'Pr' stands for a predicator particle *yn* which reduces to *'n* after vowels.

(17) Structure of CP Recursion



The material embedded under *mai/taw* is unquestionably a focus sentence and hence a CP. In sentences (15-16), the relative complementizer, either *a* or *y(r)* appears between the focused XP and the verb in the embedded clause. The choice of *a* or *y(r)* is made with the same criteria as in a main clause focus sentence (Section 2.1-2.2). In (15), the verb of the embedded sentence, *dysgodd* 'learned-3s' shows the characteristic lack of agreement with the focused topic *fi* 'I'. These embedded focus sentence in no way differ from a main clause focus sentence. Thus the embedded material under *mai* or *taw* must be a CP. *Mai* and *taw* also appear in the position a C should appear after a verb subcategorizing for a CP like *credu* 'believe'. Therefore, this structure (17) must be CP recursion. The next section shows how this developed from a Middle Welsh copula cleft construction.

3. DEVELOPMENT OF CP RECURSION

3.0 Middle Welsh Copula Cleft Construction

In older stages of Welsh, a constituent was focused by means of a cleft copula construction headed by a third-person singular form of 'to be'. (Evans, 1964, §146). At the earliest stages, the copula was inflected so that it matched the tense of the embedded clause (18) (Evans, 1964, §146). Later, the copula was frozen as the present tense *ys* 'is' (19)[9].

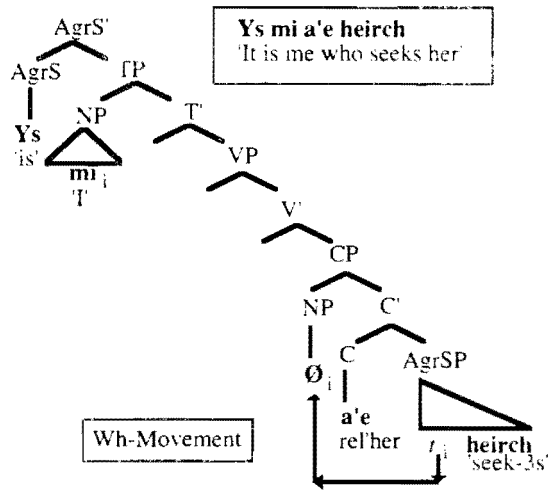
[9]In the Middle Welsh Glosses, 'PPD' stands for *Pwyll Pendeuic Dyuet* and 'KO' stands for *Kulhwch ac Olwen*, and they are both Middle Welsh prose tales.

(18) **Oed Maelgun a uelun in imuan**
be-Impf-3s Maelgwn rel see-Impf-1s Pr fight
It was Maelgwn that I was seeing fighting. (Evans, 1964, § 146)

(19) **Ys glut a beth yd ymdidanyssam ni**
is continual prt SM-thing aff conversed-1p we
Continually have we conversed together (PPD l. 156)

The copula-cleft construction differs from the modern focus sentence in that the cleft sentence would have two clauses (20). The XP in focus would have been in the higher clause with the copula, and the Spec-CP of the lower clause would have been filled with a Null Wh-operator.[10]

(20) **Middle Welsh Copula Cleft**



Finally the copula was lost altogether. At first the deletion was optional; for instance in the tale *Kulhwch ac Olwen*, the Middle Welsh equivalent of the sentence "It is I who seeks her" occurs first without the copula *ys* in line 563; then the identical sentence occurs later but with the copula *ys* 'is' in line 566 (21).

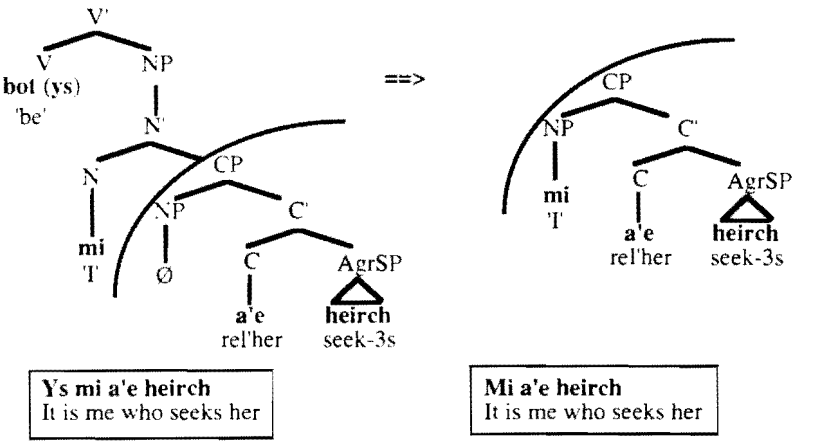
[10]For whatever reason, Celtic languages do not use overt relative pronouns in relative clauses.

(21) a. **Mi** **a'e** **heirch**
I prt'her seek-3s
It is me who seeks her (KO l. 563)

b. **Ys** **mi** **a'e** **heirch**
Is I rel'her seek-3s
It is me who seeks her (KO l. 566)

When the deletion of the copula was optional, the copula-free versions had a Null copula, but once the deletion became obligatory, the focused XP was reinterpreted by a later generation as being in Spec-CP of the lower clause (22). The focus sentence then changed from being biclausal to monoclausal.

(22) Loss of Copula and Reinterpretation - Main Clause



Ys mi a'e heirch
It is me who seeks her

Mi a'e heirch
It is me who seeks her

3.1 Embedded Copula-Cleft

The Middle Welsh copula cleft construction could be embedded, but when that occurred, the form of copula was either *mae* 'is' (23 a-b) or *taw* 'is' (23c), but not *ys* (Evans, 1964, § 148).[11,12]

[11]It is not clear whether *mae* (> *mai*) and *taw* had the same dialectal distribution that they do in Modern Welsh.

[12]Middle Welsh declarative sentence order was V2 (Pyatt, 1993).

(23) a. **a** **thi** **a** **wybydy** **y** **mae** **gwac uocsach**
and you prt SM-know-2s aff is empty boast
y w **y** **teu** **di**
is the yours you
And you will know that an empty boast is yours.

b. **Mi** **a** **gredwn** .... **y** **taw** **ti** **oed** **Bown**
I prt believe-Impf-1s aff is you was-3s Bown
I believed that you were Bown.

The Middle Welsh *mae* 'is' corresponds both to Modern Welsh *mai* 'that' and *mae* 'is'. *Taw* is cognate with Irish *tá* 'is' but is only used in embedded cleft sentences in Middle Welsh. In (23 b,c), the embedded copulas are preceded by the affirmative complementizer *y*, which was allowable because *mae* and *taw* were forms of 'to be.'[13] Once the main-clause cleft sentence had been reanalyzed as a sentence with Movement to Spec-CP (21), the embedded cleft also changed. *Mae* (> *mai*) and *taw* were reanalyzed as complementizers which headed a single focus sentence CP (23). And so CP recursion was born.

(23) [$_V$ **credu** [$_{CP}$ [$_{C'}$ **y** [$_{AgrSP}$ [$_{AgrS'}$ **taw** **ti** [$_{CP}$ O [$_{AgrSP}$ **oed** **Bown**]]]]]]
believe aff is you was-3s Bown
believing that it was you who was Bown.

==> [$_V$ **credu** [$_{CP}$ [$_{C'}$ **taw** [$_{CP}$ **ti** [$_{AgrSP}$ **oedd** **Bown**]]]]]
believe that you was-3s Bown
believing that it was you who was Bown.

The result is that Modern Welsh *mai/taw* can never occur with *y* because all three are C's.(24).

(24) **Credu** **[taw/mai/*y taw/ *y mai [** **ti** **oedd Bown]]**
believe that / *aff-that you was-3s Bown
believe that you were Bown

If *mai* and *taw* were still true verbs, then there should be no reason why they cannot be preceded by *y* as in Middle Welsh. Further, in Northern Colloquial Welsh there is a pronunciation difference between *mae* /mai/ 'is' and *mai* /may/ 'that' both from Middle Welsh *mae* /mai/ showing that the *mai* before focus sentences is seen as a different word than *mae* 'is'.[14] The chart below gives the

[13]Even though this *y* is a complementizer, this is not CP recursion because the *y* is subcategorizing for an AgrSP headed by a copula, not another CP.

parallel evolution of the copula cleft to focus order in both main and embedded clauses (25). The numbers in parentheses refer to previous sentences in this paper.

(25) **Stages in Development of Focus Order and CP Recursion**

Time	Main Clause	Embedded
A. Early Mid. Welsh	Cleft:: Tensed Copula (17)	No Data
B. Middle Welsh	Cleft: Copula = *ys* 'is' (20)	Cleft: copula=*mae/taw* 'is' (22)
C. Later Mid. Welsh	Optional Copula Deletion (20b)	Same as time B
D. Early Mod. Welsh	Cleft reanalyzed as Focus Order (21)	*Mae/Taw* reanalyzed as C (23)

Discovering the origin of a CP recursive structure is not just a historical problem. For instance, this change can give clues as to the distribution of CP recursion in some languages: wherever embedded cleft sentences can occur. This is a different prediction than one made by Iatridou and Kroch (1993) which claims that CP recursion can only occur if the top CP is governed by a verb. Unfortunately , a further discussion of the theoretical implications of this change will have to wait for another occasion.

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[14]In other dialects of Welsh both *mai* and *mae* are pronounced as /may/.

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The Template for Intensive Reduplication in Afar*

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1. Prosodic Morphology One of the main tenets of the theory of Prosodic Morphology (McCarthy and Prince 1986,1990) is that templates can only be expressed in prosodic terms (i.e. mora, syllable, foot, and prosodic word). This entails that in languages where both Cvv and CvC syllables are heavy, there is no principled way to distinguish them in terms of templates. However, in a recent paper, Shaw (1992) introduces evidence from reduplicative processes in a number of unrelated languages which seems to support the claim that we need to distinguish between the two types of heavy syllables. She proposes the traditional notion of a Nucleus as a formal unit of syllable structure in order to formalize such a distinction. She claims, for example, that any analysis of the intensive reduplication process in Afar, a Lowland East Cushitic language, requires reference to the distinction between a monomoraic vs. a bimoraic Nucleus in templatic representation. In this paper, I propose an alternative analysis of the reduplication process in Afar which does not require the addition of a prosodic unit such as the nucleus in order to account for the intensive template. Specifically, I argue that the intensive reduplication template is a bisyllabic foot (i.e. a minimal word template).

2. The Nucleus Hypothesis One problem which is inherent to the theory of Prosodic Morphology is that of Quantitative Transfer, which refers to the 'transfer' of length/weight from a base to a prosodic template. In languages where length is distinctive, long vowels are always transferred as such in the process of mapping from a base to a morphological template, when the template is large enough to accomodate it. The progressive aspect of the Mokilese verb (Harrison and Albert 1976) illustrates how a bimoraic template can be satisfied according to the availability of segments in the copied melody.

1	a.	pɔpok	pɔd-pɔdok	'plant'
	b.	pɑ	pɑɑ-pɑ	'weave'
	c.	sɔɔrɔk	sɔɔ-sɔɔrɔk	'tear'

As the data show, the bimoraic template can be realized as a CvC syllable in (1a) and as Cvv in (1c) where the length of the vowel is transferred intact from the base to the morphological template. In order to handle length transfers, prosodic theory has to assume that when two moras are lexically linked to a vowel in the base, they are copied along with the vowel. Note that in such cases of transfer, moras play a role similar to that of skeletal positions in representing duration rather than weight.

Although Shaw (1992) assumes that 'moraic copying' is the correct analysis in most cases, she argues that in some languages the quantitative transfer of length is not respected in reduplication processes. The intensive reduplication process in Afar is a case in point. Reduplication in this language seems to make a distinction between Cvv and CvC heavy syllables in that the length of a long vowel is never transferred to the template. The second templatic mora is always filled by a consonant, either from the copied melody or, if none is available, by what seems to be spreading of the initial consonant of the stem. Crucially, the second moraic position of the template cannot be filled by a vowel, even when the copied melody of the base provides a bimoraic vowel for mapping.

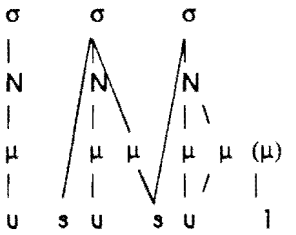
2	*Root*	*Intensive*	
	a. usuul	u-**sus**-suul	'laugh'
	b. idigil	idi-**gig**-gil	'break'
	c. camm	**cam**-camm	'throw'

In order to account for the data, Shaw claims that the syllable final consonant of the reduplicative affix is derived through leftward gemination. She argues that this gemination process is evidence that syllable final consonants are moraic in the language. Furthermore, as the data show (2a), superheavy syllables are found word-finally, and final consonants are never copied in the reduplication process (2b). These facts, she argues, can be explained if word-final consonants are extraprosodic in Afar.[1]

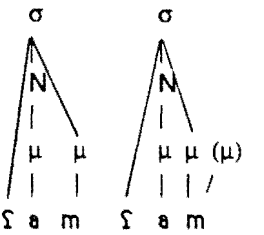
The main thrust of Shaw's arguments is that such apparent violation of the quantitative transfer hypothesis by the Afar intensive reduplication argues for the Nucleus as a formal unit of the prosodic hierarchy. She proposes that the intensive reduplication takes as its circumscribed base the rightmost syllable and that its

prosodic template is a bimoraic syllable with a non-branching nucleus affixed to the base: a CvC bimoraic template.

3a. B/ϕ [template [B: ϕ]]



b. B/ϕ [template [B: ϕ]]



However, this proposal faces some theoretical problems. Shaw's solution to the Afar data requires a far less restrictive prosodic theory than the standard model. The main problem is that the theory is too powerful, predicting the presence of unattested stress systems (e.g. in which only CvC syllables would attract stress, but where long vowels are present) and reduplicative systems (e.g. a heavy syllable template restricted to bimoraic nuclei in a language with both heavy Cvv and CvC syllables). Shaw argues that her proposal to enrich moraic theory by adding the syllable nucleus to the prosodic hierarchy is necessary in order to support the Quantitative Transfer Hypothesis. Shaw's proposal, however, does not simply enrich moraic theory with an additional prosodic constituent. In my view, these templates which include a nucleus can be argued to be a notational variant of Sloan's (1991) skeletal templates.

Sloan (1991) demonstrates (within the framework of skeletal theory) that Southern Sierra Miwok differentiates between three types of iambic morphological templates: CvCvC, CvCvv and CvCvX (where X may represent the second position of a long vowel or a coda consonant, depending on the melody of the base).

4.	**CvCvC**	**CvCvv**	**CvCvX**
polat	polat	polaa	polat
kool	kolu?	koluu	koluu

The vowel [u] and the glottal stop are epenthetic segments used to fill the unmapped templatic positions since spreading of melodic

elements is not allowed in SSM to satisfy a template.

Crucially Sloan argues that, in order to account for the three SSM templates, templatic representations such as those in (5) are not sufficient and that some syllable structure is needed, as shown in (6).

5a. **CvCvv**

b. **CvCvC** [2]

6a. **CvCvv**

b. **CvCvC**

c. **CvCvX**

Since the last skeletal position is unattached in (6c), it can be syllabified either as the rightmost position of the nucleus or as that of a branching rime, depending on the melody of the base. These templates can be translated into Shaw's system, as in (7).

7a.

b.

c.

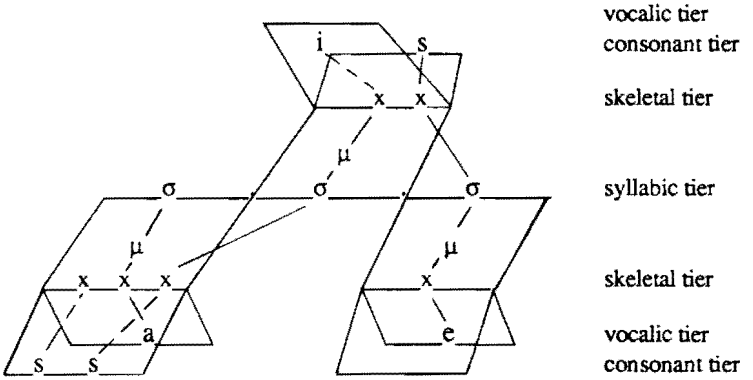
One could then view Shaw's proposal as simply adding the generative power of pure skeletal theory to that of moraic theory.

3. A Reanalysis of Afar Reduplication In this paper, I propose a reanalysis of reduplication in Afar within a moraic theory which only recognizes the standard prosodic units: prosodic word, foot, syllable, and mora. The goal of this paper is to demonstrate that the solution to the apparent lack of quantitative transfer in Afar does not require the more powerful theory proposed by Shaw. I argue that there is no need for an additional prosodic unit such as the nucleus if we posit a minimal word template for the intensive

affix and if we assume a binarity requirement on minimal words (Itô and Mester 1992). Central to my analysis are two proposals concerning the grammar of Afar: (i) that syncope, a deletion process which targets root vowels, also incorporates prefixed reduplicative templates into its domain of application; and (ii) that vowels and consonants are segregated on different planes, thus allowing the copied melody of a monosyllabic root to fully satisfy a bisyllabic template.

Before discussing these two issues, however, it will be necessary to clarify a few assumptions concerning the configuration of planar geometry. Crucially, I assume that the linear order of morphemic planes is defined on the syllabic tier. The linear order of segregated consonant and vowel planes, on the other hand, I assume to be defined on the skeletal tier.[3] This is illustrated in (8).

8.



3.1. Syncope Consider now the issue of how to define the domain of syncope. The data in Bliese (1981) show that, in triconsonantal nominals and suffixing verb roots, an unstressed short vowel in an open syllable is consistently deleted when preceded by another short-vowelled open syllable. Syncope only applies to root vowels and is blocked when identical consonants would become adjacent after vowel deletion (11).

9 a.	xamíla	xaml-í	'swampgrass (acc./nom.gen.)'
b.	ʕagára	ʕagr-í	'scabies'

c.	darágu	darg-í	'watered milk'
10 a.	digib-t-é	digb-é	'she/I married'
b.	wager-né	wagr-é	'we/he reconcilied'
c.	meʃer-tá	meʃr-á	'you/he kills a calf'

11 a.	midadí	'fruit'	c.	xarar-é	'he burned'
b.	sababá	'reason'	d.	gonan-á	'he searched for'

All of the cases where syncope is blocked deal with tauto-morphemic identical consonants (since the domain of syncope in most dialects is the root). McCarthy (1986) attributes this blocking effect to the OCP. However, because morphemes are on different planes, one would expect the OCP not to block syncope when it creates geminates across morpheme-boundaries. McCarthy (1986) discusses such a case of heteromorphemic syncope in the Hausa and Shewa dialects. He claims that, in these dialects, syncope is more general and can apply to the vowels of some closely bound suffixes (the benefactive *-it* and the causative *-is*). In such cases syncope between identical consonants is permitted.

12 a.	as-is-é-y-yo	asséyyo	'I will cause to spend the day'
b.	xas-is-é-y-yo	xasséyyo	'I will cause him to motion'
c.	sas-is-é-tto	sasétto	'you will cause (him) to hide'

Note, however, that all the roots in (12) are monosyllabic. I propose that a minimal word constraint applies to roots in these dialects. The violation of the minimal word constraint by these roots would then trigger a reanalysis of the root and suffix as a bisyllabic root. The suffix vowel would then be subject to deletion without having to enlarge the domain of syncope.

The question is how can syncope see the two morphemes without triggering Plane Conflation, since conflation would entail that the OCP is obeyed. The solution to this problem can be found in the planar geometry proposed in (8) above. If we assume that the adjacency relations between morphemes are defined on the syllabic tier, we can argue that the domain of syncope is also defined on the

syllabic tier, as the minimal word constraints should be.

Another argument in support of the domain of syncope being defined on the syllabic tier comes from the prefixing verb class. Prefixing verb roots present an interesting case in that syncope always incorporates a VC prefix into its domain when the prefix immediately precedes the root. Prefixing roots are always vowel-initial. Note that syncope then targets the first vowel of the root.

3.3. Consonant/Vowel Segregation Another important aspect of Afar discussed in McCarthy (1986) is whether the language has vowels and consonants on different planes like Arabic. McCarthy shows that Afar does have Semitic-style morphology, but that it also has conventional roots. The language makes a clear distinction between the two types, confining Semitic morphology to a small number of verb roots of the prefixing class. Such verbs show all the hallmarks of Semitic morphology, including variable vocalism and variable canonical patterns. However, since the vast majority of verbs and apparently all nouns have invariant vocalism and canonical patterns, McCarthy (1986) assumes that these forms have roots that are not decomposable into separate vowel and consonant morphemes. He concludes that there can be no V/C segregation for these forms.

McCarthy (1989), however, reaches a different conclusion. He argues that planar segregation is motivated in languages which lack inherent linear order between elements on separate planes. McCarthy gives three conditions under which vowels and consonants must lack linear order: (i) Weak Morphemic Plane Hypothesis cases like Semitic where consonantal and vocalic melodies are different morphemes; (ii) templatic morphology where the linear order of consonants and vowels is predictable (e.g. Yawelmani); and (iii) sufficiently restrictive root structure constraints which also make linear order predictable.

In Afar, at least two of these conditions are met. As noted above, the prefixing verb class has the variable vocalism which indicates that vowels and consonants are different morphemes. The second condition is concerned with the very restrictive syllable structure found in roots. Although there are surface consonant clusters in Afar, I argue that only the first part of a geminate consonant can be syllabified as a coda within roots. All the other consonant clusters can be shown to result from either syncope or suffixation. These

restrictions can be accounted for if we assume that Afar is a strict CV language, where the only encoded lexical information is moraic: i.e. long vowels are lexically assigned two moras and geminates are assigned one mora. The linear order of vowels and consonants is then entirely predictable from syllabification within roots and from morpheme adjacency defined on the syllabic tier.

Another strong argument for V/C segregation in Afar comes from the total vowel harmony process found in roots and prefixes throughout the grammar.[4] Only the vowel [a] is transparent to the harmony process. Furthermore, five suffixes have their vowels agreeing with the preceding vowels in all features except that the mid-vowels [e] and [o] are raised to [i] and [u]. I am aware that there is another plausible account for such cases of vowel hamony which is based on the works of Clements (1990) and Hume (1992). The main element of their proposal is that consonants have both a primary consonantal place of articulation and a secondary vocalic place of articulation, while vowels only have the secondary place node. This allows vowel harmony to spread across consonants. This account is not a viable solution for Afar, however, since the consonantal glide [w], which arguably shares a secondary place node with vowels, is invisible to vowel harmony. Thus, the harmony process, in conjunction with the variable vocalism of the prefixing verb class and the syllabification constraints within roots, is clear support for V/C segregation in Afar.

Assuming then that V/C segregation is present in Afar, it is possible to advance the strong claim that every prefixing and suffixing verb root, along with the nominal roots, brings its own fixed prosodic template. Surface differences between morphological forms in the prefixing verb class can be derived from two language-specific processes: (i) syncope of the first or of the second unstressed short vowel of the root, and (ii) a rule of gemination found in some morphemes. In other words, the only morphological difference between prefixing and suffixing verb roots would be the variable vocalism of the prefixing class. That is, the vocalic and consonantal planes of this verbal class would still be considered separate morphemes.

3.4 Minimal Word Template With these issues resolved, we are now in a position to reconsider the intensive reduplication data. First, it is necessary to define the shape of the reduplicative template. The claim put forward here is that the intensive prefix is a

minimal word template consisting of a single bisyllabic foot. The relevant data are given again in (13).

13	*Root*	*Intensive*	
a.	usuul	u-**sus**-suul-é	'you laughed heartily'
b.	idigil	idi-**gig**-gil-é	'you smashed'
c.	camm	**cam**-camm-is-n-é	'we threw hard'

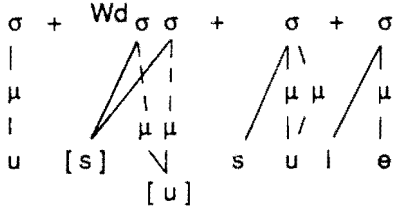
There is strong empirical support for prosodic templates which are defined as a minimal word. The question is what would force the minimal word template to be bisyllabic rather than bimoraic. This problem can be resolved if we assume Itô and Mester's (1992) Weak Layering Hypothesis. The theory of weak layering imposes two conditions on derived minimal words. First, for a prosodic word to be minimal, it must contain no more than one foot. The fact that it contains at least one foot is insured by a notion of Proper Headedness. Itô and Mester assume that every constituent must have a head, which they define as the immediately dominated category. Thus, every word must have at least a foot and every foot at least a syllable. The second condition imposed on minimal words is that of branchingness, as formulated in (14).

14. *Binarity Requirement* (Itô and Mester 1992)
P-derived words must be prosodically binary.

P-derived words are words which are related to more basic ones through prosodic-morphological operations. Crucial for my analysis is their claim that syllable-internal structure is opaque to the binarity requirement. In other words, although underived words can be minimally bimoraic, derived minimal words have to be at least bisyllabic.

Consider now the application of the intensive reduplication process in Afar. Reduplication circumscribes as its base the rightmost syllable of the root. A minimal word template is affixed to that base and both the vocalic plane and the consonantal plane associated to that base are copied. The two melodic planes then map to the template in the only way that can satisfy the minimal word requirement.

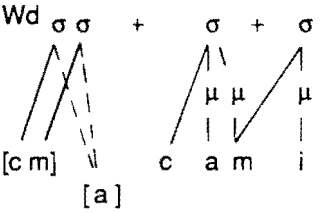
15. *Intensive Reduplication*



[u-**susu**-suu-le]

As shown in (15), the length of the vowel has been transferred, but this is obscured by the need to satisfy the bisyllabic template. The copied consonant, being on a different plane from the vowel, can map onto the onset of the first syllable and then spread to the second syllable. With regard to the form in (13c) which shows no surface gemination, the affixation process is illustrated below:

16.



[**cama**-cam-misné]

Mapping to the template results in the two forms [u**su**suulé] and [**cama**cammisné]. Assuming that the template, being a copy of the root base, is part of the domain of syncope, we can then derive the surface forms [u**su**ssuulé] and [**cam**cammisné].[5] Note that, because of syncope, the bisyllabic nature of the template is rendered opaque. However, although syncope triggers the loss of the second mora of the template, this should not entail the loss of its syllable. In other words, the application of syncope does not result in a violation of the binarity requirement placed on minimal word templates.

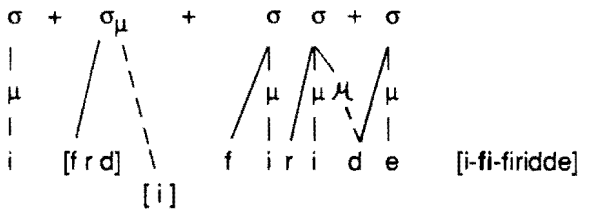
The intensive reduplicative is not the only morphological form with apparent surface gemination. Consider the case of the prefixing benefactive forms, illustrated in (17). Crucially, the data show two apparent gemination processes. Bliese (1981:256) points out that prefixing benefactives always geminate the final root consonant, unless preceded by an underlying long vowel in which case the last root vowel lengthens instead (17d).

17	a.	usguudé	'I slaughtered	u-s-suguddé
	b.	iskiré	'I got drunk'	i-s-sikirré
	c.	itkilé	'I planted'	i-t-tikillé
	d.	ublé	'I saw'	u-b-buulé
	e.	ifridé	'I judged'	i-f-firiddé

Two cases of gemination within the same morphological form seems to be a bit much. In fact, for a number of prefixing verbs, the benefactive affix is [Vtt-], rather than the one illustrated in (17). Only the gemination of the last root consonant (or root vowel) is consistently found in all the benefactive forms. In their work on Arabic morphology, McCarthy and Prince (1990) argue that cases of gemination should be regarded as being outside of the scope of templatic theory. They argue that gemination should be viewed as a morphologically conditioned rule and that the only role of the template is to provide the mora to which the geminated consonant will be associated. This, I argue, is also the case in Afar where gemination of the last root consonant is morphologically triggered.[6]

As for the apparent gemination of the first root consonant, I propose that, in these benefactive forms, a reduplicative template is prefixed to the root. (The invisibility of vowel-initial syllables to templatic affixation is a well-known phenomenon.) This template is a monomoraic syllable whose surface form is obscured by the application of syncope. Note that although the initial vowel of the root is invisible to the reduplicative affix, it is still part of the domain of syncope.

18. *Benefactive Reduplication*



The first copied consonant maps onto the onset of the syllable template, while the vowel maps onto its moraic position, giving us

[i-fi-firiddé]. Syncope then applies to the second short vowel of the word (the templatic vowel) resulting in the surface form [iffiriddé] (with gemination of the last consonant).

4. Conclusion In this paper, I have demonstrated that there is no need for an additional prosodic unit such as the nucleus if we posit a minimal word template for the Afar intensive reduplicative prefix and if we assume a binarity requirement on minimal words. I have also shown that the surface realization of the template is driven by two independent characteristics of the language: the segregation of vowels and consonants on different planes, and a syncope process which applies within and across morpheme-boundaries.

Endnotes:

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1. Shaw is led to this conclusion by the fact that the forms in McCarthy (1986), which she cites, do not include any of the suffixes attached to the roots. This claim about the extraprosodicity of final consonants is contradicted by the fact that word-final root consonants are visible to stress. With regard to reduplication, the last consonant of the root is outside of its domain by virtue of being syllabified as the onset of a following suffix. The full forms are given in (13).

2. The CV forms should not be regarded as part of the template but simply as a formalization of the surface representations.

3. In this paper, I do not take position on the identity of the tier mediating between the melodic planes and the syllabic plane. I make no claim as to whether it is the Root tier as proposed, amongst others, by McCarthy (1989), or the skeletal tier. See Piggott (1993), however, for strong arguments in support of a skeletal tier within moraic theory.

4. Final root vowels are not predictable, however.

5. Note that Shaw's bimoraic templates would not be subject to syncope, being bimoraic. Thus, the question of whether vowels

and consonants are on different planes or not has no apparent consequences for her analysis.

6. In the Arabic cases discussed by McCarthy and Prince, the mora which is the target of gemination is part of a morphological bimoraic template. In the Afar benefactive forms the targetted mora must be assigned to the root syllable. In other words, the rule must both assign a mora to the penultimate syllable and make it a target for gemination.

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PRECOMPILED PHRASAL PHONOLOGY: AN ANALYSIS OF FRENCH LIAISON

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0. Introduction

In the domain of the Phonology-Syntax Interface, the prosodic hierarchy theory has experienced considerable descriptive and explanatory success, although there still exist some problems and possible counterexamples in various languages. The shortcoming of the prosodic hierarchy theory is that it cannot serve as a complete theory to account for phonological phenomena that are syntax-dependent. French liaison is one example of a linking phenomenon which refers to some specific syntactic information, and one which does not generalize across categories. Hayes (1990) proposes a precompilation theory for the residual problem left unaccounted for by prosodic hierarchy theory. The theory claims that there exist no direct-syntax rules. The theory reanalyzes such rules as precompiled rules. Hayes cites French liaison as one of the examples which can be analyzed by precompilation theory. However, there is no complete analysis for it provided in his work. In this paper, I will first present the main premise of Hayes' theory. Secondly, I will show that French liaison can be analyzed as a precompiled phonological rule, based on evidence from empirical data.[1] Thirdly, I will show how this novel theory can be fleshed out to account for French liaison by presenting two possible analyses. Finally, I will point out residual problems of treating French liaison with precompilation theory.

1. What Is Precompilation Theory?

The basic idea of precompilation theory is that, first, a number of allomorphs may be derived by the morphological and phonological rules

[1] As diagnostics for precompiled rules, Hayes examines phonological processes from several viewpoints such as structure preservation, rule ordering, inflectional restructuring, sensitivity to pause, speech rate and empty category, among others.

within a lexicon. The lexicon may include a set of "phonological instantiation frames," which indicate where a precompiled allomorph is to be inserted. Then, at the stage of lexical insertion, the appropriate precompiled allomorph is selected, and is then inserted into a designated context for phonological instantiation. Thus the choice of an allomorph is determined syntactically, while the formation of the allomorph or inflected words is carried out in a lexicon (Hayes, 1990). Hayes cites an example from Hausa to illustrate how precompilation theory actually goes to work to treat complex data. In Hausa, final long vowels of verbs shorten when a direct object NP follows the verb. Hayes proposes the following Hausa shortening rule with a phonological instantiation frame as in (1):

(1) Hausa Shortening
V: →V / [. . . __] [Frame 1]
Frame 1: / [$_{VP}$ __ NP. . .], NP non-pronominal

The Hausa shortening rule refers to frame 1, which serves for the phonological instantiation of words. According to this rule, for example, the two allomorphs are generated for a verb *ká:mâ:* as in (2):

(2)

ká:mâ:	*ká:mâ* : [Frame 1]	inputs
↓	↓	↓
ká:mà:	*ká:mà* [Frame 1]	outputs

At the stage of phonological instantiation, the appropriate allomorph is inserted in each syntactic environment. Consequently, *ká:mâ* with a short vowel at the end will be inserted before lexical objects, and *ká:mâ:* with a long vowel will be inserted elsewhere. This pattern follows the Elsewhere Principle that Hayes posits to ensure the privilege of the more specific insertion context over the more general ones.

Hayes proposes the following formula to account for French liaison between adjectives, quantifiers, and a following noun in colloquial style (conversation familière):

(3) C --> [+extrasyllabic][2] / [{A, Q} . . . ___] [Frame 1]
Frame 1: / [X' __ X^0 . . .]

To illustrate the notion of phonological instantiation more concretely, consider the example of *petit* as in (4). *Petit* has an index of 111, for example, in the lexicon, and the two allomorphs are generated; /pətit/ before a vowel, /pəti/ elsewhere. Frame 1 is necessary to specify the syntactic environment at the stage of lexical insertion of the word:

(4) 111 --> pətit / __V where 111 = index of *petit*
pəti / elsewhere
Frame 1: / [NP__ N^0 ....]

The Elsewhere Principle posited by Hayes earlier ensures the selection of the /pətit/ allomorph over /pəti/ in prevocalic position.

2. Arguments for Precompilation Theory

Following Hayes' criteria, I will argue that French liaison can be analyzed as a precompiled phonological rule. From among several criteria set by Hayes, I will present three pieces of evidence; 1) Structure Preservation, 2) Rule Ordering, and 3) Inflectional Restructuring.

2.1. Structure Preservation

As Kiparsky (1985) and others propose, structure preservation is one of the characteristics of a lexical rule. All the segments derived by liaison do exist in the phonemic inventory of French. In other words, there are no novel phonological strings or syllable structures created by the application of this sandhi rule. Therefore, rules previously believed to be direct-syntax rules can be treated as precompiled rules in a lexicon, where

[2]The notation [+extrasyllabic], in my understanding, means that a consonant is rescued from rhyme deletion by a linking to the onset of the following word. Thus, Hayes' formula in (3) is interpreted to mean that the extrasyllabic consonant of adjectives or quantifiers are linked to the initial vowel of the following head noun in the syntactic environment designated by Frame 1.

syllable structure is preserved. The syllable structure resulting from the application of liaison rule in *petit ami* 'boyfriend,' for example, is identical with that of *petit tapis* 'small carpet':

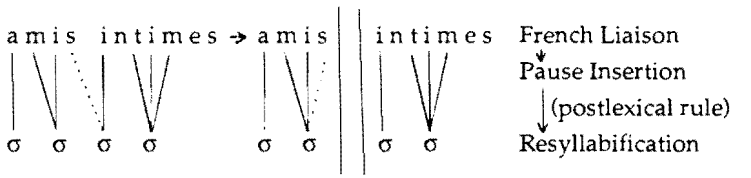
(5) a. petit ami (pə̃) (ti) (ta) (mi)
b. petit tapis (pə̃) (ti) (ta) (pi)

Apparently this neutralization does not hold true for postlexical rules, which create allophonic segments in a surface structure.

2.2. Rule Ordering: Precompiled precedes Postlexical

There are two kinds of phrasal phonology distinguished by Hayes' theory: precompiled phrasal phonology and true phrasal phonology. The former lies in the lexicon and the latter respects syntax and the prosodic hierarchy. Hayes claims that precompiled phonology precedes true phrasal phonology, but not vice versa. This holds true in French rule ordering as well. Maes (1988) demonstrates that pause insertion, which is postlexical, apparently must follow French liaison. Her contention is that if pause insertion precedes liaison (optional liaison), then the latent consonant would not be able to associate with the following syllable across the slash, an inserted marker of pause, and thus would be deleted. The process of optional liaison, representing the phrase *amis intimes* 'close friends' is schematized as in (6):

(6)



In the illustration above, 1) association first applies to allow the latent consonant to lose its extrasyllabicity, then 2) pause insertion breaks the association line, then 3) resyllabification applies. On the other hand, Maes

claims that obligatory liaison is resistant to a pause, thus liaison is not affected by pause insertion.[3]

2.3. Inflectional Restructuring

Hayes claims that precompiled alternations sometimes undergo an inflectional restructuring. He reports that this phenomenon is observed in various languages: verbal mutation in Modern Irish, English *n't* , Italian inflected prepositions and French liaison. In Modern Irish, for example, certain tense-marking pre-verbal particles have been deleted, so that the mutation left can then be reanalyzed as the sole marker of verbal tense:

(7) a. Bi ag dul abhaile.
be at going home
"Go home."
b. Bhi si ag dul abhaile.
be-PST she at going home
"She was going home." (Rotenberg, 1978)

In the data in (7), verbs lenite spontaneously when they are not preceded by anything in the normal VSO sentence. We can see that lenition occurs in the absence of any trigger to the left of the verbs. Rotenberg (1978) considers the lenition on the onset of a verb as part of the morphological marking of the preterit, the past habitual and the conditional. Historically, the preterit was marked by the verbal prefix *do-*. Currently, the bare verb stem visible in the imperative lenites to form the "personal" preterit.

Similarly, the examples of inflectional restructuring in French liaison can be seen in the following liaison contexts: 1) **-z** as a plural marker, and 2) **-t** as a verbal marker (Morin & Kaye, 1982). Words which trigger liaison do not necessarily have to be adjacent to each other. Consider the following examples:

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[3]This insensitivity to pause also provides evidence in support of the claim that French liaison can be analyzed as a precompiled phonological rule.

(8) [les chemins de fer] **z**-anglais 'The English railways'
[des avions à réaction] **z**-américaines 'American jet planes'
[des chevaux de course] **z**-arabes 'Arabian race horses'
(Morin & Kaye, 1982)

Z as a plural marker can be seen in the agreement between compound nouns and their following adjectives. Thus, this **z** can be reanalyzed as a plural marker of the NP as well, but it appears at the end of the whole NP, not to the head N. A similar example can be found in English as well: [$_{NP}$ [the man] in New York]'s opinion.

The consonant **t** has also been reanalyzed as inflectionally restructured. However, in this case, it is the marker of a verb, rather than that of the following complement. In the literature, these phenomena are called "delayed liaison" (liaison à distance) and "post-verbal liaison" (Morin & Kaye, Klausenburger). Delayed liaison is illustrated in (9), and post-verbal liaison in (10):

(9) c'es(t) pas **t**-à moi. 'it is not mine.'
ça doi(t) bien **t**-être cuit, maintenant. 'it must be cooked by now.'
ils chanten(t) tous **t**-en coeur. 'they all sing in chorus.'

(10) j'ai **t**-un lit garni. 'I have a bed with all the trimmings.'
j'ai **t**-aperçu **t**-une réelle beauté. 'I noticed a real beauty.'
(Morin & Kaye, 1982)

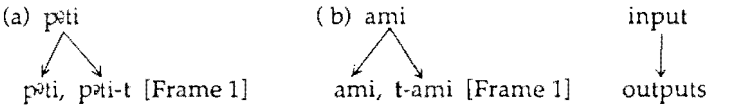
What is interesting in (9) is that **t**, the final consonant of the verb in the third person, either singular or plural, hops the intervening elements, and consequently gets copied onto the prevocalic position of a word which comes rightward. More surprisingly, in (10) we see a case where liaison has been extended to verbs in other persons than verbs in the third person, which do not have the inflection-final t. This suggests that **t** can be reanalyzed more as a personless verbal inflection. The examples in (10) provide a strong piece of evidence that post-verbal liaison is no longer a person marker, but instead is analyzed as a verb marker.

3. Application to French Liaison

So far, based on three pieces of evidence, I have demonstrated that French liaison can be analyzed with a precompilation theory. Now I will discuss how this theory can be fleshed out to deal with actual complexities of the French liaison data.

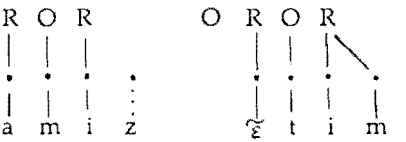
As mentioned in 1., Hayes proposes a formula (3) to account for the liaison between adjectives, quantifiers, and a following noun in colloquial style. My claim here is that there might be two possible ways to account for the liaison: either the extrastrasyllabic consonant is resyllabified (a) to the word-final position (coda in the last syllable) of the preceding word or, (b) to the word-initial position (onset in the first syllable) of the following word. For instance, in the liaison context in the phrase *petit ami* as candidates for allomorphs, we could have not only /pəti/ and /pəti-t/, by analysis (a), but also /ami/ and /t-ami/ by analysis (b). Analysis (b) is similar to the one proposed by Klausenburger (1984). Then allomorphs are generated as indicated below:

(11)



Encrevé (1988) differentiates the two types of liaison in terms of "liaison avec et sans enchaînement" (liaison with and without chaining). He assumes that there is an empty onset position in every vowel-initial word in French. This idea is illustrated in the sentence *amis intimes* as follows (O=onset, R=rhyme):

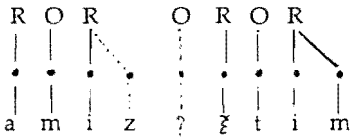
(12)



First, according to his analysis *sans enchaînement* (without chaining), comparable to analysis (a), the extrasyllabic consonant /z/ may be

attached as the final coda to *amis*. In his alternative analysis *avec enchaînement* (with chaining), comparable to analysis (b), the liaison consonant may be attached as the onset to *intimes*. The first analysis is illustrated in (13) and the second in (14):

(13) Liaison sans enchaînement



(14) Liaison avec enchaînement

Encrevé claims that liaison sans enchaînement is, however, only available in optional liason context. Obligatory liaison, on the other hand, is always realized by means of *enchaînement* . However, it is not clear why obligatory liaison is always the case of liaison *avec enchaînement*. As we will see in the following discussion, liaison before a pause, which is possible also in obligatory liaison contexts, suggests the possibility of obligatory liaison *sans enchaînement*.

3.1. Arguments in Favor of Analysis (a)

I will first present arguments for analysis (a). Agren's data (1973, from Morin & Kaye, 1982) which show liaison before a pause strongly suggests the possibility of analysis (a):

(15) Liaison before a pause

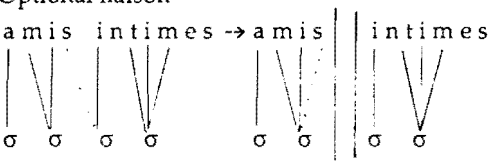
sans-**z**...envisager le mariage	'without...considering marriage'
qui est-t...un des premiers films	'which is...one of the first movies'
un grand-t. . . ethnologue	'a great ethnologist'
quant-t. . . à lui,	'about him'

(Morin & Kaye, 1982)

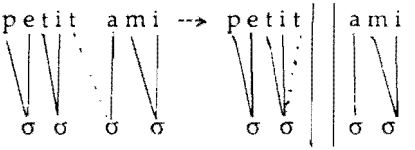
In Maes' theory, resyllabification after pause insertion provides the second evidence in favor of analysis (a). As we have seen earlier, her theory suggests that extrasyllabic consonants are resyllabified to the coda of a

preceding word. Maes claims that obligatory liaison is resistant to slash insertion (SI), so that, for instance, *petit ami* , which is in an obligatory liaison context, cannot be broken apart by SI (marked II) as [pətit II ami] nor [pəti II tami]. However, the data in (15) show that pause insertion is also possible in an obligatory liaison context.[4] This is a piece of evidence that not only optional liaison, but also obligatory liaison, entails resyllabification after pause insertion. Thus, the possibility of SI does not differentiate obligatory liaison from optional liaison. As illustrated in (16), the same analysis is applied to both optional and obligatory liaison:

(16) i) Optional liaison



ii) Obligatory liaison



In obligatory liaison, as well as in optional liaison, the association line which links the extrasyllabic consonant to the initial vowel in the second word is broken by SI. By resyllabification, the extrasyllabic consonant is attached to the immediately preceding vowel. This may suggest that analysis (a) is a plausible one. Thus, the truncation for *petit ami,* for example, could be /pəti-t/ + /ami/ not /pəti/ + /t- ami/.

3.2. Arguments in Favor of Analysis (b)

Next, I will present arguments in favor of analysis (b). Agren's data, which show liaison after a pause, provide support for this analysis:

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[4]The examples in (15), except "un grand-t...ethnologue" (adjective + noun), are in the contexts of obligatory liaison.

(17) Liaison after a pause

Deux petites...z-histoires	'Two short...stories'
Quelques...z-années plustôt	'A few...years earlier'
Parce que des réserves de change sont très...z-abondantes	
	Because exchange reserves are quite...plentiful'
	(Morin & Kaye, 1982)

In addition, the examples of false liaison, speech errors widely observed not only in informal speech but also in elevated speech, support analysis (b). First consider the mistakes in NP illustrated in (18):

(18) quatre **z**-enfants	(cf. deux **z**-enfants)	'four children'
beaucoup de **z**-enfants	(cf. les **z**-enfants)	'many children'
un gros **t**-enfant	(cf. grand **t**-enfant)	'a big child'
le **n**-éléphant	(cf. un **n**-éléphant)	'the elephant'
		(Klausenburger, 1984)

Klausenburger concludes that false liaisons such as 'un gros t-enfant', 'le n-éléphant' "force us to reconsider standard, obligatory liaison", such as in 'grand enfant' and 'un éléphant' (1984:34). He also provides a possible analogical model for each mistake of liaison, and these are shown in brackets. This analysis leads Klausenburger to propose the truncation of 'grand enfant' into /grɑ̃/ + /t- ɑ̃fɑ̃/ instead of /grɑ̃-t/ + /ɑ̃fɑ̃/, and 'un elephant' into /ɛ̃/ + /**n**-elefɑ̃/, instead of /ɛ̃-**n**/ + /elefɑ̃/. Now consider the mistakes in VP between a verb and a clitic in (19):

(19)	donne-moi-**z**-en	'give me some'
	amène-moi-**z**-y	'take me there'
		(Klausenburger, 1984)

For an adequate account for this type of mistake, Morin & Kaye propose that the **z** consonant before the clitics *y* and *en* should be analyzed as the

initial consonant of these clitics. This is because in imperatives, clitic *y* always appears as /zi/, and clitic *en* almost always appears as /zɑ̃/.[5] Klausenburger has the same analysis as Morin & Kaye and explains that "the speakers might have been influenced by the expression 'prends-z-en' (take some) or 'vas-z-y' (go away)" (1984:34). This evidence provides a strong support for analysis (b), since /zɑ̃/ and /zi/ appear in the mistakes in liaison without any consonant to trigger the liaison. Klausenburger sets two lexical allomorphs of *en* and *y* as in (20):

(20) /zɑ̃/, /zi/ in imperatives
/ɑ̃/, /i/ elsewhere

Under the analysis by precompiled theory, they may be formulated as (21):

(21) 100 --- zɑ̃ / __V
ɑ̃ / elsewhere
Frame 1: / [VP V__]
where 100 = index of *en*

101 --- zi / __V
i / elsewhere
Frame 1: / [VP V__]
where 101 = index of *y*

4. Residual Problems

I have presented arguments for both analyses, (a) and (b). Because of equal evidence supporting each analysis, it is not easy to determine which analysis, (a) or (b), would be more likely. I can only point out a problem associated with analysis (b). It is the question of what mechanism determines which of several allomorphs is to be used. For example, given the phonological instantiation frame set as in (3), to obtain a phrase *petit ami*, /pətitami/, how will we know that the allomorph 't-

[5]One of the participants in the conference, who is a native speaker of French, pointed out that the clitic *en* does not always appear as /zɑ̃/ as seen in the following examples:
(i) Donne-m'en. /mɑ̃/ 'Give me some.'
(ii)Vas-t'en. /tɑ̃/ 'Go away.'

ami' is the right one, not '**n**-ami,' '**r**-ami,' '**z**-ami'? It may be more plausible to think that allomorphs are generated as in analysis (a). We have seen that the existence of liaison after a pause is one of the obstacles for analysis (a). I have to leave this question to further investigation.

To render the precompilation theory completely workable as a plausible explanation of idiosyncratic phenomena in French liaison, we need to set a formula for each liaison context which reflects specific syntactic environments. Hayes formulates a rule which only accounts for the liaison between adjectives, quantifiers, and a following noun. As we know, however, there are a number of possible liaison contexts:

1) modifier-head sequences	moins-**z**-important	'less important'
2) pronoun clitics	ils-**z**-ont parlé	'they have talked'
3) specifier-prehead sequences	mes-**z**-excellents amis	'my excellent friends'
4) after prepositions	dans-**z**-un bol	'in a bowl'
5) after complementizers	quand-**t**-il est parti	'when he left'
6) after copula, auxiliaries	c'est-**t**-un livre	'it's a book'

These are considered to be obligatory liaison contexts by Selkirk's analysis (1986). What we need to do is to set a number of frames which accommodate all the data of French liaison. For instance, a frame which designates the context of [prepositions and the following word] may be formulated as in (22):

(22) C --> [+extrasyllabic] / [$_{Prep}$ ___ . . .] [Frame 1]
Frame 1: / [$_{X'}$ X^0___ · · ·]

Another residual problem in accounting for French liaison by precompilation theory is formulation of instantiation frames suitable for each syntactic environment.

5. Conclusion

5. Conclusion

In this paper, I have demonstrated the workability of application of precompilation theory to French liaison by citing evidence from 1) structure preservation, 2) rule ordering, and 3) inflectional restructuring. In order to apply precompilation theory to French liaison, I have proposed two possible analyses. These differ in resyllabified position of the extrasyllabic consonant; in one analysis it is the final coda of the preceding word, in the other it is the initial onset of the following word. In either case, the application of a precompiled theory to French liaison is constrained by lexically specified syntactic frames. I have provided evidence in support of the claim that French liaison can be analyzed as a precompiled phonological rule.

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Rich Object Agreement and Null Objects:
A Case Study From Navajo

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1. Introduction

The best-known studies of null objects, Rizzi (1986) on Italian and Huang(1984) on Chinese and European Portuguese, focus on languages without rich object agreement morphology. Both Rizzi and Huang assume that if a language has rich morphology marking object agreement, null objects will be licensed.

Navajo is an interesting case, because it does have object agreement morphology, and it does allow null objects, but null objects are allowed only if the subject is also null. Thus, it has looked like rich object agreement does not always license null objects. In this paper, I will reexamine the distribution of null objects in Navajo, and will argue that in fact there is a direct relationship between rich agreement and the licensing of null objects. This in turn has implications for the question of whether Navajo NPs are in argument positions at S-Structure, as I have argued in Speas(1990, 1992), or in adjunct positions, as Jelinek(1984, this volume) and Willie(1991) have claimed.

2. Null Objects, Mapping and the NP-PRO Constraint

Navajo has a fairly rigid SOV word order, with rich verbal morphology[1] and no Case morphemes on NPs, as illustrated in (1) and (2).

(1) a. At'ééd ashkii yidoots'os
girl boy 3O-3S-will:kiss
'The girl will kiss the boy'

b. Yidoots'os
'S/he will kiss him/her'

(2) Mósi tsís'na yiishish
cat bee 3O-3S-stings
'The cat stings the bee' NOT 'The bee stings the cat'

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1. I am grateful to Evangeline Parsons for judgements and advice. All errors are my own. I give a gloss of the relevant parts of the verbal morphology, but I do not attempt a morpheme by morpheme breakdown. Phonological processes obscure the morpheme by morpheme breakdown. Further, Navajo has between 10 and 14 prefix positions, and in some cases I am not certain what the exact breakdown is. Therefore, I gloss only the agreement morphemes and the stem.

As (1)b shows, both Subject and Object may be null in Navajo. However, the interesting fact is illustrated by (3) and (4). Here, we see that if a transitive sentence has only one overt NP, that NP must be interpreted as the Object. Such a sentence cannot have an interpretation in which there is a null object and the overt NP is the subject, even if a somewhat anomalous interpretation results, as in (4).

(3) Ashkii yiyiiłtsą̀ pro NP V
boy 3O-3sgS-saw
'He/she/it saw the boy'
NOT:'The boy saw him/her/it' *NP pro V

(4) Tsį́s'nà yiishish
bee 3O-3S-stings
'He/she/it stings the bee' NOT 'The bee stings him/her/it'

As Platero(1978, 1982) pointed out, it appears that these sentences are subject to a constraint whereby a null third person argument cannot be preceded by an overt third person argument.

(5) **NP-PRO CONSTRAINT**: If PRO immediately follows an overt noun phrase NP', it must be coreferential with NP'. (Platero 1982:288)

This constraint is essentially identical to the Generalized Control Rule proposed by Huang(1984) for Mandarin and Portuguese.

(6) **GENERALIZED CONTROL RULE**: Coindex an empty pronominal with the closest nominal element.

Since the GCR is obligatory, it has the effect of creating a violation of Principle B of the Binding Theory whenever it applies to a null pronominal in object position. However, a crucial feature of the Navajo facts is that the constraint on null objects only holds if the subject NP is overt. Null objects are fine if the subject is also null.

This fact (among others) has led Jelinek(1984) and Willie(1991) to conclude that Navajo uses a set of string-dependent mapping principles to relate overt NPs to argument positions. As Willie states it, the person/number marking morphemes on the verb serve as pronominal arguments, and the NPs are adjuncts, which are related to the pronominal arguments by means of a set of mapping rules. The rule which accounts for the constraint on null objects is shown in (7).

(7) When a transitive sentence has only one adjunct, that adjunct is interpreted as coindexed with the object (patient) argument. (Willie 1991:59)

In Willie's discussion of this rule, she presents a number of intriguing counterexamples, in which certain features of the verb appear to "override" the word order convention. Her examples are given in (8).

(8) a. Ashkii yiyiibii'
boy 3O-3S-picked:round:objects
'The boy picked them'
b. Ashkii yiyiiłta'
boy 3O-3S-count:pl.:objects
'The boy counted them'
c. Ashkii yǫ́ldǫn
boy 3O-3S-shooting
'The boy is shooting at it'

These observations of Willie's led me to investigate the question of exactly what sorts of features allow the mapping principle to be overridden. It has generally been assumed in the literature that whatever principle is operating here functions to eliminate ambiguity, and so one might simply think that the mapping principle can be overridden whenever the verb gives enough information to avoid ambiguity. However, I will show some additional Navajo facts that suggest that the mapping strategy has more to do with syntactic agreement and less to do with avoidance of ambiguity than has previously been thought. The facts also suggest that Navajo NPs may in fact be in argument positions.

3. Null Objects in Navajo

My investigation indicates that sentences in Navajo which allow null objects fall into 3 types.

In the first type, pointed out by Platero(1978), the object agreement morpheme is other than neutral third person. In (9)a, the object is first person singular, in (9)b the object is second person singular, and in (9)c, and object is first or second person duoplural.

(9)a. Hastiin nashiłtę́
man 1sgO-3S-carry:around
'The man is carrying me around'
b. Hastiin nighą́ą́d
man 2sgO-3S-shaking
'The man is shaking you'
c. Hastiin nihighą́ą́d.
man 1/2plO-3S-shaking
'The man is shaking you(dpl)/us'

Into this group, I would also put the sentence of what has been called the 'inverse' construction. Navajo has two different markers of third person object.

The examples shown before have the marker -yi, and in these cases the word order is SOV. The other third person marker is -bi, and when the bi marker is used, the word order is OSV. I have argued in previous work that bi is an incorporated pronoun, so that object in a bi sentence is in a dislocated position, as represented in (11).

(10) a. Ł̨íí' dzaanéézˊ yiztał. b. Ł̨íí' dzaaneez biztał.
horse mule yi-kicked horse mule bi-kicked
'The horse kicked the mule' 'The mule kicked the horse'[2]

(11) Ł̨íí'$_i$ [$_S$ dzaaneez bi$_i$ - ztał.
horse mule bi - kicked
'The horse, the mule kicked it' (=the mule kicked the horse)

As Platero shows, in the bi-construction when there is a single overt NP, it is interpreted as the subject:

(12) Dzaanéézˊ biztał.
mule bi-kicked
'The mule kicked it' NOT 'It kicked the mule'

Superficially, at least, sentences like (12) have the same structure as the sentences with one NP plus first or second person agreement: There is a null object, which is apparently licensed by the presence of the marker of object agreement.

(13) Dzanéézˊ e biztał.

So, I suggest that one type of sentence which allows a null object is that in which the object agreement morpheme on the verb licenses the null object. These are illustrated in (14).

(14) a. Hastiin nashiłtę́
man 1sgO-3S-carry:around
'The man is carrying me around

b. Dzanéézˊ biiiłtsą́
mule 3O-3S-saw
'The mule saw him/her/it'

The second type of null object sentence occurs when the object is an

2. It is difficult to get an accurate translation of the bi-construction, since there is an implication that the patient somehow let him/herself have the action done to him/her. A more accurate translation might be 'The horse, he had the mule kick him'.

indefinite or interrogative pronoun. In a transitive sentence with two overt NPs, if the first NP is indefinite or interrogative, the sentence is ambiguous, with the indefinite or interrogative being interpretable as either Subject or Object.

(15)a. Háish Kii yizts'os.
who Kii 3O-3S-kissed
'Who kissed Kii?'

b. Kii háish yizts'os.
Kii who 3O-3S-kissed
'Who did Kii kiss?'
OR 'Who did Kii kiss?'

(16) a. ɬa'da ashkii yidoots'os
somebody boy 3O-3S-will:kiss
'Somebody will kiss the boy' OR 'The boy will kiss somebody'

b. Ashkii ɬa'da yidoots'os
boy somebody 3O-3S-will:kiss
'The boy will kiss somebody'

I suggest that in sentences like (15)a and (16)a, the indefinite or interrogative may either be in subject position, or may be interpreted as having been fronted to an A' position, leaving a variable in object position. Thus, in this second type of null object sentence, the object is an A' bound variable rather than a null pronoun. This type of sentence is an interesting counterexample to the hypothesis that null objects are allowed whenever the verb can somehow disambiguate the sentence. Null objects are allowed here even though the relevant sentences are ambiguous.

My hypothesis is that sentences (15)a and (16)a are ambiguous because they may involve a variable in object position, and not because of any other property of indefinites and interrogatives. This hypothesis predicts that if an indefinite or interrogative were the only overt NP in a transitive sentence, the sentence would be unambiguous. The indefinite or interrogative may occupy object position, or could bind a variable in object position, but cannot occur as Subject with a null pronominal as object, since there is no special property of the indefinite or interrogative that allows this. This prediction is right, as shown in (17).

(17) a. Háish yizts'os.
who 3O-3S-kissed
'Who did he/she kiss?' NOT 'Who kissed him/her'

b. ɬa'da yidoots'os
Somebody 3O-3S-will:kiss
'He/she will kiss somebody' NOT 'Somebody will kiss him/her'

A null object which is a variable also seems to be occurring for some speakers in contexts in which the object has been made heavily topical. For some

speakers, a null object is possible in a question-answer pair like that in (18).

(18) S1: Háish Kii yizts'os.
who Kii 3O-3S-kissed
'Who kissed Kii?'
S2: Mary yizts'os
M 3O-3S-kissed
'Mary kissed him' (some speakers)

Here, I would follow Huang(1984)'s analysis of Mandarin, and suggest that the answer to the question contains a null topic, which binds a variable in object position.

(19) OP [Mary t yizts'os]

The third type of null object sentence is represented by Willie's examples. In these, the agreement morpheme is the neutral third person -yi, yet apparently some other feature of the verb exceptionally allows a null object. Willie suggests that the relevant feature is that the subject is animate.

(20) a. Ashkii yiyiibii'
boy 3O-3S-picked:round:objects
'The boy picked them'
b. Ashkii yiyiiłta'
boy 3O-3S-count:pl.:objects
'The boy counted them'

However, further investigation indicates that animacy cannot be the crucial feature. In (21) and (22), the subject is necessarily animate, yet a null object is not possible. When asked about the well-formedness of (21)b and (22)b, consultants say that it sounds like you are saying that someone is boiling the woman/someone is weaving the woman. The null object reading seems not to be available, and consultants say that these examples contrast with examples like (20), in which the null object reading is preferred.

(21) a. Asdzą́ą́ atoo' yiyiiłbéézh (not a handling stem)
woman stew 3-3-boiling
'The woman is boiling the stew'
b. Asdzą́ą́ yiyiiłbéézh
woman 3-3-boiling
'S/he is boiling the woman' (???'The woman is boiling it')

(22) a. Asdzą̀ą́ diyogi yitł'ǫ́.
woman rug 3O-3S-weaving
'The woman is weaving the rug'
b. Asdzą̀ą́ yitł'ǫ́.
woman 3O-3S-weaving
'He/she is weaving the woman'(???The woman is weaving it')

(23) a. Ashiiké didzé ndayizhjaa'
boys berry PL-3O-3S-brought-rnd-Os
'The boys brought berries'
b. Ashiiké ndayizhjaa'
boys PL-3O-3S-brought-rnd-Os
'The boys brought them' (or, S/he brought the little round boys)

I suggest that rather than animacy, the relevant factor is that the verb in the null object examples is one of the type called handling stems. These stems are for the verbs of motion and handling, and they classify the theme of the action according to size, shape, consistency and sometimes number. Some examples of these verbs are given in (24), (25).

(24)a. Slender stiff object:
Nàstáàn ła' dzídzàátą́
log a 3O-fire-1sgS-handle:SSO
'I put a log into the fire'

Ashkii bee'ak'e'elchíhí ła' shaa yiníłtą́
boy pencil a me-to 3O-3sgS-handle:SSO
'The boy gave me a pencil'

b. Flat flexible object:
Naaltsoos dzídzàáłtsooz
paper 3O-fire-1sgS-handle:FFO
'I put the paper into the fire'

Ashkii naaltsoos shílák'eyíłłtsooz
boy paper me-to-3O-3sgS-handle:FFO
'The boy handed me the paper'

c. Multiple small round objects:
Yoo' níléidi shijaa'
beads over-there sitting:round:plO
'The beads are sitting over there'

Kii didzé yijáah
Kii berry 3O-3S-carrying:round:pl:O
'Kii is carrying them (round objects)'

With this type of stem, the object apparently may always be null:

(25) a. Ashkii shaa yiníłtą
boy me-to 3O-3sgS-handle:SSO
'The boy gave it/one to me'
b. Kii nistsóós
Kii 3O-3S-carrying:flat:flexible:O
'Kii is carrying it (flat flexible object, eg. paper)'
c. Kii yijáah
Kii 3O-3S-carrying:round:pl:O
'Kii is carrying them (round objects)'

I suggest that the handling stems manifest a kind of lexical agreement, which is distinct from the inflectional agreement system of Navajo. Thus, in the null object sentences with handling stems, lexical agreement features are licensing the null object.

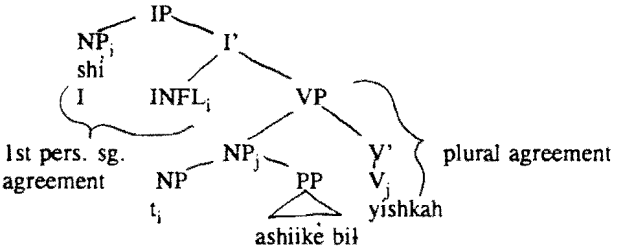
That Navajo does have two distinct systems of agreement can be seen by facts such as those in (26), where we can see the two systems operating independently. In (26)a and b, the verb stem is one which classifies for singular actors. The stem in (26)c is one which classifies for plural actors. In (26)d, the syntactic subject of the intransitive verb is first person singular, yet the stem for plural actors is used. This is because the understood number of people walking is plural.

(26) a. Shí yi-sh-áał
I prog-1sgS-sg:walk
'I am walking along'
b. Kii yi-0-gáał
Kii prog-3S-walk
'Kii is walking along'
c. Ashiiké yi-0-kah
boys prog-3S-pl:walk
'The boys are walking along'
d. Shí ashiiké bił yi-sh-kah
I boys with prog-1sgS-pl:walk
'I am walking with the boys'

Adapting an analysis by Hale(1975), I suggest that shí ashiiké bił ('I with

the boys') forms a constituent at D-Structure, and that this constituent is in the VP-internal subject position. The first person NP moves to the specifier of IP at S-Structure. Hence, at D-Structure, the verb undergoes VP-internal lexical agreement, with the plural actors, and then at S-structure the NP shi undergoes syntactic agreement with INFL. This is diagrammed in (27).

(27)



Shí ashiikè bił yi-sh-kah
I boys with prog-1sgS-pl:walk
'I am walking with the boys'

To summarize this section, null objects are allowed in Navajo in the three cases shown in (28).

(28) Possible Null Objects: t
e licensed by shi, ni, nihi, bi
e licensed by lexical agreement

What is not allowed is a null object with overt subject if the third person agreement morpheme is the neutral yi. This suggests that traces are licensed in object position when bound by a phrase in an A' position, and that the other two types of empty categories are null pronouns, licensed whenever verbal or inflectional agreement is "rich enough". Under such an account, the neutral third person yi does not count as "rich enough". Let us explore now what might be lacking in the neutral third person yi[3].

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3. The morpheme yi is in other contexts found as a meaningless affix, added to a verb in order to fulfill a general requirement in Navajo that all verbs must be at least two syllables. Kari(1976) calls this a 'peg' morpheme. For example, in (i), the verb is intransitive, and the subject agreement morpheme is the first person singular sh-. Since sh is not syllabic, when it is added to the stem, an additional syllable is needed in order to ensure that the word will have two syllables. The syllable added in such cases is yi.

(i) yishàą́ł 'I am walking along'
yi+sh+àą́ł

It seems clear that we cannot say that yi is not rich enough to license a null pronoun, since null objects occur with yi when the subject is also null.

(29) pro pro yidoots'os
3O-3S-will:kiss
'S/he will kiss him/her'

I suggest rather that Huang's Generalized Control Rule is operating here, and that Navajo differs from some other languages only in that the definition of what counts as a 'closest nominal element' includes morphological richness as a sub-part.

(30) **GENERALIZED CONTROL RULE**: Coindex an empty pronominal with the closest nominal element.
CLOSEST NOMINAL ELEMENT:
Mandarin/English: Any NP or AGR
Navajo: Overt/rich NP or AGR

This accounts for the various types of sentences, shown in (31) as follows:

(31) a. NP pro {sh/ni/bi}-V
b. NP pro V[+handling stem]
c. pro pro yi-V
d. *NP pro yi-V

In (31)a. f the object agreement morphology on the verb is first or second person, or the "rich" third person bi, this morpheme will count as the closest nominal element, and the null pronoun in object position will be coindexed with it. In (31)b, if the stem of the verb is of the handling type, this stem will include a type of agreement which is rich enough to count as a closest nominal element, and the null pronoun will be coindexed with it.[4] In (31)c, there is no nominal

---

peg+1sgS+walking:along

*shaał

4. If Jelinek(this volume) is correct in claiming that handling verbs involve some sort of abstract incorporation, then both handling stems and verbs with the "rich" inflectional agreement actually involve object incorporation rather than licensing of a null pronoun. In this case, the definition of 'closest nominal element' could be simplified to include only overt NPs.

element with which the null object must be coindexed. It is identified as third person by the morpheme yi, but this morpheme does not count as a nominal element, and so the GCR applies only vacuously and the sentence is grammatical. Finally, in (31)d, the subject NP counts as the closest nominal element, and so the null object must be coindexed with it. This indexing results in the null pronoun being bound within its governing category, in violation of Binding Principle B. Therefore, the sentence is ungrammatical.

The GCR applies whenever there is a null pronoun, not just in the case of null objects. This predicts that dislocated NPs may not be construed with an object over a null subject. This prediction is true, both when the object is a variable and when the object is licensed by the third person bi. The sentences in (32) are unambiguous, because they can only have the representations shown in (33) and they cannot have the representations shown in (34).

(32) a. Háish yizts'os.
who 3O-3S-kissed
'Who did he/she kiss?' NOT 'Who kissed him/her'

b. Dzanéézˇ bíiiłtsą́
mule 3O-3S-saw
'The mule saw him/her/it' NOT 'S/he/it saw the mule'

(33) a. pro Háish yizts'os.

b. Dzanéézˇ pro bíiiłtsą́

(34) a. *Háish$_i$ pro t$_i$ yizts'os.

b. *Dzanéézˇ$_i$ pro pro$_i$ bíiiłtsą́

In (34)a and b, the GCR would automatically coindex the subject pro with the dislocated NP, causing all arguments to be coindexed. Thus, the representation is impossible.

In this section, I have argued that the contexts in which null objects are permitted in Navajo fall into three types. One type involves a variable, licensed by an NP in an A' position. The other two types, I have argued, involve a null pronoun licensed by rich agreement. When the agreement is not rich enough to count as a closest nominal element for the GCR, the null object is not permitted. Thus, there is a direct relationship between richness of agreement and the possibility of null pronominal objects. Notice however that the relation is not simply one of pro being licensed by rich agreement. Pro is licensed when the agreement is the neutral yi. However, the GCR does not require pro to be

coindexed with yi as it does with the richer agreement. Hence, the GCR rules out cases of pro in object position when there is a closest overt NP in subject position.

4. Some Residual Problems

In this section I will discuss three problems that remain under my account.

First, I have claimed that handling stems license null objects but that other stems do not. One of Willie's three examples seems to be a counterexample to this:

(35) Ashkii yòldon
boy 3O-3S-shooting
'The boy is shooting at it'

The stem don is not a handling stem. According to Young and Morgan(1988), it means roughly 'explodes' and occurs in various verbs of shooting with a gun. Two properties of this verb may be relevant. First, it does seem that the theme of this verb is incorporated, i.e., expressed in the stem, although this is not one of the handling stems. This verb cannot be used if the shooting involved arrows rather than a gun. (cf. 'adisht'oh 'I am shooting (arrows)). Second, because the theme has been incorporated, the null object here is the goal. This is quite unusual in Navajo: it is very rare to find a direct object which is not a theme. Predicates which would in English involve a non-theme direct object (such as psych predicates) have no object in Navajo and instead have the experiencer in a prepositional phrase, as in (36).

(36) 'I am angering Kii' LIT: 'I am causing anger for Kii'
Kii bà hàshchiih
Kii 3O-for 1S-cause:anger

A second problem, related to the first, is that objects of postpositional phrases seem to allow the object of the postposition to be null, and such sentences seem to allow even the direct object to be null. Willie(1991) gives the following sentence as grammatical:

(37) Asdzą̀ą́ yii' yiyiiłbèezh
woman 3-in 3-3-boiling
'The woman is boiling it in it'

This fact is not predicted by my theory.

Finally, although I have treated bi and yi both as object agreement

morphemes, an important morphological fact about them remains unexplained. This is that they only appear if the subject is also third person. If the subject is first or second person, no morpheme at all appears in the verbal slot for object agreement:

(38) a. Ch'įnįshteeh
ch'į+0+ni+sh+teeh
out+3O+perf+1S+carry
'I carried him out'

b. Nįtł'o
0+ni+tł'o
3O+2S+weaving
'You are weaving it'

c. *Ch'įbinįshteeh
out+bi+perf+1S+carry
'I carried him out'

It seems that yi and bi in fact carry information about both subject and object. Rice and Saxon(1991) have analyzed yi as a subject agreement morpheme. Their insights may help explain why yi does not count as the closest nominal element to a null objects.

5. Conclusion

I have argued here that there is a relationship between rich agreement and the possibility of null pronouns in Navajo. I'd like to close with some comments about the relevance of these data to the question of whether Navajo NPs are in argument positions or not.

First, the fact that agreement is crucial in the theory of null objects and that resolution of ambiguity seems not to be relevant suggests that licensing of pro is involved, rather than mapping of NP adjuncts to argument positions.

Second, I have made use of Huang's Generalized Control Rule, which as a principle of control, is likely to be relevant only to relations within a clause, not to mapping of adjoined NPs to argument positions. Note that left dislocated NPs in English are not required to control PRO:

(39) John, PRO to finish this paper would please him.

Finally, since the apparent need for mapping principles has been one of the strongest arguments in favor of treating Navajo as a language in which all NPs are adjuncts, the possibility of accounting for these facts without recourse to special mapping rules leads me to suspect that Navajo NPs are in fact in argument positions.

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THE AXININCA FUTURE REFLEXIVE*

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The empirical aim of this paper is to distribute previously unpublished data on Axininca Campa Future Reflexive phonology. The contributions are threefold. First, I show that the several realizations of the Future Reflexive reported in previous work are not quite complete: because the Future Reflexive was previously cited only in word-final position, that all Future Reflexive markers in non-final position have a long vowel was missed (cf. Payne, 1981). Second, a class of verbs is identified which is invariantly phonetically [y]-final but which is phonologically velar-glide final. In identifying this class, the Axininca velar glide, [ɰ], is shown not to be limited in its deep distribution as previously reported (Payne, 1981; Black, 1991). The constraint that [ɰ] is found only surrounded by its vocalic counterpart [a] is not a fact about the phonological distribution of this consonant. Instead, invariant neutralization of phonological /iɰ/ to surface [iy] produces the surface distribution of [ɰ]. In identifying this distributional regularity, resolution of the seemingly problematic description of [y] reported in earlier literature on Axininca is resolved.

Besides providing the analytic framework to show distribution of Axininca glides [y] and [ɰ], the analysis of the complex Future Reflexive provides evidence from the active morphophonology of the language to support the feature analysis of the passive--consonant and vowel--inventories of Axininca (Spring, 1993a): velar underspecification is required (cf. Trigo, 1988), while coronals must be specified. As well, the notion that *ranking* explains preference relations between phonological alternations is borne out. This paper shows that the realization of the Future Reflexive is dependent upon the place features of the final consonant of the verb root and that three components of its realization follow from widespread principles of Axininca phonology. But a problem in the formalization of *direction* of application of [-back] "spread"--fundamental to the realization of the Future Reflexive--is explained by ranking constraints in an Optimality Theory approach, thus providing support for a basic tenet of this theory: that output forms result as the best case realization of all potentially applicable processes (Prince and Smolensky, 1993; McCarthy and Prince, 1993). However, a Lengthening process involved in the realization of the FR, which appears to be related by analogy to a historic syllable structure shift in Asheninca (*Asheninca* is a collection of dialects spoken in Peru, of which Axininca is a member; cf. figure (21)) from Campa, appears not to support the second notion of the strong interpretation of Optimality Theory: that language particular rules are absent, with all phonology resulting from universal constraints.

Section 1 compares the findings of published data and of recent field research on the Future Reflexive (hereafter, 'FR') in the language. Section 2 provides background and general phonological principles of Axininca relevant to the explanation of the FR. Section 3 shows how most properties of FR result from general principles. Section 4 discusses the contribution of Optimality Theory to explaining the variable direction of the application of [-back] "spread" accompanying

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the FR and shows the problem of Lengthening for the notion that all phonological regularities are necessarily formalized by constraints, demonstrating instead, the (language-specific) process-oriented nature of Lengthening.

1. Future Reflexive Data

In his insightful work on Axininca Campa, David Payne (1981) noted that the complex realization of the FR in Axininca is dependent upon the final consonant of the verb root, (1). But in eliciting this form in a paradigmatic format, all FR morphemes were positioned word-finally, as shown (Payne, 1981:129). And as shown by (1f), the few "[y]-final" forms elicited behaved differently than other palatals--compare (1d) with (1f)--leading Payne to conclude that [y] is fundamentally distinct, with respect to its FR behavior, from other palatal(ized) consonants.[1]

(1) Future Reflexive (Payne, 1981)

	Root	Future Reflexive	I will --- (to) myself
a. [labial]-final	p	[no-m-p-iya] 1-F-give-FR	give
b. [coronal]-final	kant	[no-ŋ-kanč-a] 1-F-say-FR	say
c. 0place-final	čʰik	[no-n-čʰič-a] 1-F-cut-FR	cut
d.[cor]/[-back]-final	monč	[no-monč-iiya] 1-cross river-FR	cross river
e. [ɰ]-final	ɯɰ	[no-n-ta -iya] 1-F-burn-FR	burn
f. "[y]"-final	'piy'	[no-m-piy-a] 1-F-lose-FR	lose

In hindsight, elicitation of the Future Reflexive in word final position was misleading, as this position requires that a vowel be short, as illustrated in (2a): regularly long vowels shorten in word-final position. (2b) compares pre-suffixal short vowels. Moreover, as just a few [y]-final roots were elicited, that there are actually two types of phonetically [y]-final verb roots was also missed.

(2)	1-noun-POSS'ed	UNPOSS'ed--word final	gloss
a.	no-sampaa-ti	sampa	(my) balsa
	no-sawoo-ti	sawo	(my) cane
	no-cʰimii-ti	cʰimi	(my) ant
b.	no-yaaroto-ti	yaaroto	(my) black bee
	no-worita-ti	porita	(my) small hen

In fieldwork conducted in October, 1989, D. Payne and C. Spring engaged a native speaker of Axininca to follow up on these two points.[2] Shown in (3), the FR suffix

[1] Features assumed to formalize place of articulation of verb-final consonants throughout this section are argued in sections 2 and 3.

[2] The native speaker of Payne and Spring's field work identifies himself as having the same great-grandfather as the primary informant of Payne's 1981 data (see Spring, 1990:88). Thus,

was elicited in non-final position, in which case, its final vowel is invariantly long. And extensive "[y]"-final forms were elicited in the FR. Two surface "[y]"-final verb types consistently appeared. Compare (3f) with (3g): while phonetically [y]-final forms like Payne's earlier data, (3f), again behave distinctly from palatal(ized) consonants in (3d), a second class of [y]-final forms exemplified by (3g) consistently behaves like other palatals: cf. (3d) and (3g) (more forms of both types in (3f) and (3g) are given in 3.2, figure (19)).

(3) Axininca Future Reflexive data (Payne and Spring, 1989)

	Root	Future Reflexive	I will --- myself?
a. [labial]-final	p	[no-m-p-iyaa-ma] 1-F-give-FR-DUB	give
	kim	[no-ŋ-kim-iyaa-ma 1-F-hear-FR-DUB	hear
	kiw	[no-ŋ-kiw-iyaa-ma] 1-F-wash-FR-DUB	wash
b. [coronal]	kant	[no-ŋ-kanč-aa-ma] 1-F-say-FR-DUB	say
	oman	[n-oman-aa-ma] 1-hide-FR-DUB	hide
c. 0place-final	čʰik	[no-n-čʰič-aa-ma] 1-F-cut-FR-DUB	cut
d. [cor]/[-back]-final	monč	[no-monč-iiyaa-ma] 1-cross river-FR-DUB	cross river
	miç	[no-mic-iiyaa-ma] 1-peel-FR-DUB	peel
	n̄	[no-n̄-iiyaa-ma] 1-see-FR-DUB	see
e. [ɣ]-final	taɣ	[no-n-ta -iyaa-ma] 1-F-burn-FR-DUB	burn
f. [y]-final 1	'piy'	[no-m-piy-aa-ma] 1-F-lose-FR-DUB	lose
g. [y]-final 2	miy	[no-miy-iiyaa-ma] 1-jump-FR-DUB	jump

A summary of the surface forms of the Future Reflexive of (3a-d) is given in (4) (glide-final forms are considered in section 3.2 after showing the basic analysis of the FR). To note is that the realization of the FR is dependent upon the place features of the verb-final consonant: following [labial] and [coronal]/[-back]- final roots, the FR is disyllabic. But following [coronal] and velar consonants, the latter of which are phonologically underspecified for place features ("0place"), the FR surfaces as palatalization of the root consonant followed by monosyllabic [aa].

(4)

root-final	FR	root-final	FR
a. [labial]	iyaa	c. [coronal]	y-aa
b. [coronal]/[-back]	iiyaa	d. 0place	y-aa

---

the language data reported from Payne and Spring's corpus arguably do not represent a major dialectal departure from Payne's 1981 corpus (cf. Kaufman, 1990; esp. 26-27).

The next section shows the feature composition of the Axininca consonant and vowel inventories, and general principles of Axininca phonology which are crucial to understand the realization of the FR.

2. Phonological regularities in Axininca

This section outlines the feature formalization of place of articulation of Axininca consonants and vowels. Space constraints prohibit detailed argumentation for these features (for complete arguments for both the individual features and for the system proposed see Spring, 1993a; 1994). Second, the phonological form of the FR (which is never so realized) is shown to be /ia/, not */ya/ (see Payne, 1981: 129-132 for additional arguments); finally, I overview the general rule of vowel Lengthening after a palatal in a derived environment.

2.1 Axininca place of articulation

Spring (1993a) argues that the active participation of some segments and the absence of others in Axininca phonology, combined with the *system* governing the passive inventory, requires the features [labial], [-back], and [coronal], (5A), for Axininca consonants, and [labial] and [-back] for Axininca vowels, (5B).[3] The system resulting from these features is demonstrated to support the theories of Combinatorial Specification and Grounding Theory (Archangeli and Pulleyblank, to appear). Under the tenets of this theory, starred columns in (5) indicate segments predicted by the system, but 'missing' from the inventory (see Archangeli and Pulleyblank, to appear, for explication of these two theories).

(5) L = [labial]; C = [coronal]; C/-b = [coronal]/[-back]; -b = [-back]

	1	2	3	4	5	*6	*7	*8
	L	C	C/-b	-b	0	L/-b	L/C	L/C/-b
A. consonants								
-back			-	-		-		-
coronal		+	+				+	+
labial	+					+	+	+
egs.	[p]	[t]	[ʧ]	[y]	[k]	*	*	*
B. vowels								
-back						-		
labial	+			-		+		
egs.	[o]			[i]	[a]	*		

To account for absent consonants in (5A.6-8) and an absent vowel in (5B.6), the Grounded Path Conditions in (6) are argued: essentially, [labial] cannot combine with other features.[4]

---

[3] The term 'segment' is used throughout this paper, which is assumed formally to correspond to the root node (cf. Clements, 1985; Sagey, 1986, etc). However, Spring, 1993b, 1994 argues that dialect variation in Asheninca argues against the root node and for intrinsic syllable structure. I ignore this point solely for expositional ease under limited space constraints in the current work.

[4] That [labial] cannot co-occur with [-back] is argued to be universal and is based on formant properties of the two features: the inverse of [labial] enhancement of [+back] argued by Stevens et al (1986) is argued by Spring (1993a) to be a prohibition against [labial] with [-back].

(6) Axininca Path Conditions:
a. [labial]/[-back] together are disallowed; holds for vowels and consonants
b. [labial]/[coronal] together are disallowed; holds for consonants i.e. since only consonants use [coronal]

The net result of Combinatorial Specification in (5) and Grounding Theory in (6) is the place of articulation feature-phonology of Axininca consonants and vowels, shown along the top horizontal row in (7), and assumed throughout this paper; feature-based (7.1-5) correspond to (5.1-5). Features along the leftmost column correspond to specified manner features (as based on other phonological processes in Axininca). (Note that sonorants [w r rʸ y ɰ] are completely underspecified for manner features, and thus [ɰ] is the completely underspecified consonant. Also note that stops are [-continuant]; both points which will figure in discussion of the FR.)

(7) Summary: feature phonology of Axininca consonants.

	1.labial	2.coronal	3.coronal/-back	4. -back	5. Oplace
[-cont]	p	t	ʧ		k
" , [sp glot]		tʰ	ʧʰ		
[+cont]		s	ç		h
[-/+cont]		c			
" , [sp glot]		cʰ			
[nasal]	m	n	ñ		N
	w	r	rʸ	y	ɰ
moraic:	o			i	a

Because the realization of FR is dependent upon the feature specification of the final consonant of the verb-root, understanding of the general phonology in (5) and (6) (in particular the prohibition against [labial] and [-back] together, (6a)) as summarized in (7), is critical. The next section shows that the phonological form of the FR is bimoraic /ia/; two empirical arguments, including a general Lengthening rule which will figure prominently in following analyses and discussion, demonstrate this point.

2.2 Phonological form of the Future Reflexive

Representative examples of the three tense markers other than the FR are shown in (8); to note, the future marker ('F') is [i], and the reflexive ('NFR') is [a]. Payne (1981) argues that the underlying form of the Future Reflexive marker is a port manteau morpheme composed of the future /i/ + reflexive /a/, respectively. But given that [y] (formally, the feature [-back] in a consonantal, i.e. onset, syllable position) but not [i] is *always* a component of the realization of the FR, the question which naturally arises is whether /-ya/ is the true phonological representation of the FR.

(8) a.no-ʧʰik-ak-**i**-ro — [noʧʰikakiro] — I have cut it
1-cut-PERF-**NF**-3f

b.no-N-ʧʰik-ak-**i**-ro — [nonʧʰikakiro] — I will have cut it
1-F-cut-PERF-**F**-3f

c.no-ʧʰik-ak-**a** — [noʧʰikaka] — I have cut myself
1-cut-PERF-**NFR**

That Payne was correct is shown by two sets of facts. First, the behavior of vowel-final roots suffixed with the FR shows that the FR must begin with a vowel. As shown in (9a), [t]-epenthesis regularly intervenes between a vowel-final verb root and a vowel-initial suffix. In contrast, (9b), when a consonant-initial suffix follows a vowel-final verb root, epenthesis does not intervene. Forms in (9c), vowel-final roots suffixed with the FR, show that [t]-epenthesis intervenes between root and suffix. Like phonologically /t/-final verb roots in (1b)/(3b), this epenthetic consonant palatalizes to [č]. Since [t]-epenthesis intervenes only between two vowels, in a verb+suffix, derived environment, it follows that the FR must begin with a vowel--not a consonant. Hence /ia/, not */ya/ is the correct phonological form of the FR.

(9)	V-final root		
	a. misi	[no-**misi-t i**] 1-dream-E-F	I will dream
	oti	[n-**oti- t i**] 1-insert-E-F	I will insert
	b. pisi	[i-m-**pisi-piro**-t i] 1-F-sweep-VER-E-F	he will really sweep
	naa	[no-**naa-wai**- t i] 1-chew-CONT-E--F	I will continue to chew
	c. piyo	[i-m-piyo-č aa-ma] 3m-F-gather-FR-DUB	he will gather himself?
	oti	[h-oti-č aa-ma] 3m-put in-FR-DUB	he will put in himself?

The second argument that [y], or formally, [-back] in a syllable onset position, in all forms of the FR must be derived, comes from a general Lengthening rule of Axininca. First, we know that the reflexive marker is [a], a short vowel, in Axininca (cf. figure (8c); also, eg. [ipiyocitakawo] 'he has gathered it, in addition', with the NFR in non-final position). Nonetheless, the vowel [aa] in FR forms in (4a-b) is long. Note that the onset [y] (formally, [-back]; cf. figure (7.4)) precedes this long vowel. More generally, note from (10a) that vowels following a palatal(ized) consonant in Axininca in a derived environment, are long. (10b) shows that the same vowel-initial suffixes following a non-palatal consonant are short; and (10c) shows that in non- derived environments, vowels can be short when a palatal precedes.

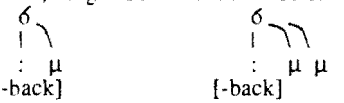
(10)	a.no-č-ak-i 1-enter-PERF-NF	[nočaaki]	I have entered
	no-miç-i-ro 1-peel-F-3f	[nomiçiiro]	I will peel it
	no-ñ-i-ri 1-see-NF-3m	[noñiiri]	I saw him
	no-parʸ-ak-i 1-fall-PERF-NF	[noparʸaaki]	I have fallen
	b. no-p-ak-i 1-give-PERF-NF	[nopaki]	I have given
	no-N-kiw-ak-i 1-F-wash-PERF-F	[noŋkiwaki]	I will have washed
	no-kis-a-ma 1-angry-NFR-DUB	[noŋkisama]	I am not angry with myself?

c.kačok-aanch^{h}i mix-INF	[kačokaanch^{h}i]	to mix
çiya palm	[çiya]	palm
koñapi poison root	[koñapi]	poison root
no-yor^{y}ani 1-manioc root	[noyor^{y}ani]	my manioc root

Figure (11) formalizes this general Lengthening of Axininca, via mora insertion, which regularly occurs in a derived environment and when a [-back] feature in onset position precedes a vowel (see section 4 for discussion of the historical roots of Lengthening).[5] By Kiparsky (1985) then, this derived environment will be satisfied anytime the environment is derived i) by morphological concatenation, or ii) a [y] is created on the same phonological cycle as Lengthening. Section 3 argues that [y] in all forms of the realization of the FR [iyaa] is a case of the latter: [y] is derived, and thus [aa] in the FR in (4a-b) is too. It follows from this point that /ia/, and not */ya/, must be the phonological form of the FR: were /y/ underlying, it would not create the derived environment for Lengthening.

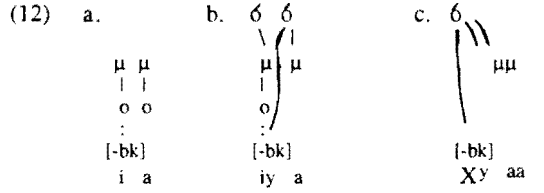
(11) a. argument: mora; insert; Target Condition: derived environment

b.



Summarizing, in a moraic formalization (see Hyman, 1985; Hayes, 1985; McCarthy and Prince, 1986, etc. on the mora), the FR is phonologically bimoraic, as shown in (12a). Notably, this /ia/ sequence is not a well-formed syllable nucleus in Axininca; rather, possible syllable nuclei include only [a], [i], [o], geminates, and [oi] and [ai] (see Payne, 1981). Stated in terms of a phonetic regularity governing the nucleus: the nucleus must be of strictly equal or decreasing sonority from left edge to right. In its empirical realization, the FR takes two forms: i) following a [labial] or [coronal]/[-back] consonant it is realized as disyllabic, (12b) (long vowels are excluded as they result from Lengthening in (11); see section 3)); and ii) after a [coronal]- or 0place-final root, the FR is monosyllabic, with palatalization of the final consonant of the root, as shown in (12c). Note that both (12b) and (12c) resolve the syllabic ill-formedness of the FR in (12a).

(12)



[5] (11) assumes without argument rule parameterization in keeping with Archangeli and Pulleyblank (to appear).

With this understanding of the general phonology of Axininca complete, the next section shows that the realization of the FR is achieved by linking the feature [-back] from /i/ in the FR. Interestingly, linking is to the left in (12c), and is to the right in (12b).[6]

3. Analysis of the Future Reflexive: the contribution of the general phonology

Although the phonological form of the FR is bimoraic /ia/ as in (12a), as stated above, it can never be realized as such since [ia] is a syllable nucleus with increasing sonority from left to right edge. (Moreover, it cannot be realized as heterosyllabic [i.a] because onsets are required in Axininca.[7]) This constraint on the syllable nucleus, i.e. that it have decreasing sonority, if sonority change at all, is common; we shall identify it as *Nuc-Son*. For now, the point is that the realization of the FR must in all cases diverge from the phonological form to produce well-formed syllable structure. Both realizations of the FR in (12) are consistent with a rule-type formalization of [-back]-spread, as given in (13): [-back] aligns with a syllable position which does not violate Nuc-Son, via insertion of association lines.[8] Note that the direction of Spread is unspecified; as we shall see immediately, [-back] aligns with a syllable to the left with [coronal]- or 0place-final roots, i.e. when feature restrictions are not violated, and with a syllable to the right when a [labial] or [-back] consonant precedes. Only in the latter case would a feature violation occur (the relevance of the FREE specification on the target in (13) will become clear when we examine [-back]-final verb roots.) Finally, Lengthening, and in some forms multiple iteration of Lengthening, produces output forms.

(13) [-back] Spread: Argument: [-back]; Insert: assoc. line ("path");
target FREE

Figures (14)-(18) illustrate i) the affects of (13) with verb-roots ending with various place features, and ii) the lack of a specified direction in (13). By linking [-back] with a [coronal]-final root, the well-formed Axininca palatal, formally a [coronal]/[-back] consonant (cf. figure (7.3)), results, as shown in (14). A feature hierarchy following

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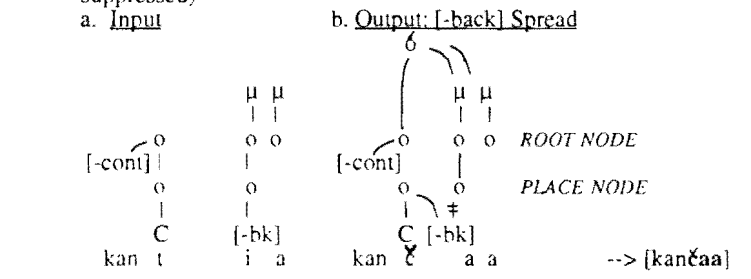
[6]Because [-back] "spread" is argued to arise from a constraint on Structure in section 4, I use descriptions: "to the left" or "to the right" in an attempt to describe and illustrate the phenomenon without engendering the formal apparatus of direction connotated by "right-to-left" and 'left-to-right'. Nonetheless, the statement and discussion of [-back] 'spread' continues to be expressed partially 'process oriented', i.e. in terms of generative rules. Part of the reason for this is the difficulty of describing phonological regularities without reference to the discriptive vocabulary developed along with the rule-based theoretical underpinnings from which the current theory arises. The second problem, unresolved in this short paper, is the fact that [-back] spread must stipulate FREE (see below), a formalization which, at least in lieu of further discussion, appears rule-based (cf. Archangeli and Pulleyblank, to appear, on FREE).

[7] This point is well-established in the literature. See Payne, 1981; Spring, 1990; 1993b; 1994; McCarthy and Prince, 1993.

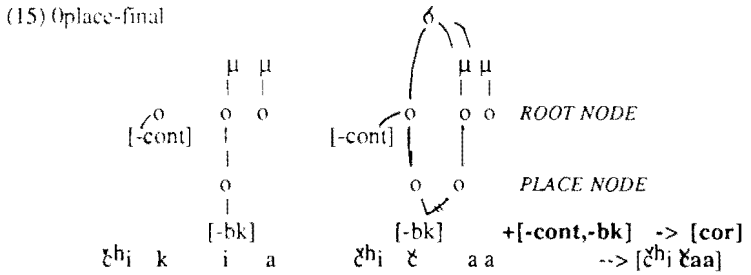
[8] We shall argue in section 4 that structure--such as accompanies association line insertion as in (13)--is dispreferred in Axininca (cf. Prince and Smolensky, 1993). But for now, with (13), hierarchical representations exemplify the interaction of (13) with particular consonants, and the problem of a lack of specified direction in (13).

Sagey (1986) is assumed.[9] Note that association of [-back] is to the left, i.e. is to a preceding syllable, and produces a monosyllabic FR output. Both morae of the FR, dominating no features at all, are realized phonetically as [aa]--in keeping with the vowel phonology identified in (7.5). Likewise, with 0place-final consonants [-back] aligns to the left since no place feature violations result, as shown in (15).[10]

(14) [coronal] (C = [coronal], [-bk] = [-back]; irrelevant features suppressed)



(15) 0place-final



With roots ending with other than [coronal] or 0place, were[-back] to associate to the preceding syllable, i.e. to the left, feature violations would result, as shown in (16). If [-back] associated with a preceding [labial] consonant the prohibition against [labial]/[-back] consonants shown in (7) by (6a) would result. Instead, with a [labial]-final root, [-back] links to the right, as shown in (17). In this case, [-back] Spread produces an onset [y] intermediating the FR; i.e. /i.a/ -> [iya]. Because this onset is derived, it in turn produces the environment for Lengthening in (11)--the latter of which requires a derived environment for application (note that [i] following [w], a [labial], i.e. a vowel following a non-palatal, does not lengthen).

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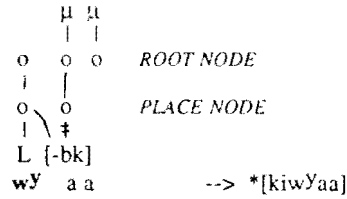
[9] The behavior of Axininca consonants and vowels includes virtually no long distance dependencies, no transparent segment effects, no partial-spread rules. Lacking such data, Axininca bears little on the question of which specific feature hierarchy is correct. Sagey (1986) is assumed because this hierarchy allows [-back] as a dependent of [dorsal], a point critical to *the system* underlying the Axininca consonant and vowel inventory. See Spring, 1993a, 1994.

[10] Note in the far right column of (15) that redundancy dictates that [coronal] be specified on this [-continuant, -back] consonant; cf. features of [c] in figure (7.3).

(16) [labial]-final root

a. Input

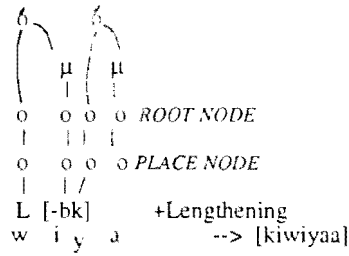
b. Output: [-back] Spread



(17) [labial]-final root

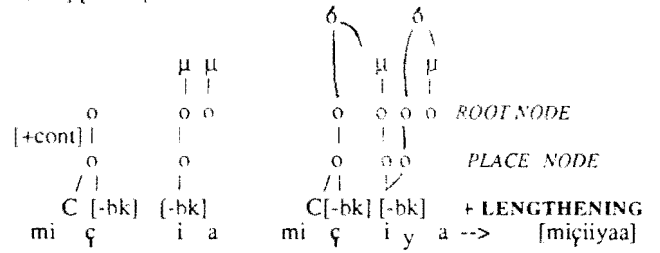
a. Input

b. Output: [-back] Spread



Finally, roots which end with [coronal]/[-back] are specified with [-back]; hence, because the target of [-back] Spread must be FREE, i.e. must not be specified for the argument, as shown in (13), [-back] cannot link to the left, rather must link to the right, (18). Note that the derived environment for Lengthening is satisfied in two environments in (18): i) because the morphological juncture between verb and FR is derived, [i] lengthens; and ii) because [y] is created on the phonological cycle by link of [-back] to the right, [a] following derived [y] is Lengthened.

(18) [coronal]/[-back]-final



Summarizing to this point, that the realization of the FR is invariantly distinct from its input form is motivated by the syllabic ill-formedness of this affix 'as is'. In every case, [-back] spread eliminates this nuclear ill-formedness. General constraints explain most points relating to the output form of the FR. First, that [-back] links to the left with [coronal]- or 0place-final roots follows from the compatibility of [-back]

with the place specification of the root-final consonant: no feature violations occur. In contrast, with a [labial]-final root, were [-back] Spread to link to the left, the prohibition against these two features together would be violated. Note the argument here for velar underspecification: if velar were specified, i.e. as [+back], because [-back] *can* spread to velars to produce a [-back] segment, [-back] Spread would necessarily be feature changing. In turn, if it were feature changing, [-back] Spread would be falsely predicted to link to [labial]-final roots--as a feature changing operation. That it does not is evidence that velar cannot be specified, and [coronal], therefore, must be specified (cf. Trigo, 1888; and Paradis and Prunet, 1990 et seq.). And [-back] cannot link to the final consonant of the root if that consonant is already [-back] as per the stipulation FREE on the target in (13). Finally, Lengthening in the FR follows from the general phonology: when a [-back] consonant is in a morphologically/phonologically derived environment, the following vowel lengthens.

Before showing the solution to the issue of bidirectionality of [-back] Spread from an Optimality Theory approach to phonological analysis, and before arguing the language particular nature of Lengthening, we first show how the analysis developed in this section sheds light on the phonological form of two types of "[y]"-final verbs.

3. 2 The phonological form of some [y]-final roots: /iɣ/-final roots

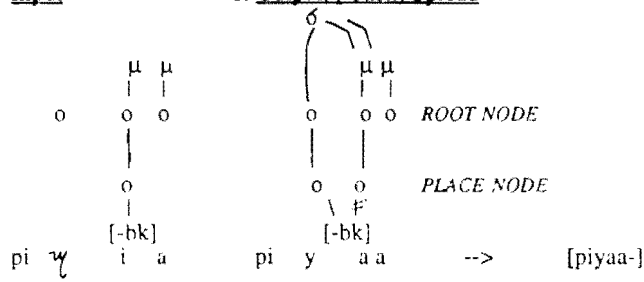
One class of [y]-final verbs behaves identically to other palatal-final roots, as shown in (19a). Like other [-back]-final roots illustrated in (18), these forms behave as if [-back] links to the right: the appropriate FR form, [iiyaa], results. In contrast, the class of surface [y]-final roots in (19b) behaves like [coronal]- and 0place-final roots: [-back] denotes the final consonant of the root, and the remainder of the FR is realized as [aa]. Note that whereas with forms in (19a) root-final [y] is preceded by any quality of vowel, those in (19b) are invariantly preceded by the vowel [i].

(19) Two classes of "[y]"-final forms (D. Payne and C. Spring, 1989):

Future Reflexive		surface root
a. no-N-miy-ia-ma 1-F-jump-FR-DUB	[nomiy**iiyaa**ma]	(o)miy
no-N-kay-ia-ma 1-F-hull-FR-DUB	[noŋkay**iiyaa**ma]	kay
no-N-oy-ia-ma 1-F-wait-FR-DUB	[noy**iiyaa**ma]	oy
b. no-N-piy-ia-ma 1-F-lose-FR-DUB	[nompiy**aa**ma]	piy
no-N-kiy-ia-ma 1-F-dig-FR-DUB	[noŋkiy**aa**ma]	kiy
no-N-asiy-ia-ma 1-F-chew-FR-DUB	[nasiy**aa**ma]	(a)siy
no-N-kawiy-ia-ma 1-F-insult-FR-DUB	[noŋkawiy**aa**ma]	kawiy
no-N-ciy-ia-ma 1-F-pole up river-FR-DUB	[nociy**aa**ma]	(o)ciy
no-N-kach^{h}iy-ia-ma 1-F-fold leaf-FR-DUB	[noŋkach^{h}iy**aa**ma]	kach^{h}iy
no-N-siy-ia-ma 1-F-escape-FR-DUB	[nosiy**aa**ma]	siy

Assume for the moment that forms in (19b) are 0place final. From the inventory in (7.5) we see that the final glide of such forms would be [ɰ], i.e. roots in (19b) would be /i ɰ /-final. As with other 0place final roots, [-back] is predicted to link to the left (cf. (15)), and the correct realization of the FR results, as shown in (20) (in this case note that the glide [y], with no concomitant [coronal] insertion must result).

(20) a. Input b. Output: [-back] Spread



Two pieces of evidence demonstrate that the analysis of forms in (19b) as phonologically /-i ɰ /-final roots is correct. First, comparative evidence shows that these Axininca forms are historically / ɰ /-final. (21b): historically, /-V ɰ / roots exist in Axininca. Note that forms corresponding to those in (19b) are attested in (21b): e.g. 'run' = [siy] in (19b) corresponds to historical 'run' = /si ɰ / in (21b). That these roots maintain a distinction in the FR (at least), behaving as though they are 0place-final, shows that the surface distribution of [ɰ] surrounded only by [a] is not a fact about the deep phonology, as previously assumed (e.g. Payne, 1981; Black, 1991). Rather, future research should demonstrate further interesting phonological behavior of these /-i ɰ /-final roots.[11]

(21) CAMPA

			Asheninca	
		Caquinte	Pichis	Axininca
a.	sleep	ma ɰ	ma ɰ	ma ɰ
	burn	ta ɰ	ta ɰ	ta ɰ
	show	(o)ni ɰ a ɰ	onyaak	onaa ɰ
	insert	o ɰ iha ɰ	owik	oyaa ɰ
b.	run,escape	shi ɰ	shiy	siy
	change-state			
	avenge	pi ɰ a	piya	piya
	stand	kati ɰ	kaciy	—

Second, Lengthening facts support the hypothesis presented here: recall that [-back] consonants in a derived environment trigger Lengthening (figure (11)). While forms

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[11] In fact such data already exist: /ow/, 'to kill' is historically /o ɰ /. In Pichis, a dialect closely related to Axininca, this root behaves as though it is still phonologically / ɰ /-final. And the alternations of 'manioc root' demonstrate that this form may well continue to be phonologically / ɰ /-initial.

from (19a) do trigger Lengthening in a morphologically derived environment, as shown in (22a), those in (19b) do not, (22b).

(22)

			reflexive
a.	ir-kay-ak-a 3m-hull-PERF-NFR	[ikay**aa**ka]	he has hulled
	ir-oy-ak-a 3m-wait-PERF-NFR	[hoy**aa**ka]	he has waited
b.	ir-asiy-ak-a 3m-escape-PERF-NFR	[hasiy**a**ka]	he has escaped
	ir-piy-ak-a 3m-lose-PERF-NFR	[ipiy**a**ka]	he has lost

In sum, elicitation of a large number of surface [y]-final verbs shows two classes which consistently behave differently. One set is truly /y/-final: it prohibits [-back] linking to the left, it triggers Lengthening, and it is historically /y/ final. As expected, any vowel precedes this glide. Thus /y/ is not an analytical maverick in Axininca, as previous data would force us to conclude.

The second set of surface [y]-final verb roots is demonstrably /ɣ/-final. This set does undergo [-back] linking to the left, it fails to trigger Lengthening, and comparative evidence demonstrates that it is historically /ɣ/-final. That the vowel [i] invariantly precedes this velar-glide causes the invariant neutralization of this verb root to an [iy]-final verb at phonetic level.

The remainder of this paper takes up the remaining question of the FR: why is the direction of [-back] association variable? In Axininca [-back] linking to the right occurs *only if linking to the left fails* by feature violation. This observation, i.e. that certain aspects of outputs are preferred (eg. linking to the left); that others are impossible (eg. *[ia]); and that none is absolute (eg. linking to the left) begs for an analysis using ranked constraints in an Optimality approach to phonological analysis.

4. An Optimal Solution to Direction

A basic tenet of Optimality Theory (Prince and Smolensky, 1993; McCarthy and Prince, 1993) is that a given output (where 'output' is like 'surface' form but does not engender the notion of overt derivation) is the best-case result of satisfying competing constraints. Some constraints are inviolate (hence, never violated by output forms), while others are ranked relative to each other. In the latter case, in a situation where constraints compete for actualization, the higher ranked constraint wins, i.e. is manifest in the output. Thus, output forms only violate a constraint in order to satisfy another, higher ranked constraint. In its strong form, Optimality allows no language-particular rules, and thus language variation is due entirely to language-specific ranking of constraints. The preference of such a theory, if tenable, is clear: if language-particular constraints are allowed in such a theory, the question is back to a basic one, i.e. how to formally distinguish constraints and rules.

This section shows that because of its focus on explaining preference relations, an Optimality approach incorporating the notion of ***ranking*** accounts well for the direction issue remaining in the realization of the FR. Axininca bears out the notion that, ceteris paribus, structure in phonological representations, both association lines and nodes, is dispreferred; I refer to this constraint as *Structure*.[12]

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[12] This constraint is cited in McCarthy and Prince, 1993:15, 22.

Recall the problem of direction: [-back] linking to the left fails only when combination of [-back] with a preceding place specification would be a feature violation. In such a case, [-back] links to the right. But once we have linking to the right, the question is why [-back] *ever* links to the left--since[-back] linking to the right is always an option and would be phonologically well-formed in all cases: eg. *[kant-iyaa-] 'tell-FR', *[ɛ̆ʰik-iyaa] 'cut-FR', etc.[13]

Optimality Theory argues that output forms best satisfy competing constraints. Taking the ill-formedness of nuclear /ia/ in Axininca to be a restriction against increasing sonority in the nucleus, termed here *Nuc-Son*, figures (23a) and (24b) show that Nuc-Son is inviolate, i.e. is always obeyed ('->' shows actual output; the left column, rows a-c, shows competing output; '*' shows a constraint violation; and '!' shows an impossible violation). Hence, output forms never display such a tautosyllabic sequence.

We know from general constraints on Axininca place specification that the features [labial]/[-back] together are illformed, (6a). In terms of an Optimal approach: violation of [labial]/[-back] is dispreferred (in fact, it is inviolate in Axininca). But since, with a [coronal]-final root, this constraint is never potentially violated, it simply does not figure when output forms compete for realization. In (23c), if [-back] linking were to the right, a disyllabic suffix, [i.yaa] would result. In fact, linking to left avoids excessive syllable structure, instead maintaining only the bimoraic structure of the phonological form, resulting in a monosyllabic suffix [C'aa]. Thus the output in (23b) over (23c) is due to compliance with Structure.

(23)		Nuc-Son	[labial]/[-back]	Structure
a.	kant . i a	*!		
b.	-> kan . ɛ̆ aa			
c.	kan. t i . ya			*

In contrast to [coronal] or 0place-final roots, for which the contrast prohibiting [labial]/[-back] is simply irrelevant, when a [labial]-final form is suffixed with the FR, the high ranking constraint against [labial]/[-back] is active. It is ranked higher than Structure. In (24), structure is unviolated, (24b), only by sacrificing [labial]/[-back]; but since the latter is higher ranked, output in (24b) is impossible. Instead, lower ranked Structure is violated, with the output being disyllabic (24c).[14]

---

[13] If Archangeli and Pulleyblank (to appear) are correct that the default *direction* parameter is left to right. Hence in Axininca, where, if specified, [-back] linking would have to be to the left--to explain forms where a feature violation does not occur--an argument based on defaults cannot go through.

[14] Presumably, the stipulation FREE in the specification of [-back] Spread in (13) must, like [labial]/[-back], be higher ranked than structure. (Together these two constraints might reduce to a family of constraints against feature violation.) Hence, [-back]-final roots link [-back] to the right, in violation of Structure, rather than to the left, in violation of FREE. As noted above, FREE, in its current incarnation in (13), is a problem for a completely constraint-based interpretation of (13) using *Structure*.

A competing alternative analysis to (13)/Structure would be to posit a direction in (13), i.e. right to left [-back] Spread, where direction is disobeyed only if higher ranked FREE or [labial]/[-back] would be violated. Such an analysis would imply that bidirectionality in spread rules *which are overtly specified for one direction of application* should be common, a proposition which cannot at present be maintained. Space constraints prohibit further discussion of these points.

(24)		Nuc-Son	[labial]/[-back]	Structure
a.	kiw . i a	*!		
b.	ki . w^{y}aa		*!	
c. ->	ki .w i . ya			*

Summarizing, several aspects of the realization of the FR result from very general principles of Axininca phonology. The invariant realization of the Future Reflexive as distinct from its input form is due to a constraint against increasing nuclear sonority. Feature constraints, which are unviolated in Axininca, dictate [-back] linking to the right--producing an extra syllable--in violation of Structure. Elsewhere, linking maintains a monosyllabic FR.

But other aspects of the FR support a processual notion of generative phonology, i.e. rules, which is in one case, language specific. First, that Lengthening occurs only in a--sometimes phonologically--derived environment is intrinsically processual. Moreover, Lengthening itself seems to be a language particular consequence of a preceding historical change. Vowel length in derived environments in Axininca appears to persist as a reflex of an earlier innovation of the language: historically, Asheninca palatal consonants appear to derive from surface sequences C-i-V in Proto-Campa. Compare, for example, Caquinte data in (25) (all data from Swift, 1985). Note that Nuc-Son, prohibited in Axininca (and in fact, in Asheninca) appears to characterize Caquinte (surface-level) nuclei. Moreover, that Lengthening does not apply to invariantly neutralized /-i^{y}/-final roots in (22b) presents a substantive challenge for formalization of Lengthening in a constraints-based system.

(25)

/ci^{y}-a/	[inciantakemparoka]	up there with which he will burn it
/hi^{y}-ak/	[iri^{y}otakaahiakeri]	he will instruct them
	[irioshi]	God
/i-pe^{y}-ak-a/	[ipeaka]	he had disappeared

Such data as these from Caquinte suggest that Axininca (more precisely, Proto-Asheninca) palatals arose from a promotion of Nuc-Son to an inviolate constraint: Asheninca dialects quite possibly innovated palatal consonants from the [iV] nuclei exemplified in (25). Detailed comparative data are likely to show that Lengthening in Axininca after a palatal is a reflex of a rule of compensatory lengthening which arose when the [-back] of [i] in Proto-Campa spread to onset position in Proto-Asheninca, leaving behind an empty mora (i.e. a process like [-back] spread with [coronal]-final roots in the FR, (14); the relationship between Lengthening and historical compensatory lengthening was pointed out by David Payne, p.c.). While compensatory lengthening itself is arguably the result of constraints, the synchronic analogical Lengthening rule of Axininca is arguably, intrinsically processual, rule-based and language specific. (Note that it interacts with word final shortening, (2), which is arguably a universal constraint, as shown by FR forms in (1) vs. (3).)

To conclude, while the notion of *ranking* in Optimality Theory is demonstrably useful to elucidate the Axininca FR, in particular to explain variable direction of [-back] linking, the notion that all phonological alternation is attributable to universal constraints is questionable. In particular, Lengthening in Axininca is less

easily explained by Universal Constraints. But Optimality Theory need not allow ranked *Language Particular* Constraints; rather, rules are needed. Presumably, such rules will be so identified by such means as comparative analysis. This result would no doubt provide some comfort to linguists, but would obviously remain unexplanatory with respect to the question of language acquisition. Finally, that universal constraints might govern rule parameterization, such as the constraint *Structure* governing direction of a rule like [-back] Spread, might be tenable.

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Some Aspects of Perceptual Phonology

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1. Introduction

Phonological theories have focused on the productive aspects of phonology. This means that phonological theories have tried to devise rules and conventions which are necessary to describe mainly productive phonological phenomena(cf. Hooper 1976, Stampe 1973/1979). A typical example of productive phonological phenomenon is assimilation: palatalization, nasal assimilation, voicing assimilation, and vowel harmony, etc. (Kim 1982).

However, there exist both speakers and hearers in the act of speech performance. In this paper, I will try to illustrate the need for considering perceptually motivated processes in phonological theory, which I term "perceptual phonology". To this end, I use as evidence some Korean phonological processes, which are perceptually oriented in nature. In this paper, I also look at the rule interaction phenomena between perception rules and production rules. Based on the analysis of /i/-epenthesis (a perception rule) in borrowings and its interaction with /t/-neutralization (a production rule), I propose that perception rules should apply before production rules, which conforms to the precedence principle of Donegan and Stampe (1979) and the Productivity Hypothesis of Myers (1992).

The structure of this paper is as follows. In section 2, I provide the theoretical background on which I base my argument. Also, I characterize briefly what perceptual phonology is. In section 3, I investigate some phonological processes in Korean which are perceptually motivated in nature. Section 4 is concerned with interactions between perception rules and production rules. In section 5, I discuss some theoretical implications of my analysis. Finally, the summary of this paper follows in section 6.

2. Background

Communication is between hearers and speakers Speakers pursue so-called 'the principle of the least effort' when they speak, so speech sounds tend to become unclear and indistinct. Hearers, however, pursue 'the principle of maximum perception' when they hear, so they want the speech sounds to be clear and dis-

tinctive. Thus, hearers control excessive economy principle of speakers, and demand some conditions on the economy of the speakers to make communication work (cf. Kim 1982).[1] For that reason, we have rules for the sake of speakers (i.e. production rules) and rules for the sake of hearers (i.e. perception rules). The two rule types work together in the act of speech communication. However, I assume that maximal perception principle of hearers is considered first when there arise speech communication problems due to the interaction of the two types of rules. As a background, I look at fortition processes and lenition processes discussed by Donegan & Stampe (1979) and the Productivity Hypothesis proposed by Myers (1992).

2.1. Fortition Processes and Lenition Processes

According to Donegan & Stampe (1979), there are two major segmental rule types, each with distinct functions: lenition processes and fortition processes.

"Lenition Processes (weakening, centripetal, syntagmatic) have an exclusively 'articulatory' teleology, making segments and sequences of segments easier to pronounce by decreasing the articulatory "distance" between features of the segment itself or its adjacent segments. ... Fortition Processes (strengthening, centrifugal, paradigmatic) intensify the salient features of individual segments and/or their contrast with adjacent segments. They invariably have a 'perceptual' teleology ..." (Donegan & Stampe 1979: 142)

If lenition is based on the principle of speaker's articulatory economy, then fortition is based on the principle of hearer's maximum perception. The following diagram shows some typical examples of the two processes.

(1)

Lenition Processes	***Fortition Processes***[2]
Assimilation	Dissimilation
Laxing	Tensing
Deletion	Epenthesis
Monophthongization	Diphthongization
Desyllabification	Syllabification[3]

2.2. Precedence[4]

In explaining the interactions of processes with each other and with rules, Donegan & Stampe use the concept of phonetic teleologies. According to them, nonphonetic operations yield the last word to phonetically motivated operations and perceptually motivated operations yield to articulatorily motivated ones. Thus, the core model of the natural phonological system can be presented like this:

(2) GRAMMAR----->Fortitions----->Lenitions----->SPEECH
LEXICON (Donegan & Stampe 1979: 158)

The diagram in (2) indicates that the application of all fortition processes precedes that of all lenition processes. Donegan & Stampe (1979) provide many examples supporting their precedence principle. I will take it as given and will consider the implications of it in the following sections.

2.3. The Productivity Hypothesis

Myers (1992) examines the precedence principle proposed by Donegan & Stampe (1979) and shows that this precedence relation can be derivable from his Productivity Hypothesis.

(3) Productivity Hypothesis (Myers 1992: 33)
The ordering of the segmental rules A and B is determined in the following way:
a. If A is less productive than B, then A is ordered before B.
b. If A and B are synchronically so unproductive, so as to be primarily prepatterned, then the ordering of A and B follows from the relative productivityof A' and B' according to (3a), where A' and B' are diachronic predecessors of A and B, respectively.
c. If A and B are both fully productive, then they are not ordered. Instead they apply in accordance with Automatic Feeding.

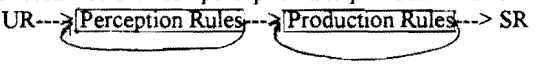
What this principle basically means is that all ordering follows solely from productivity. He suggests that fortitions are universally ordered before lenitions because fortitions are universally less productive than lenitions. He further argues that the speaker must be aware enough to know what is and what is not perceptually salient for the listener in order for a speaker to apply a rule with a "perceptual teleology" (i.e. a fortition). However, the speaker need not be conscious at all in order to apply a lenition process because its function is merely to aid in articulation. Thus, according to Myers (1992), fortitions are like his prepatterened rules which apply more consciously: lenitions are like his on-line rules in their unconscious application (cf. Myers 1992: 222). This suggests that fortitions are less productive than lenitions, since consciousness or perception correlates with productivity.

2.4. Perception Rules and Production Rules

To emphasize the perceptual aspects of phonology, I propose two types of rules: perception rules and production rules. Perception rules include all rules that

are perceptually motivated for the sake of hearers (and speakers). Whereas, production rules include all rules that are articulatorily oriented. I also assume that perception rules include some prosodic processes, which will be discussed in some detail in section 5. Further it is argued that all the perceptually motivated rules precede all the articulatorily motivated rules. The above-mentioned frameworks in the literature support my assumption that perception rules precede production rules. The model of the current system is diagrammed as in figure (4):

(4) Precedence between perception and production rules



3. Perceptually Motivated Rules in Korean

We now consider the phonological processes which are perceptually oriented in nature. In this paper, I discuss three types of perception rules: dissimilation, tensing, and epenthesis. Especially, I provide evidence supporting my argument that perception rules precede production rules through the discussion of /i/-epenthesis and /t/-neutralization.

3.1. Dissimilation: Korean Causativization

Korean causativization shows a typical example of dissimilation. Causative marker in Korean is -i as shown in (5).

(5)

Stem	Causative	Gloss
məkta	mək-i-ta[5]	to eat
cukta	cuk-i-ta	to die
pota	po-i-ta	to see
sokta	sok-i-ta	to get deceived
nokta	nok-i-ta	to liquefy

However, the causative marker -i dissimilates and is changed into -u, when it comes right after the i-final verb stem as in (6).

(6)

Stem	Causative	Gloss
phita	phi-u-ta	to blossom
cita	ci-u-ta	to bear
pita	pi-u-ta	to be empty
c'ita	c'i-u-ta	to grow fat

(Data from Kim 1982)

As we can see in the above examples, Korean causative -i is changed into -u, when -i comes after an i-final verb stem. By dissimilating /i/ to /u/, we can avoid -ii sequences and perceive the causativization process even more clearly. What is interesting is the examples of double causative forms as shown in (7).

(7)

Stem	Causative	Coalition	Double Causative	Gloss
cata	ca-i-ta	cæta	cæ-u-ta	to sleep
sə̀ta	sə̀-i-ta	seta	se-u-ta	to stand
t'ita	t'i-i-ta	t'iyta[6]	t'iy-u-ta	to float
khita	khi-i-ta	khiyta	khi-u-ta	to raise

(Data from Kim 1982)

The examples given in (7) are so-called double causative forms. In each case, causative marker -i is attached to the stem, and this undergoes coalition. However, the result of coalition produces homonyms (i.e. *cæta* 'to measure', *seta* 'to count', *t'ita* 'to belt, and *khita* 'to fire'), so that another causative marker -u is attached in this case to enhance the distinctiveness of the words. The double causative forms support the perceptual strategy to clarify the distinctiveness of meaning by avoiding producing homonyms.

In sum, the dissimilation processes of -u causativization and double causativization account for the perceptual strategy which aims at enhancing the perception of words in Korean. This perceptually motivated phenomenon contrasts finely with the articulatorily motivated one.

3.2. Tensing: Tensification in Korean

Korean tensification is a good example of a tensing process.

(8) [polim] [tal] -----> [porimt'al]
`full moon day' `moon' `full moon'

[pom] [pi] -----> [pomp'i]
`spring' `rain' `spring rain'

[næ] [ka] -----> [nækk'a][7]
`river' `side' `riverside'

[soa] [kwa] -----> [soakk'wa]
`child' `dept.' `pediatrics'

(Data from Sohn 1987)

It is a general tendency that /p,t,k/ in Korean are changed into [b,d,g] between voiced sounds by the voicing assimilation (e.g., /pata/----->[pada] `sea', /pantal/----->[pandal] `half a month', etc.). However, in the cases of compounds, the consonants between voiced sounds are changed into tensed ones as shown in (8) contrary to the general tendency to become voiced ones. The major function of the tensification in compounds is to enhance the perception of the words which are the constituents of the compounds (Choi 1937, Kim 1982). By tensing the first consonant of the second word of the compound, and by avoiding obscurity of the second word as a result of voicing assimilation, we can perceive the elements of the compounds clearly (i.e., we know that the second element of the compound is an independent word as is the first element), and can capture the whole meaning of the compounds with ease, by combining the meaning of the two elements of the compound.[8]

3.3. /i/-epenthesis

The main function of /i/-epenthesis also lies in the enhancement of perception. This rule applies only to foreign words which are borrowed into Korean. This fact strongly suggests that this rule has a perceptual strategy.[9] Some representative examples are given in (9).

(9)

pass	[pæsi]
Christmas	[khirisimasi]
Bach	[ba:hi]
beds	[bɛdzi]
sports	[sipho:tsi]
Jacques	[jak'i]
set	[sɛthi]
Carmen	[kharimɛn]
perro	[p'ɛriro]

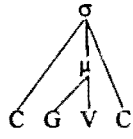
(Data from Chung 1989)

The next section focuses on the discussions of /i/-epenthesis (a perception rule) and its interaction with /t/-neutralization (a production rule).

4. Interaction of Perception Rules and Production Rules

To understand /i/-epenthesis, we need to look at the syllable structure of Korean:

(10) Korean Syllable Structure (Surface Structure)



(G = Glide)

As figure (10) suggests, we can not have consonant clusters in onset and coda positions. Moreover, only seven consonants which are [-released] can be positioned in syllable-final position in Korean: [p,t,k,m,n,ŋ,l]. This means that the other consonants which are [+released] can never occur in that position. Here, [+released] consonants include aspirated/glottalized stops, fricatives, affricates, and /r/. Thus, we can represent the syllable structure constraint of Korean as in (11) using the feature [+released]:

(11) Korean Syllable Structure Constraint

* C]σ
|
[+released]

According to this constraint, [s,h,ts,dz,th,k'] in examples in (9) can not come in syllable-final position because they are all [+released] sounds. Thus, borrowed words whose syllables end in an inappropriate consonant are made licit by the insertion of a vowel /i/. Now we formalize the /i/-epenthesis rule as in (12).

(12) /i/-epenthesis in Korean (Perception Rule)

$$\varnothing \text{ -----> } \begin{bmatrix} V \\ +\text{high} \\ -\text{round} \end{bmatrix} \; / \; \begin{bmatrix} C \\ +\text{released} \end{bmatrix} ____ \;]\sigma$$

The rule says that after the [+released] consonants in syllable-final position /i/ is inserted.

Let us take *Christmas* for an example. According to the syllable structure of Korean (10), [khrismas] would be [khi.ris.mas]. However, when /i/-epenthesis is applied, it becomes [khi.ri.si.ma.si]. As we can see in the above example, the reason of vowel /i/- insertion lies not in the number of syllable-final consonants but the quality of consonants (i.e., [+released]), since /i/-epenthesis occurs when there is no coda consonant clusters (i.e., there is only one syllable-final consonant). Thus, the original pronunciation [krismas] which has only two syllables becomes [khirisimasi], having five syllables when the word comes into Korean.

It is important to notice that the /i/-epenthesis does not apply to the native

Korean words, to which the /t/-neutralization rule applies instead.

(13) /t/-neutralization in Korean (Production Rule)

$$\begin{bmatrix}\text{-sonorant}\\ \text{+coronal}\end{bmatrix} \text{ -----> } \begin{bmatrix}\text{-continuant}\\ \text{-del.rel}\end{bmatrix} / \underline{\quad}]\sigma$$

This rule says that coronal obstruents are realized as /t/ in syllable-final position.

The classical example of neutralization in phonology is the so-called final devoicing of voiced obstruent in German. In German, voiced and voiceless obstruents contrast in non-final position but the contrast is neutralized in final position in favor of the voiceless obstruents. Voiceless obstruents are typologically unmarked. Thus, the member of the opposition found in the position of neutralization in German is the typologically unmarked member. This fact is consistent with the general correlation between unmarkedness and wider distribution (J.K. Gundel et al. 1986). This is true of the Korean neutralization of /t/,/s/,/c/,/ch/, /th/ to /t/. In syllable-final position contrasts are neutralized to the typologically unmarked member of the opposition. I interpret the correlation between unmarkedness and wider distribution as being motivated on the basis of making less effort in the production of unmarked and widely distributed speech sounds. Thus, the neutralization rule can be classified as one of the production rules. The discussions of /i/-epenthesis and /t/-neutralization suggest that there are actually two possibilities for resolving the [+released] coda constraint: /t/-neutralization and /i/-epenthesis.

Let us take another example: *pass* /pæs/. To the given form *pass* /pæs/, we can apply either /t/-neutralization or /i/-epenthesis. To get the right surface form we have to assume extrinsic rule ordering, which says that /i/-epenthesis (12) applies before /t/-neutralization (13). However, this is not a desirable solution. The other explanation could be to hypothesize that /i/-epenthesis applies only to loanwords whose original consonant clusters or syllable-final consonants violate the surface phonetic constraint of Korean. This line of explanation is not unproblematic, either. It doesn't explain why /t/-neutralization, which is very productive phonological rule in Korean, should not be applied to loanwords.

However, in the current approach, a precedence relation between perception rules and production rules finds a natural explanation. As I assumed in the previous sections, perceptually motivated rules should come before articulatorily motivated rules. I also showed that the basic claims of Donegan & Stampe's (1989) fortition/lenition precedence and Myers' (1992) Productivity Hypothesis support the current assumption that perception rules precede production rules. Thus, according to the precedence relation between the two types of rules, I argue that /i/-epenthesis (i.e., a perception rule) should apply before /t/-neutralization (i.e., a production rule). The following illustrates the derivation:

(14)

/pæs/	`pass'	UR
/pæsi/		/i/-epenthesis (Perception Rule)
-----		Neutralization (Production Rule)
[pæsi]		SR

If we reverse the ordering, however, we do not get the correct surface form.

(15)

/pæs/	`pass'	UR
/pæt/		Neutralization (Production Rule)
-----		/i/-epenthesis (Perception Rule)
*[pæt]		SR

As we can see in the derivations (14) and (15), /i/-epenthesis is motivated to perceive the original pronunciation of the borrowings. By applying this rule first, we can avoid applying /t/-neutralization rule whose application makes it difficult to know what the original pronunciation of the borrowing is.

5. Discussion

In section 2.4, I suggested that prosodic processes can be included in perception rules. Donegan & Stampe (1979), Kaisse (1985), and Myers (1992) argue that prosodic processes precede segmental rules. The prosodic constituency of the speech signal is basic to the application of segmental processes (Donegan & Stampe 1979: 142, Myers 1992: 85). However, while Donegan & Stampe (1979) do not discuss further the implication of the relationship between prosodic processes and segmental processes, Myers (1992) makes a worthy observation. Based on the notion of Prosodic Licensing (Itô 1986), he argues that prosodic structure must either be present or be built before segmental structure can be built or changed. Therefore, segmental processes can only take place within the framework provided by prosodic structure, which he calls the Prosodic First principle (Myers 1992: 85).

However, the Productivity Hypothesis cannot account for the relative ordering of prosodic and segmental processes. Even if both prosodic and segmental processes are equally productive, prosodic processes appear to be ordered before segmental rules. In fact, whether the rules are partially productive or fully productive, prosodic rules always precede segmental rules. Thus, it requires a stipulation (i.e. Prosody First principle).

In my analysis, prosodic processes are considered to be perception rules whether they are productive or not in the sense of Myers (1992). Perception rules are not exactly the same as the fortition processes of Donegan & Stampe (1979).

Perception rules range over both fortition processes (segmental and partially productive) and prosodic processes (prosodic and productive or/and non-productive).

Using the notion of perception and production, we may generalize all the phonological processes (whether they are prosodic or segmental) into two types: perception processes and production processes.

6. Conclusion

Thus far, I have argued that we should consider both perceptual aspects of phonology as well as articulatory aspects of phonology by citing some phonological processes of Korean. Further, I have argued that perception rules precede production rules conforming to the basic claims of Donegan & Stampe (1979) and those of Myers (1992). Finally, I have suggested that both prosodic and segmental processes can be generalized under the notion of perception and production in that prosodic processes have basically perceptual orientation.

Footnotes

* I would like to thank Michael Hammond, Cari Spring, James Myers, Chip Gerfen, Diane Meador, Diane Ohala, Keiichiro Suzuki, Sung-Hoon Hong, and Yongtae Shin for their insightful comments and suggestions. Any errors are, needless to say, solely mine.

1. Linell (1979) assumes that there is a unitary competence to be used in encoding as well as in decoding. It suggests that a speaker's competence and a listener's competence are the same. For more detailed discussion, see Linell (1979: Chapter 2).
2. For further details of vocalic fortition processes, see Donegan (1978/1985).
3. We need to note that this process is not related to the current prosodic theory of phonology (cf. Itô 1986, 1989)
4. Suh (1985) discusses precedence relations and rule interactions using different typology of phonological rules (cf. Anderson 1974, 1975).
5. -ta is an indicative marker. Ch and C' represent aspirated consonant and glottalized stop respectively.
6. In Korean *iy* sound preceded by an onset consonant tends to be pronunced as *i* sound.
7. In this case where the lefthand sisters of the compounds are vowel-final, the denominal adjective morpheme (a consonant) is inserted to make tensed the

stem-initial obstruent in the righthand sisters.

8. Voicing assimilation is a production rule and tensing is a perception rule. Here, we can observe that a perception rule precedes a production rule. When tensing is applied, voicing assimilation is not possible.
9. According to Silverman (1992) and Yip (1993), loanword phonology involves two scans: perceptual and phonological.

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CLIFF PATH SENTENCES AND THE GRAMMAR/PARSER INTERFACE*

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1. INTRODUCTION. One of the central concerns in the field of human language processing is the nature of the interaction between the parser, the automatic sentence processing mechanism, and the competence grammar. The task of the parser is to impose a structural analysis on an incoming string of words, and that analysis must be compatible with the structures generated by the competence grammar. The two components must be fairly closely related, and yet almost all previous work has assumed that they are distinct. Taking the work of Bradley Pritchett (1988, 1992) as my point of departure, I will argue that the core of syntactic parsing consists of the local application of grammatical principles.

Sentences which are grammatical, but which cause processing degradation, provide a unique set of tools for exploring the interface of the grammar and parser. To the extent that processing breakdown can be described in syntactic terms, a case can be made for the application of competence principles during parsing.

Very broadly, there are two classes of grammatical sentences which cause processing problems. The first of these is thought to be inherently hard to process for structural reasons. This class contains the centre-embedded sentences, and those with crossed dependencies. The second class of sentences are those where the local resolution of ambiguity leads to an attachment which is not tenable in the long run. Examples of this latter class are the well-known garden path (GP) sentences (e.g., Bever, 1970; Frazier & Fodor, 1978; Pritchett, 1988, 1992). This paper will focus on a set of sentences which fall into the second class.

A garden path effect arises when the parser makes an attachment which is locally tenable, but which must be reanalyzed later in the parse. For example, in the sentence

(1) The horse raced past the barn

the parser reaches the lexical item *raced* in the input string and makes the decision that it is the verb of a main clause. This does not cause any problems in processing sentence (1). Now consider the classic garden path sentence (due to Bever, 1970)[1]

(2) ¿ The horse raced past the barn fell

The parser makes the same decision about the lexical item *raced* as it did for sen-

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1. I will mark all sentences which are grammatical, but which cause processing difficulties, with an inverted question mark.

tence (1), namely that it is the verb of a main clause. When *fell* is reached in the input string, however, *raced past the barn* must be reanalyzed as a relative clause,[2] so that *fell* can be analyzed as the main clause verb. This reanalysis proves to be too costly for the parser,[3] and the sentence cannot be interpreted without conscious effort. As a general characterization, we may say that the processing breakdown in garden path sentences is due to the **presence** of **unexpected** material at the end of an input string.

Now we may ask about the converse situation. Are there sentences where processing breakdown is triggered by the **absence** of **expected** material at the end of the input string? Instead of the parser being led down the garden path, in these cases the parser is metaphorically akin to the cartoon character who runs over a cliff and hangs in midair before falling. I will call sentences of this form *cliff path sentences*. To my knowledge, such sentences have never before been demonstrated to exist. In this paper, I will argue that there are, in fact, cliff path sentences, that they appear in a number of different contexts, and that they can be used as a tool to study the grammar/parser interface.

As an example, consider the pair of sentences

(3) John claimed that felt funny

(4) ¿ John claimed that felt

In the first case, the parser attaches *felt* as a transitive verb when it is reached in the input string, and this analysis causes no problems. In the second, however, analysis of the word *felt* as a transitive verb causes performance breakdown when no verbal complement is encountered in the input string. The sentence is not ungrammatical where *felt* has a nominal reading, but the reanalysis of the sentence proves to be too costly, and so the sentence is unprocessable.

2. AGAINST PERFORMANCE-BASED THEORIES OF PARSING. In this paper, I will argue that the cliff path phenomena can be explained with a grammatical theory of parsing. Due to space limitations, I will not attempt to critique performance-based theories of parsing, or to show that they are inadequate for a complete description of cliff path sentences. Nevertheless, a few words are in order about the particular approach which I have espoused.

Pritchett (1992) argues persuasively against previous parsing models which he

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2. As is the paraphrase *The horse which was raced past the barn fell.* Alternately, it might be reanalyzed as an AP.

3. The key descriptive problem is characterizing unprocessable sentences without predicting that those sentences which are merely ambiguous will cause processing degradation. When I use the term 'costly reanalysis', I mean to imply that the reanalysis causes some sort of processing breakdown. In the case of ambiguity, reanalysis is assumed to occur (sometimes), but not to cause processing breakdown.

divides into four classes: perceptual, computational, lexical and semantic. His taxonomy is based upon the functional motivation of the algorithms and heuristics employed by each model. As a group, perceptual models have usually been based upon the idea of limited cognitive resources. They have been characterized by the lack of a constrained theory of backtracking, and poor empirical coverage of processing breakdown. Computational models usually incorporate a predictive theory of backtracking and a deterministic account of processing which is assumed to follow from human cognitive limitations. Like perceptual models, computational models tend to account for garden path effects in terms of parsing architecture, and thus ignore the possibility that there may be something about the syntactic structure of the problematic sentence which leads to processing difficulty. Lexical approaches attribute garden path-type effects solely to lexical ambiguity, and thus suffer from very poor empirical coverage. Finally, the semantic models seem not to be able to account for garden path sentences at all. As an alternative to the above kinds of models, Pritchett proposes a grammatical account of parsing, claiming that "the core of syntactic parsing consists of the local application of global grammatical principles."

Based upon computational complexity analyses, Ristad (1990) makes the claim that "the relation between competence and performance, between a generative theory and a theory of processing, is not one of limited ability." If it were, he argues, then language users would have difficulty processing those utterances which are truly computationally difficult, and they would not have trouble processing computationally trivial utterances. Neither prediction is observed, however. For example, garden path sentences are quickly parsed with simple algorithms, and yet the human parser finds them extremely difficult. On the other hand, a sentence containing empty categories is very difficult for parsing algorithms, but effortless for the human parser.

Ristad suggests that a single fixed resource bound is never subtle enough to capture the diverse range of empirical facts, and that a more plausible approach is to use a small number of bounds to capture a large range of seemingly unrelated facts. He claims that there is no empirical justification for the idea of resource limitations. The only prediction that such models make is that there is a point at which the parser runs out of resources, but no one has ever demonstrated a pair of examples which are on either side of such a critical point. Finally, he argues that performance errors should be intermittent and unexpected. The language device cannot be said to make systematic errors because it was not designed; "systematic 'errors' cannot be errors in performance, only empirical inadequacies of a particular competence theory." He concludes that "empirical facts thought of today as performance limitations will be explained tomorrow either as interactions among the refined linguistic principles, or as the incomplete acquisition of linguistic knowledge."

I adduce further support from the work of Abney & Johnson (1991). They show that the parsing strategies assumed by most psycholinguists require **less** space for

processing centre-embedded constructions than for processing other perfectly comprehensible constructions. They also show that attempts to reduce the amount of space which the parser requires often lead to an increase in local ambiguities. Both of these results indicate to me that the search for a single resource bound such as a short term memory limitation will have the effect of reducing coverage of garden and cliff path sentences.

3. PRITCHETT'S GRAMMATICAL THEORY OF PARSING. In this section, I will briefly describe Pritchett's (1992) account of grammatical parsing, and show how it accounts for sample garden path sentences. This is not intended to be a complete summary of the theory, but merely a sketch.

The central mechanism is a constraint on non-costly reanalysis during parsing.

> **On-Line Locality Constraint (OLLC):** The target position (if any) assumed by a constituent must be governed or dominated by its source position (if any),[4] otherwise attachment is impossible for the automatic Human Sentence Processor.
>
> **government:** α governs β iff α m-commands β and every γ dominating β dominates α, γ a maximal projection. (Adapted from Chomsky, 1986).
>
> **m-command:** α m-commands β iff α does not dominate β and every γ that dominates α dominates β, γ a maximal projection. (Adapted from Chomsky, 1986).
>
> "Descriptively, one of its primary predictions is that reanalysis of an argument as a lower or co-argument may be acceptable whereas reanalysis as a higher argument or an adjunct is illicit." (p. 101)

The OLLC is correctly able to predict processing breakdown for a variety of garden path sentences, without predicting breakdown for unproblematic sentences with local ambiguities. First, consider sentence (1), reprinted here with some labelled bracketing[5] as (5)

(5) [$_{IP}$ [$_{NP}$ The horse] [$_{VP}$ raced past the barn]]

If we assume that (5) is a reasonable analysis for the input string *the horse raced past the barn*, then the VP in (5) will be the source position for the reanalysis in the garden path sentence, and the target position will be somewhere inside the NP. This can be seen in sentence (2), reprinted here with labelled bracketing as (6)

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4. Pritchett assumes, as do I, that the parser attaches constituents into a parse tree as it receives them in the input string. During reanalysis, a constituent must be clipped off the tree (the source position) and attached somewhere else (the target position).

5. In the labelled bracketing, I show only enough structure to convey the argument. I assume a standard version of X-bar theory with XP, X' and X.

(6) ¿ [IP [NP [NP The horse] [XP raced past the barn]] [VP fell

I have indicated the phrase *raced past the barn* as an XP because its exact nature is not the issue here. To be concrete, we can assume that it is either a relative clause (following Pritchett) or an adjective phrase. The key point is that it is adjoined inside the subject noun phrase. Since the source position (complement of IP) does not govern the target postion (adjoined to the constituent in the SPEC of IP), this reanalysis is correctly predicted to be costly.

Now consider a pair of sentences involving a local ambiguity. Reanalysis will be required at least some of the time, in those cases where the default analysis is incorrect. Crucially, this must be a non-costly reanalysis.

(7) Ned knew the man extremely well

[IP [NP Ned] [VP [V' [V knew] [NP the man

(8) Ned knew the man hated Rex

[IP [NP Ned] [VP [V' [V knew] [CP [IP [NP the man

If we assume that the sentence in (7) is the default analysis,[6] then the source position is going to be the NP complement of *knew* in (7) and the target will be the CP complement of *knew* in (8). In other words, reanalysis involves removing the NP complement of the main clause verb *knew*, nesting it inside of a CP and IP, and reattaching it in the same position. In this case, the source position dominates the target position, and the reanalysis is correctly predicted to be non-costly.

4. CLIFF PATH SENTENCES. The OLLC can also be used to predict cliff path sentences. In this section I will introduce three different kinds of cliff path sentence, and show how the OLLC works in each case.

First, a cliff path effect can arise when the parser has attached a constituent as a transitive verb, and there is no forthcoming verbal complement. This can be seen in sentences (3) and (4), reprinted here as (9) and (10).

(9) John claimed that felt funny

[IP [NP John] [VP [V' [V claimed][CP [C that] [IP [VP felt

(10) ¿ John claimed that felt

[IP [NP John] [VP [V' [V claimed][NP [DET that] [N' [N felt

(i.e., John went to the lost-and-found and claimed some material.)

If we assume a default analysis for *that felt* as in (9), then the following operations will be required for reanalysis. First, the element *that* must be lowered into the phrase which contains *felt*. This involves a change of category (which I assume to be non-costly) and a lowering, which may or may not be costly, depending on one's

6. I follow Pritchett's (1992) assumptions about default attachments during a parse.

theory of government. Second, the phrase containing *that felt* must be raised to become the complement of the verb *claimed*. It is this second movement which is certainly costly, and which leads to processing breakdown.

Second, a cliff path effect can arise in the context of incorrect theta role assignment. In these cases, assignment of the correct theta role is accompanied by costly reanalysis.

(11) John thought the doctor examined patients

[IP [NP John] [VP [V thought][CP [IP [NP the doctor] [VP examined

(12) ¿ John thought the doctor examined

[IP [NP John] [VP [V thought][NP the [N' [N'[N doctor]] [AP examined

(i.e., John thought someone examined the doctor)

If (11) is the default analysis for the string *John thought the doctor examined*, then the operations required during reanalysis will be the movement of *examined* into the NP and subsequent attachment as an adjunct (a position not governed by the source position) and the raising of the NP *the doctor examined* to the complement position of *thought*. Both of these operations are predicted to be costly, and the OLLC correctly predicts that this will cause processing degradation.

The last class of cliff path effects arises when the parser has analyzed a phrase as a coordinate structure, and is awaiting a second conjunct. Reanalysis in this case will also be costly.

(13) John prefers German or French

[IP [NP John] [VP [V' [V prefers][NP [NP German] [CONJ or

(14) ¿ John prefers German ore

[IP [NP John] [VP [V' [V prefers][NP [AP German] [N' [N ore

If (14) is the default analysis for the string *John prefers German or/ore* then the reanalysis operations will be: first, lowering *ore* into the head of the NP which contains *German*, second, raising *German* within the NP, and third, raising the whole NP to become the complement of *prefers*. Both of the raising operations are illicit, and the OLLC predicts this to be a costly reanalysis.

5. A MINIMALIST ACCOUNT. The OLLC has nice empirical coverage, and is able to capture both Garden Path and Cliff Path effects. We may ask, however, why the OLLC makes reference to government and command. Why not some other grammatical relations? (In fact, Pritchett's earlier formulations of the reanalysis constraint involved theta roles and theta domains.)

The key to an explanatory grammatical theory lies in the observation that the standard operation of move-α is raising, whereas non-costly reanalysis is lowering. The Minimalist theory (Chomsky, 1992), which unifies raising movement and structure building, allows us to derive this contrast by claiming that, in some sense,

structure rebuilding is the inverse of structure building.

Minimalist structure building requires the following components (Chomsky,1992):

Projection: the computational system selects an item X from the lexicon, and projects it to one of the following structures

$[X\ ]$

$[X'\ [X\ ]]$

$[XP\ [X'\ [X\ ]]]$

Generalized Transform (GT): target a phrase marker K and substitute K1 for 0 in K. 0 is not drawn from the lexicon, but rather inserted in the first part of the operation of GT. There are two modes of operation for GT, binary substitution, which maps two phrase markers K, K1 onto a single phrase marker K*, and singulary substitution (move-α), which draws K1 from within K, and leaves a trace.

Target Extension: in the overt syntax, 0 is required to be external to K, so that the output phrase marker K* includes K as a proper subpart. Schematically

$[K\ ]\ \text{-- GT -->}\ [K^*\ [K\ ]]$

X-Bar Theory: all phrase markers in the computational system must be licensed by X-bar theory.

In addition, for the purposes of online reanalysis, I posit the following components:

Generalized Transform Reanalysis Mode (GT:r): GT has two modes for online (non-costly) reanalysis. **Splitting** is the inverse of binary substitution. It maps a composite phrase marker K* into two phrase markers K, K1 and deletes K1. **Lowering** is the inverse of singulary substitution. It maps a composite phrase marker K* into two phrase markers K, K1, and then lowers K1 into K.

Target Contraction: the non-costly operation of GT:r is constrained by the requirement that the output phrase marker K be a proper subpart of the input phrase marker K*. Schematically

$[K^*\ [K\ ]]\ \text{-- GT:r -->}\ [K\ ]$

I assume that the splitting mode of GT:r is used during non-costly reanalysis for pruning unneeded branches off of the parse tree. The lowering mode of GT:r is used during the non-costly reanalysis of structures with local ambiguities, such as the *Ned knew the man extremely well / Ned knew the man hated Rex* case. All of the garden and cliff path effects in this paper require the reanalysis to extend its target, and thus violate the requirement that reanalysis contract its target, or they require adjunction, which also violates the target contraction requirement.

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TOWARDS AN LF THEORY OF NEGATIVE POLARITY LICENSING

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This paper argues in favor of an LF approach to Negative Polarity Licensing. First, I analyze the behavior of Negative Polarity Items (NPIs) within preverbal indefinite NPs. I show that polarity licensing takes place only when the indefinite NP can reconstruct to its original position at LF, which permits the NPI to be c-commanded by Neg at that level. The restrictions on reconstruction are derived from the type of matrix predicate involved, and linked to the phenomenon of Definiteness Effects displayed by Hungarian 'bleached' verbs. I also introduce some unnoticed asymmetries in polarity licensing in embedded sentences that raise serious problems for an SS approach to the phenomenon. I show that the contrasts are dependent on the temporal interpretation of the predicates involved, and propose an account that relies on the different representation that the examples are forced to have at LF to license the tense of the embedded clause.

1. Subjects and Negative Polarity Licensing

1.1. NPIs within Preverbal Indefinite NPs

Although all syntactic approaches to Negative Polarity Licensing (NPL) assume the need of a c-command relation between the polarity licenser and the polarity element, the level at which this c-command relation has to take place has been subject to debate. Works such as Safir (1985) and Laka (1990), among others, argue that the relevant level for NPL is SS. An SS approach to the phenomenon (SST) accounts for the ungrammaticality of (1) below by appealing to the failure of Neg to c-command the Negative Polarity Item (NPI) at SS. Under the SST, the basic difference between (1) and the grammatical (2,3) is that it is only in the latter that Neg c-commands the NPI at SS.

(1) a. * Anybody$_i$ wasn't arrested t_i by the police
    b. * Anybody$_i$ didn't come t_i
(2) The police didn't arrest anybody
(3) Didn't anybody come?

Restricting ourselves to cases where the polarity licenser is Negation, the SST predicts that NPIs not c-commanded by Neg at SS will not be licensed. Keeping this in mind, consider the example in (4), from Linebarger (1980):

(4) [A doctor who knew anything about acupuncture] was not available

In (4) the NPI is within a preverbal subject and, under the standard assumption that IP dominates NegP in English, it is not c-commanded by Neg at SS. However, the NPI is licensed, since the example is

grammatical.

The contrast between (1) and (4) raises an interesting problem for the SST. If what accounts for the ungrammaticality of (1) is that Neg does not c-command the NPI at SS, it is not clear what accounts for the grammaticality of (4); this is so because Neg also fails to c-command the subject in (4). The same problem arises if we compare (4) and (5).

(5)* [Many doctors who knew anything about acupuncture] were not available [Linebarger 1980]

Linebarger makes a relevant observation with respect to examples like (4). In particular, she notes that all the examples structurally parallel to (4) where the NPI is licensed have a reading where Neg takes wide scope over the subject. Whereas (6a), a simplified version of (4), is ambiguous between the readings in (6b,c), only the reading corresponding to the surface order is allowed for (7), the counterpart of (5); that is, (7) lacks the reading where the subject NP takes narrower scope than negation.

(6) a. A doctor wasn't available
b. [Ex: x a doctor] NOT (x was available)
c. NOT [Ex: a doctor] (x was available) [Linebarger 1980]
(7) Many doctors weren't available

Linebarger accounts for the reading in (6c) by proposing a reordering operation between Negation and the indefinite subject at LF, in the spirit of Kroch (1974). The same operation is available for (4), as roughly illustrated in (8).

(8) NOT E(x) [x:a doctor who knew anything about acupuncture] x was available

As a result of this operation, the NPI in (4) is under the scope of Negation at LF. This accounts for the licensing possibilities displayed by examples like (4). The impossibility of this reordering operation for (7) accounts in turn for the ungrammaticality of (5), since the NPI will not be under the scope of Neg at LF in that case.[1]

1.2. On the Relevance of the Type of Predicate: 'Bleached Verbs'

Linebarger's LF account offers a way to explain why the NPI can get licensed in (4) but not in (5), a genuine problem for the SS

[1] Some speaker allow marginally a reading where *many*-NP subjects can take narrower scope than negation in some negative sentences. What is important to us, and confirms Linebarger's generalization, is that it is only when this reading is allowed that NPIs embedded within this type of subject are licensed.

approach. However, her analysis faces a serious problem to restrict the LF reordering operation to the cases where polarity licensing takes place. Thus, as the pairs in (9-10) and (11-12) show, NPIs within preverbal indefinite subjects are not always licensed.

(9) [A doctor who knew anything about acupuncture] was not available
(10) *[A doctor who knew anything about acupuncture] was not intelligent

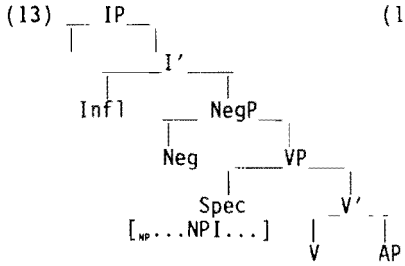
(11) [Tickets to any of the afternoon concerts] were not available
(12) *[Tickets to any of the afternoon concerts] were not green
[Linebarger 1980]

These examples are structurally parallel in all respects at SS. However, they behave differently with respect to NPL. Since the examples in each pair only differ from each other in the matrix verb, it must be the nature of the predicate that is responsible for this contrast.

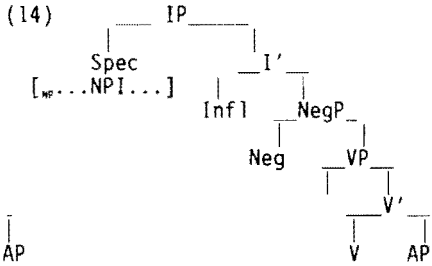
If we analyze these pairs in some detail, there is a clear difference between the predicates in (9,11), on the one hand, and (10,12), on the other. What *green* and *intelligent* have in common is that they are individual-level predicates (ILP); this distinguishes them from *available*, which is a stage-level predicate (SLP). It is well known since Milsark (1974) and Carlson (1977) that these two groups of predicates impose different restrictions on their indefinite subjects. Following recent research on the topic, one might assume that the different properties displayed by indefinite subjects of ILPs and SLPs follow from the different positions that they can occupy at LF: while indefinite subjects of ILPs can only appear in SPEC/IP at LF, indefinite subjects of SLPs appear within VP when interpreted with a weak reading (Diesing 1990; Kratzer 1990; Herburger 1993).

Let us suppose that this is correct. If so, the reason for the contrast in NPL displayed by the examples in (9-12) is that, although parallel at SS, they have different LF representations.

(13)



(14)



In (9) and (11) the subject appears in its base-generated position at LF; in that position it can be c-commanded by Neg at that level,

as roughly illustrated in (13) above. The LF structure in (13) accounts for the narrow scope interpretation of the subjects in (9,11); it also explains why the NPI can be licensed in these examples. The indefinite subjects in (10) and (12), however, appear in SPEC/IP at LF, as illustrated in (14). Embedded within the indefinite subject in SPEC/IP, the NPI cannot be c-commanded by Neg at LF and, as a result, it cannot be licensed.

A prediction of this analysis is that NPIs will be allowed whenever they are embedded within an indefinite preverbal NP in a clause containing a stage-level predicate. The ungrammaticality of examples like (15), however, indicates that this prediction is not totally correct.

(15) * A fundamentalist yogui that had any interest in philosophy wasn't lying on the floor

Although the grammatical examples involve stage-level predicates, it is not the case that NPIs within a preverbal indefinite NP are licensed every time a stage-level predicate is involved.

If we consider other grammatical examples where NPIs within preverbal indefinite subjects are licensed, an important generalization arises: the main predicate is very 'light' in meaning.[2]

(16) a. ? [A doctor with any knowledge of cancer] didn't appear in the hospital yesterday
b. [A solution to any of these problems] doesn't exist
c. ? [A .44 caliber pistol with any accessories] wasn't available in the gunshop
d.(?)[A messiah who would bring any hope] didn't appear to the Jews

Assuming that this is correct, I propose the hypothesis in (17):

(17) NPIs within preverbal indefinite subjects are only licensed when the matrix predicate is a 'bleached' predicate.

The term 'bleached predicate' is borrowed from Szabolcsi (1986). Szabolcsi observes that Hungarian verbs conform to the following generalization:[3]

(18) "In Hungarian, verbs which express existence, or change in the state of existence or availability of the denotation of the designated NP show Definiteness Effects (DE) when no aspectual prefix is attached to

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[2] I am indebted to Barbara Partee for this observation.

[3] Thanks to Irene Heim for bringing Szabolsci's paper to my attention.

them".

Consider the examples in (19), which illustrate the generalization (18). (19a) and (19b) -where the verb has no aspectual affixes attached to it and object is an indefinite NP-, are grammatical examples. Consider now (19c). As in the other examples in (19) the verb is also prefixless; but now the object is either a definite NP or an NP headed by a strong determiner, and the examples are ungrammatical. As (20) shows, when the aspectual prefix meg is added to (19c), the DE disappears and the example becomes grammatical.

(19) ø + V: DE

a. Mari ø + talált tollat / (némi) tejet
Mary ø + found pen-acc / (some) milk-acc
'Mary found a pen / sm milk'

b. Mari nem ø + talált tollat / (némi) tejet
Mary nem ø + found pen-acc / (some) milk-acc
'Mary not found (any) pen / (any) milk'

c. * Mari ø + talált(a) a tollat / minden tollat [DE]
Mary ø + found the pen-acc / every pen-acc
'Mary found the pen / every pen'

(20) Aspectual Prefix + V: No DE

Mari megtalált(a) két tollat / a tollat
Mary pfx-found two pen-acc / the pen-acc
Mary found two pens / the pen.

Szabolsci argues that Hungarian verbs that conform to the pattern in (18), like van ('to be, to have'), akad ('to happen to exist'), érkezik ('to arrive'), kerül ('to become available'), etc., have their meaning reduced to the assertion of (a change in the state of) existence. She calls them 'bleached verbs'. She assumes that every predicate of natural language must have some content. Since the meaning of *bleached verbs* amounts to a logical predicate of existence plus, plausibly, a change operator, they must be substantiated with some lexical content. She further proposes that the indefinite NP, which she assumes is in sisterhood relation with the verb at the V'-level, serves as the 'lexical integer' which substantiates the verb with the necessary lexical content. It is the fact that this indefinite NP has to appear under the V'-level in a strict sisterhood relation with the verb that yields the definiteness effects displayed by these verbs.

Keeping this in mind, let us now come back to our problem. Recall that in the grammatical examples where NPIs are licensed within preverbal indefinite NPs the predicate is 'light' in meaning. I would like to propose that these 'light' predicates are the English non-overt version of the Hungarian *bleached verbs*. As their

Hungarian counterparts, the English *bleached predicates* need to be substantiated with some lexical content. In the examples we are considering, this lexical content is provided by the indefinite NP containing the polarity item. At LF, then, this indefinite NP has to appear in its base-generated position in a strict sisterhood relation with the *bleached predicate* to be able to form a complex predicate with it. Once in its base-generated position within the V'-level, the indefinite NP -and, consequently, also the NPI-, is c-commanded by Neg at LF.

Summarizing, the grammatical cases where a NPI can be licensed within a preverbal indefinite NP involve *bleached predicates*. At LF, the indefinite subject is in a strict sisterhood relation with the predicate; this permits Neg to c-commands the NPI at that level. The LF representation of the ungrammatical cases is different. In particular, the indefinite subject remains in SPEC/IP at LF; consequently, Neg does not c-command the polarity element at LF. If this analysis is correct, the ungrammaticality of examples like (1) does not follow from the failure of Neg to c-command the NPI at SS but rather at LF. Therefore, it should be derived from whatever constraint prevents the subject NPI to reconstruct to its base-generated position within V' in these constructions.

In the next section, I provide further support for the LF approach to NPL on the basis on some unnoticed interactions between NPL and tense interpretation.

2. On the Interaction between NPL and Tense Interpretation

2.1. Licensing by [Neg]COMP

In the previous section, we have analyzed cases where a NPI within a preverbal indefinite subject was licensed even if not c-commanded by Neg at SS. If we move from nominal subjects to sentential subjects, similar cases can be found where NPIs embedded within sentential subjects are also licensed, as illustrated in (21). As in the cases analyzed in the previous section, none of the NPIs within the sentential subject is c-commanded by *never* -the potential licenser of the polarity elements-, at SS; however the example is grammatical, which indicates that the NPIs are licensed.

(21)[That anyone might do anything like that] never occurred to John

The fact that the polarity items in (21) are licensed even if they are not c-commanded by *never* has been interpreted by Ladusaw (1979) as an argument that polarity licensing cannot be captured by purely syntactic means.

Within an SS approach to NPL, Laka (1990) offers a way to reinterpret this type of example in syntactic terms. She argues that the polarity elements within the sentential subject are not directly licensed by the negative element in the matrix clause, but rather by the head of the sentential subject, which she argues is a negative complementizer ([Neg]COMP). Her proposal is roughly represented in

(22a). Under this approach the fact that *never* does not c-command the polarity items in (21) does not present a problem for a syntactic account of the phenomenon, since the relevant c-command requirement can still be maintained to take place between the licenser, [Neg]COMP, and the NPIs. The NPIs in (21) are thus licensed by the head of the sentential subject, which c-commands and -according to Laka- licenses the NPIs at SS. Laka also proposes that the [Neg]COMP can be selected by verbs like *deny* and *doubt* as well as negated predicates, as illustrated in (22b). This would account for the possibility of licensing a NPI within the sentential complement of these predicates.

(22) a. $[_{CP}$ [Neg]COMP $[_{IP}$....NPI....]]$_i$ ... Neg ... t_i .. [Laka 1990]

SS c-command

b. ... { doubt } ... $[_{CP}$ [Neg]COMP $[_{IP}$ ....NPI...]] [Laka 1990]
{ Neg V }

SS c-command

Although Laka's explanation of examples like (21) is proposed within an SS approach to NPL, the hypothesis that it is a [Neg]COMP that licenses the NPI seems neutral between the SST and the LF approach (LFT). This is so because the [Neg]COMP will c-command the polarity elements in (21) both at S-Structure and LF.

There is however some evidence that suggests that this hypothesis is not as neutral with respect to the level at which licensing takes place as it seems at a first glance. Moreover, there are good reasons to believe that even if the NPIs in (21) were licensed by [Neg]COMP, the relevant level at which licensing takes place cannot be SS but must rather be LF.

2.2. Unexpected Asymmetries

Let us briefly reconsider Laka's analysis in the light of a new set of examples, in (23) below. An important prediction of the [Neg]COMP analysis is that in all the cases where a [Neg]COMP can be selected within an embedded complement, it should be possible to license a NPI within that clause. This is in fact what seems to happen in (23a,b), examples structurally parallel to (21). Under this analysis, however, the ungrammaticality of (23c) comes as a surprise.[4]

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[4] Note that the ungrammaticality of (23c) in the text stems only from the impossibility of licensing the NPI, since the example becomes grammatical as soon as we substitute the NPI by a regular NP, as illustrated in (i).

(i) [That Peter will leave the company] wasn't mentioned in the meeting

(23) a. [That anybody would leave the company] wasn't mentioned in the meeting
b. [That anybody had left the company] wasn't mentioned in the meeting
c.*[That anybody will leave the company] wasn't mentioned in the meeting

(23c) is exactly parallel to (23a,b), except for the tense of the embedded clause. Under Laka's analysis, the presence of the [Neg]COMP can account for the polarity licensing facts in (21) and 23a,b). But it is unclear what prevents the NPI from being licensed in (23c). Assuming as the null hypothesis that the three sentential subjects in (23) have been base-generated in the same position, one would expect that a [Neg]complementizer can be selected in all the three cases alike. But, if this is correct, we have no way to account for the contrast in (23) since there is no relevant SS difference in the structure of these examples. It thus looks as if we had to leave the selection facts at the level of stipulation, which would damage the analysis under consideration in a serious way.

Since the only difference between these examples is the tense of the embedded clause, one might think that there is something special about the future tense that prevents NPL from taking place. (24) and (25) suggest that this hypothesis is not correct, since the NPIs are licensed even if the clause where they are embedded is in the future.

(24) I will not read anything tomorrow
(25) ? [That anybody will leave the company] will not be mentioned in the meeting

But, if the NPI can be licensed in (25), what prevents licensing from taking place in (23c)? Once again there seems to be no relevant SS structural distinction between these examples.

We are thus in the middle of a puzzling situation; the examples look structurally parallel in all relevant respects at DS and SS, but they show a different pattern with respect to NPL.

One might wonder whether these asymmetries are relegated to examples where the NPI is embedded within a preverbal sentential subject. The answer is negative; consider (26), where the NPI is now embedded in a sentential object c-commanded by Neg at SS.

(26) a. Mary didn't say that Ann would read any books tomorrow
b. Mary didn't say that Ann had read any books last week
c. ?* Mary didn't say that Ann will read any books tomorrow

As the grammaticality judgements indicate, there is also an

asymmetry between these examples.[5] The grammaticality contrast exhibited by (26) raises the same problems as before, if we follow Laka in assuming that the [Neg]COMP is an available licensing mechanism in (26a,b). Note, again, that the examples are totally alike at SS, and they only differ in the tense of the embedded clause.

Notice also that we cannot attribute the ungrammaticality of (26c) to the presence of the future tense in the embedded clause, since (27) and (28) are grammatical.

(27) Mary doesn't believe [that Ann will read any books tomorrow]
(28) Mary will not say/believe [that Ann will read any books this fall]

Since in the grammatical examples the embedded verb and the matrix verb match in their tense specifications -they are both [+past] or [-past]-, one might wonder whether a morphological tense-matching requirement between the two verbs is necessary for NPL. The grammaticality of (29) indicates that this is not the case.

(29) Mary doesn't think [that Ann read any books last week]

To sum up, I have introduced some new asymmetries in long distance cases of NPL in structures that are totally parallel at SS. If what licenses the NPI in the grammatical cases is a [Neg]COMP, it is unclear what prevents the same licensing mechanism in the ungrammatical cases. Note also that these asymmetries are not only problematic for an SS approach to NPL, but also for an LF approach, unless it can be shown that there are structural differences between the grammatical and ungrammatical examples at that level.

Next I will argue that although the examples are parallel at SS, they present crucial structural differences at LF. It is precisely their different LF representation that accounts for the asymmetries in NPL.

2.3. LF Interactions: NPL and Tense Interpretation

There is a generalization that emerges from the paradigm above: all the ungrammatical cases are those where the NPI is embedded in a clause with future-*will* and the matrix verb is in the past. Why should this combination play a role in disallowing NPL? To answer this, a brief summary of how tenses work is necessary.

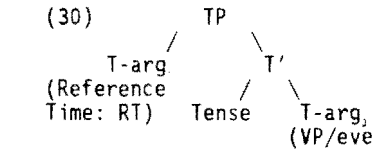
2.3.1. On Tense

I. I will assume, following Zagona (1990) and Stowell (1993), that Tense is a predicate that takes two time-denoting phrases as

[5] Some speakers find (26c) grammatical; for an account of this split in grammaticality judgments, see Uribe-Etxebarria (1994).

its arguments, as represented in (30). The internal argument corresponds to the event-time; the external argument is a reference time. Tense thus specifies whether the event time is before, after or simultaneous with respect to a reference time (RT).

(30)



The RT in matrix clauses corresponds to the utterance time (UTT), or time of speaking. In embedded clauses the RT is determined by structural conditions. Thus, as in Stowell (1993), I will assume that it will be identified with the closest c-commanding event-time. If, because of the structural position of the embedded clause at LF there is no c-commanding event-time available, then the reference time will be the UTT, as in matrix clauses.

II. I will also assume that tenses have to satisfy some morphological licensing requirements. This can be roughly illustrated with the use of *will* and *would*. Consider (31) and (32).

(31) Peter said that Mary would come
(and, as a matter of fact, she already has)

(32) Peter said that Mary will come
(* and, as a matter of fact, she already has)

In (32) Mary's coming is interpreted as future with respect to the UTT time; that is why it disallows a continuation where it is assumed that she has already done so, since it would not be future with respect to the UTT. In (31), on the other hand, Mary's coming is just interpreted as future with respect to Peter's saying it; this is why it admits a continuation where Mary's coming is posterior to Peter's saying it but previous to the UTT. This interpretation derives from the morphological requirements of *will/would*. Simplifying things, the form *will* signals morphologically that the RT (the external argument) Tense is in agreement with is not bound by (or identified with) a [+past] event time. The form *would*, on the other hand, is an overt morphological indication that the RT (T-arg, in (30)) in an agreement relation with Tense is cotemporal with a [+past] event-time. These differences are roughly illustrated in (33) and (34), respectively.

(33) WILL : [RT [-Past] event] [RT woll event]
|___=___↑

(34) WOULD : [RT [+Past] event] [RT woll event]
|____=____↑

III. Finally, I will assume that the tense features of a clause are like the Case features in an NP. If a clause appears at LF in a position where its tense features cannot be licensed, the derivation will crash.

2.3.2. C-Command Asymmetries at LF

With this much background, we are now in a position to understand the asymmetries in NPL. Let us start with the grammatical examples in (23). Recall that in order for the morphological tense features of a *would*-clause to be satisfied, this clause has to appear in a position where its external RT ($T\text{-arg}_e$) can be controlled by a [+past] event-time; that is, it has to appear in a structure like (34) at LF. At LF, then, the sentential subject in (23a) reconstructs to its original position. This is represented in (35a) by the location of the embedded clause in a line lower than the matrix clause. Once it is in its base-generated position, the embedded *would*-clause can license its tense features. The same operation will take place in (23b), also motivated by the tense licensing requirements on *had+participle*.[6] This is represented in (35b). Note that, in both (35a) and (35b), the NPIs are c-commanded by the matrix Neg at LF. This explains why these elements are licensed in these examples.

(35) a. was not mentioned
[that anyone would leave the company]

b. was not mentioned
[that anybody had left the company]

Let us now turn to the ungrammatical (23c). The licensing requirements on *will* force the sentential subject to stay in its SS position at LF, as represented in (35c) below. In that position however the NPI within the sentential subject is not c-commanded by Neg at LF, which accounts for the ungrammaticality of this example. We can also account for why (23c) contrasts with (25): while reconstruction is not possible in (23c), reconstruction of the sentential subject to its base-generated position in (25) permits both the tense requirements and the NPL requirements to be fulfilled.[7]

(35c) * [that anybody will leave the company]
was not mentioned in the meeting

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[6] I assume that the difference in licensing requirements between *have+participle* and *had+participle* is similar to that between *will* and *would*.

[7] See Uribe-Etxebarria (1994) for an explanation of the marginality of (25).

(36) will not be mentioned
[that anybody will leave the company]

The rest of the asymmetries in NPL can also be accounted for in the same terms. Consider (26a,b) first. Given that the embedded clauses can license their tense features in their base-generated position, they remain there at LF. This is roughly represented in (37a,b). In that position, the NPI is c-commanded by Neg at LF.

(37) a. Mary didn't say
[that Ann would read any books tomorrow]

b. Mary didn't say
[that Ann had read any books tomorrow]

Consider now (26c). The sentential object is a will-clause. Recall the licensing requirements of will, given in (33). If the embedded CP remains in its base-generated position at LF, the tense requirements of this clause will not be satisfied. The embedded clause thus has to move at LF to a position where it can license its tense features. But as the result of the LF movement of the embedded CP, the NPI is not be c-commanded by Neg at LF.

[that Ann will read any books]
(37) c. * Mary didn't say t

Finally, (26c) differs from (27,28) in that in the latter the tense requirements of the embedded clause can be satisfied in its base-generated position; no movement of the sentential complement is therefore necessary. The crucial difference is that, contrary to (26c), Neg will be able to c-command the NPI at LF in (27) and (28), as roughly illustrated in (38-39).

(38) Mary doesn't believe
[that Ann will read any books tomorrow]

(39) Mary will not say/believe
[that Ann will read any books this fall]

The conclusion that follows from here is that the c-command relation between Neg and the NPI at SS plays no role in negative polarity licensing. It is just their c-command relation at LF that matters. Since in all the grammatical examples Neg c-commands the NPI at LF, the question arises whether there is any need to appeal to the so-called [Neg]complementizers in polarity licensing. In any case, if [Neg]COMPs proved to be necessary, they have to be licensed in turn at LF. This is so because it is only when the head of the embedded CP is c-commanded by Neg that NPL takes place. These results are consistent with recent developments of the theory of the grammar, such as the Minimalist approach in Chomsky (1992), where it is argued that conditions involving interpretation apply only at the

interface levels.

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Rime Embeddedness in an Unwritten Language

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1. Introduction

The phoneme and the syllable are two phonological units which have long been regarded as readily accessible to the normal speaker-hearer. There is much evidence in the literature that adult language users can easily recognize and manipulate both these units. Previously researchers have investigated speakers' abilities to segment speech into sublexical units and have mainly concentrated on the phoneme or the syllable (Liberman et al., 1974; Fox & Routh, 1975; Hohn & Ehri, 1983; Morris, 1983; Perin, 1983; Barton, 1985; Mann, 1986). More recently research attention has turned to subsyllabic or intrasyllabic units, as some evidence has emerged suggesting that speaker-hearers can also identify and manoeuver intermediate units larger than the phoneme and smaller than the syllable (Treiman, 1984, 1985b, 1985c, 1986; Cutler et al., 1987; Bryant et al., 1989; Dow & Derwing, 1989; Bruck & Treiman, 1990).

There has been some indication in the literature that illiterates can manipulate syllabic size units, but have difficulty manipulating individual segments (Morais et al., 1989). Read et al., (1986) tested adults who were literate in Chinese characters only and others who were also literate in alphabetic spelling (Hanyu pinyin). The tasks consisted of adding or deleting initial consonants using real and nonsense words. There was a significant difference in ability to add or delete initial consonants between the alphabetic and nonalphabetic groups. Read et al. found that adults, who were literate in Chinese characters only, could not perform phonemic segmentation tasks, whereas those who had learned *pinyin* as well as Chinese characters could perform these tasks. The authors' conclusion was that it was not literacy in general that led to an ability to successfully manipulate speech sounds, but specifically literacy in an alphabetic system.

Identifying individual units from a continuous stream of speech is fairly difficult. Phonetic analytic skills that have been studied include segmentation tasks, which examine a subject's ability to divide words into constituent phonemes (Ehri & Wilce, 1980; Treiman & Baron, 1981; Dow, 1981, 1987); blending tasks, in which subjects blend two words into one, thus tapping their knowledge of subsyllabic units such as onset and rime or body[1] and coda (Treiman, 1986; Derwing & Nearey, 1991); deletion, addition and substitution tasks, which involve manipulating phonemes, onsets, nuclei, codas, rimes, bodies and margins (Morais et al., 1979; Perin, 1983; Treiman, 1985a, Content et al., 1986; Dow, 1987).

Some of the evidence for phonological units arises from investigations into children's reading and spelling ability. Wagner & Torgesen (1987) survey current literature in this area and conclude that not only does phonological awareness play a causal role in the acquisition of reading, but that learning to read also plays a

causal role in the development of phonological awareness. The circular argument developed in Wagner & Torgesen's paper is partially resolved by Morais et al. (1987a&b), who claim that while segmental analysis skills and the acquisition of literacy in an alphabetic system influence each other, literacy causes phonological awareness and not vice versa (see also Fox and Routh, 1984).

Other authors (such as Read et al., 1986, discussed above) have also suggested that knowledge of an alphabetic orthography affects phonological knowledge. Using a Spoonerism task and a segment judgement task, Perin (1983) found that poor spellers had more difficulty with a segmentation task than good spellers, irrespective of their reading skills. From these results Perin concluded that segmentation of words into phonemes may be achieved through knowledge of and skill with orthography. Ehri and Wilce (1980) also found that the visual forms of words influenced segmentation tasks. They concluded that "the acquisition of spellings may alter knowledge about pronunciations" and that phonemic awareness may be the result of learning to read and spell.

These studies suggested that knowledge of spelling affects segmentation skills in particular and phonemic awareness in general. The subjects chosen for the present study did know how to read and write an alphabetic system, namely English, so they should have been able to successfully segment words into phonemes. However, the subjects were also illiterate in their mother tongue, that is, they did not know any orthographic norms for their Low German dialect, Plautdietsch (PD). The fact that these subjects knew an alphabetic writing system meant that they could segment, but the fact that there was no written form of their dialect meant that there was no orthography to bias their judgements in PD.

Treiman (in press) hypothesized that there are correspondences between print and speech not necessarily based on phoneme-grapheme correspondences. She suggests that subsyllabic units are used in mapping speech to print by readers and spellers alike. Groups of phonemes which form units such as onset and rime may be associated with groups of graphemes. Treiman & Zukowski (1988) found that people rely at least to some extent on subsyllabic units like rimes when reading.

The work by Read (1986) on children's invented spelling describes how children with a limited knowledge of spelling conventions but with some knowledge of the alphabetic system (the idea of one letter for each sound) will produce spellings which suggest nonstandard segmentations. Read describes a series of experiments in which children were tested to see if they would omit preconsonantal nasals in their spellings. It appears that, for various reasons, children do not readily segment vowels plus following resonants into separate segments but treat them as single units. Based on Read's results with children's creative spellings, the prediction is made that adults unfamiliar with the spelling conventions of PD might also exhibit a tendency to segment PD words into subsyllabic rather than strictly phoneme-sized units.

The task under investigation is a segmentation task based on Dow's (1981) segment count experiment where, after a brief training session on segmentation, subjects were asked to write down the number of "speech sounds" they heard in each word. Although there were some exceptions, overall she found a high correlation between the predicted phoneme count and the actual segment counts. One group of exceptions included words containing the /awr/ rime. Here she found orthographic interference in that subjects counted more segments in words like *cower, bower* and *glower*, than in words like *sour, dour*, and *scour*. The <-ower> spelling gives the perception of another syllable and hence an inflated count, whereas the <-our> spelling does not. Orthographic interference such as this is less likely in the segmentation task using PD speakers, as they have had little or no practice in reading or writing their dialect.

Dow (1987) conducted another segment-counting experiment which included not only a phoneme counting task, but also syllable and subsyllabic unit counting tasks. She found significantly better performance on the syllable count task than on any of the other tasks. Surprising was the very low performance on the phoneme counting task (22% correct overall). Even more surprising was the poor performance on the phoneme count task by high school students (51% correct) who should be performing at the level of literate adults, leading Dow to doubt the universality of the phoneme as a natural unit

There were some problems with Dow's 1981 and 1987 experiments, however. As Dow and Derwing (1989) point out, in this type of task there is difficulty in knowing exactly what units subjects are counting. In the first experiment Dow had subjects write down the number of "speech sounds" in each word. In the second experiment, children put out a plastic counter for each unit and high school students gave a number response. While this method gives an overall count of "speech sounds", there was no way of verifying precisely which sounds were receiving counts or even where the precise segmentation points occurred.

In the current experiment an attempt was made to assess the exact units that were being counted. Subjects were asked to sound out the segments, and these attempts were recorded for later evaluation. While the subjects were vocalizing the individual speech sounds, they were also encouraged to keep track of the number by counting on their fingers. During the experiment, the investigator also kept a record of the individual segments and later compared these with the tape-recordings. In this way there would be no doubt as to how the subject had segmented words longer that three phonemes. The segmentation points were also clearer; for example, if a subject gave a count of 4 for a word like /plɷmps/, it was possible to tell from the recordings whether the segmentation was /pl-ɷm-p-s/, /p-lɷ-m-ps/ or /p-l-ɷm-ps/.

In a phoneme shift task, where subjects are asked to shift a specified group of sounds in one word onto another when presented with visual and aural stimuli, Fowler et al. (1993) noticed that subjects' responses were affected by the structure

of the word being presented to them. They found for example that responses were dependent upon whether the stimuli were mono-, di- or trisyllabic. They also found edge effects, particularly in words with initial clusters beginning with /s/. Of interest will be whether or not this phenomenon is task specific or restricted to English speaking subjects.

Finally, this study's focus is on whether it is possible for speakers of an unwritten dialect to successfully segment words into phonemes and, if so, whether their segmentations conform to any standard theoretical treatment. Following from this, the question remains that if speakers of an unwritten dialect do not readily segment words into phonemes, what kinds of units they do use, and whether these units areconsistent with a hierarchical model of syllable structure?

2. Method

A group of bilinguals, who spoke English and a Low German dialect, which they call Plautdietsch[2] (PD), were chosen for this experiment. Twenty-five adult subjects, 12 male and 13 female, took part in the experiment.

A word list of 62 mono- and disyllabic PD words consisting of a variety of initial and final consonant clusters and ranging in length from 3 to 6 phonemes was prepared with the aid of two native speakers. The list was randomized and two presentation orders, one the reverse of the other, were prepared and recorded by a female PD speaker.

Subjects were trained to count "speech sounds" on a set of 7 mono- and disyllabic English words and then tested individually. For each word a segment count was predicted, based on the number of phonemes in a standard traditional analysis (see Wiebe, 1983). On the basis of the taped responses (recorded during the segment count task), each subject's total segment count for each word was noted. No differences were found as a function of presentation order, so the results were pooled for all subsequent analyses.

3. Results and Discussion

3.1. Consonant Clusters

Final consonant clusters containing resonants (rC, LC, NC) were examined, as well as final obstruent clusters of fricative plus stop (FS) and stop plus fricative (SF) For reasons to be discussed, the sequence /ts/ is treated separately.

As can be seen in Table 1, final obstruent clusters are more likely to be treated as a single units than are final clusters containing resonants. Whereas a final consonant in SF and FS clusters was separated from the preceding consonant about 68% of the time (and /ts/ only 41%), final consonants were almost always (97%) separated from postvocalic resonants. In other words, postvocalic resonants were not "C-sticky" (Derwing et al., 1987, 1991), i.e., they do not adhere to the final consonant as a single unit. Furthermore, obstruent clusters

were more cohesive than those clusters with postvocalic resonants. Word-final /ts/ was more often treated as a unit than the other final obstruent clusters.

Table 1. Final Consonant Clusters

TYPE OF CC#	EXAMPLE	SEPARATION OF C\C#
rC# (5)	hɔrx	99% ±3
LC# (4)	kɔlt	100% ±0
NC# (3)	kʸɪnt	93% ±2
FS# (5)	mɪʌšt	74% ±15
SF# (3)	lɷtš	61% ±13
ts# (7)	blɪts	41% ±13

3.1.1. Word-Final Syllabic Consonants

The stimuli included 8 items ending in a syllabic consonant: 4 ended in syllabic /l/ and 4 in syllabic /n/.[3,4]

Table 2. Syllabic Consonants

TYPE OF CC#	EXAMPLE	SEPARATION OF C\C#
CL# (4)	bitsl̩	82% ±9
CN# (4)	dræšn̩	80% ±9

The results (as shown in Table 2) of the segmentation task suggest that for some subjects, syllabic consonants only rarely act as separate units. This is a surprising result, since word-final resonants are syllabic, and it could lend credence to Berg's (1989) notion of the "superrime".

3.1.2. Palatal Consonants

Some of the palatal consonants in PD[5] were virtually inseparable in initial and final positions but had a tendency to separate word medially, as can be seen in Table 3.

A difference was also noted in the relative cohesion of medial stops and nasals. In Table 3, the numbers suggest that /nʸ/ is much more likely to be separated by speakers of PD than medial stops. However, there were only two words containing /nʸ/ and in both of these the palatal nasal occurred intervocalically (V__V). In each case the tendency was for the palatal element to to be separated from the nasal and adhere to the following vowel. There was only

one stimulus item containing the voiceless palatal stop, /kʸ/, in medial position and this was in the environment C__V. Perhaps, intervocalically, /kʸ/, would also be less cohesive, but due to lack of data it is hard to tell. At any rate, the internal cohesion of [+stop, +palatal] consonants in PD, depends on the environment.

Table 3. Palatal Consonants

WORD POSITION	EXAMPLE	SEPARATION of C/y
Initial (13)	kʸast	1% ±3
Final (3)	tsveʌkʸ	0% ±0
Medial Stop (1)	jœnʸkʸʌ	24%
Medial Nasal (2)	hɛnʸʌ	62% ±8

3.2. Diphthongs

The stimuli contained three types of PD diphthongs (see Table 4 below): long diphthongs, /au/ and /ai/ (VV); short outgliding diphthongs, /ʌɪ/ and /ʌœ/ (ʌV); and ingliding diphthongs, /iʌ/, /eʌ/, /uʌ/, /oʌ/ (Vʌ).

Table 4. Diphthongs

TYPE	EXAMPLE	SEPARATION
VV (5)	frauts	3% ±4
ʌV (8)	fʌɪt	1% ±1
Vʌ (8)	vuʌt	33% ±27

The ingliding diphthongs (Vʌ), which were separated 33% of the time, seem to form a less cohesive unit than the other diphthongs (only about 2% separation). This suggests that the outgliding diphthongs, both long (VV) and short (ʌV), are generally inseparable units, while the ingliding diphthongs (Vʌ) are sometimes treated as units and sometimes treated as a sequence of two vowels.[6]

In Table 5, it can be seen that the type of syllable, closed (CVʌC# or CVʌCC#) or open (CVʌ#), as well as the number of consonants following ingliding diphthongs, can have an effect on the cohesiveness of Vʌ. In other words, the greater the number of consonants following Vʌ, the more cohesive the ingliding diphthongs become. Various explanations offer themselves. The second part of the ingliding diphthong, the central vowel /ʌ/, may be more noticeable to the subject in word-final position and due to this increased saliency is easier to separate.

Table 5. Effects of Final Consonant Clusters on Ingliding Diphthongs

TYPE	EXAMPLE	SEPARATION
CV$_{\Lambda}$CC# (4)	mi$_{\Lambda}$št	16% ±9
CV$_{\Lambda}$C# (3)	fi$_{\Lambda}$t	45% ±8
CV$_{\Lambda}$# (1)	fu$_{\Lambda}$	84%

The number of phonemes in a stimulus item could also be affecting the subject's segmentation ability. Whatever the reason, the embedding of the diphthong in a complex syllable structure affects the diphthong's cohesiveness.[7]

3.3. Vowels Plus Resonants

In this section postvocalic resonants will be examined and the effects of syllable structure complexity will also be discussed.

Table 6. Postvocalic Resonants

TYPE	EXAMPLE	VOWEL-RESONANT SEPARATION
Vr (9)	darp	42% ±12
VL (9)	k$_{\supset}$lt	61% ±20
VN (10)	p$_{\omega}$nt	64% ±16

Postvocalic resonants, which as we saw above (Table 1) almost never stick to a following consonant, have a strong tendency to stick to the vowel. Whereas postvocalic liquids and nasals were moderately V-sticky (see Table 6), postvocalic /r/ was joined to the vowel more often than it was separated.

Again, the structure of the syllable in which the postvocalic resonant is embedded has an effect on its V-stickiness, as indicated in Table 7. When postvocalic /r/ is followed by two consonants it is very V-sticky, less so if followed by one consonant but still more V-sticky than not, and even less so when in final position. Postvocalic nasals and liquids, exhibit the same trend, but they are always less than 50% V-sticky. It appears that the more embedded a resonant is, the greater tendency that resonant has to form a unit with the vowel.

It was noted earlier that ingliding diphthongs also exhibit this tendency to be more cohesive the more embedded they are in a complex syllable. In this case, ingliding diphthongs (V$_{\Lambda}$) seem to behave more like vowels plus resonants than like the other two types of diphthongs (both outgliding). Interestingly, V$_{\Lambda}$ and Vr have similar stickiness values (67% and 62% respectively). It seems that VV and $_{\Lambda}$V (outgliding diphthongs) form one type of nucleus, V$_{\Lambda}$ and Vr a second type, and VL and VN a third type. Of the three types, the first (VV and $_{\Lambda}$V) forms the

most cohesive unit (98% cohesiveness) while the third type (VL and VN) was most often separated (27% cohesiveness). The second type (Vʌ and Vr) was separated approximately one-third of the time and treated as a unit two-thirds of the time.

Table 7. Effects of Final Consonant Clusters on Postvocalic Resonants' Vowel Stickiness.

TYPE		EXAMPLE	VOWEL-RESONANT SEPARATION	
VrCC#	(1)	kʸaršt	22%	
VrC#	(5)	kʸɔrš	44%	±6
Vr#	(1)	gʸnɔr	72%	
VNCC#	(1)	hɛŋkst	58%	
VNC#	(5)	glɔmz	72%	±10
VN#	(1)	gʸrʌin	80%	
VLCC#	(4)	rɛlps	58%	±25
VLC#[8]	(5)	tvalv	61%	±17

Thus, there is a gradation to the bonding of vowel-resonant clusters and vowel-vowel clusters (diphthongs) in PD. Derwing et al. (1987b) also noted a similar "gradualness" in the results of their experiment on the structure of the vowel nucleus. This led them to suggest a "scalar bonding model" for the English syllable rather than a hierarchical model. Given the results here, this type of model also seems more suitable for PD.

4. Conclusions

It was found that most speakers of PD could segment words into phonemes. Even though the segmentation was usually at the phoneme level, there were some notable exceptions. The long and short outgliding diphthongs (VV, ʌV) showed a strong tendency to be treated as single units (98%), but the ingliding diphthongs (Vʌ) were separated in 33% of the cases. Vowels followed by [r,l,n,m] were not separated but were treated as single units 44% of the time. The tendency of postvocalic resonants to stick to the vowel was affected by syllable structure: the further the resonant was embedded in the syllable, the more likely it was to be treated as part of the vowel. In this respect, the second element of the ingliding diphthongs was more like a postvocalic resonant (particularly postvocalic /r/). When followed by two consonants, postvocalic /r/ was 78% V-sticky and Vʌ was 84% cohesive (see Tables 5 and 7).

Some consonant clusters were more apt to be cohesive than others. Resonants, which in traditional analyses of the syllable are thought to form part of the onset or coda, were hardly ever treated as part of the coda consonant cluster by PD speakers. Obstruent clusters on the whole generally demonstrated more cohesiveness than clusters containing resonants. The greatest amount of cohesiveness in the fricative-stop clusters was attributable to the affricate /ts/, which was generally treated as a unit (59% cohesiveness).

5. General Discussion

The segment count experiment tested the ability of PD speakers to segment PD words into phonemes. It was suggested that if the ability to segment into phonemes is dependent on literacy in an alphabetic system (Read et al., 1986; Morais et al., 1979), then PD speakers, who are literate in English, should be able to segment words into phoneme-sized units, even though they are illiterate in their mother tongue. Further, it was reasoned, since PD has no orthographic system of its own, the orthographic interference observed in previous experiments with literate speakers (Jaeger, 1980; Derwing & Nearey, 1981; Dow, 1981; Derwing et al., 1987a) would be less likely for PD speakers, especially in a task conducted orally. The experiment was designed to overcome previous difficulties with segment count tasks in verifying which units subjects were actually counting, except by inference from previously exhibited patterns (Dow, 1981, 1987). For this reason the entire experiment was tape-recorded.

Subjects, who were trained to segment English words into segmental phonemes, displayed no difficulty with the training items. Nevertheless, the units into which subjects segmented PD words did not always correspond to phonemes, but were sometimes subsyllabic units larger than the phoneme. Some general segmentation patterns emerged which suggested that the environment of the unit as well as the composition and complexity of the syllable affected subjects' segmentation abilities. Syllable-structure effects were also noted by Fowler et al. (1993) in their phoneme shift experiments with English stimuli.

Postvocalic resonants displayed a tendency to be more V-sticky (55%) than C-sticky (3%) and even though postvocalic resonants were more often treated as separate units, the likelihood of their forming part of the nucleus was much greater than their forming part of the coda. It was noted that embedding postvocalic resonants in C-clusters affects their V-stickiness, that is, it increases the likelihood that the resonant will form part of the nucleus. Word-final postvocalic resonants formed a unit with the vowel less often (24%) than when they were followed by a single consonant (41%) or a consonant cluster (48%). Thus, it appears that the more embedded a resonant is, the greater tendency it has to form a unit with the vowel.

Diphthongs have been traditionally treated as sequences of two vowels in PD, but the experimental results challenge this analysis for one sub-type. Long

diphthongs (VV) and short outgliding diphthongs (ʌV) formed very cohesive units (97% and 99% respectively). Ingliding diphthongs (Vʌ) displayed far less cohesiveness (67%) than either of the other two types of diphthongs. Further, word-final Vʌ was less cohesive (16%) than when it was followed by a single consonant (45%) or a consonant cluster (84%). It seems that whether or not Vʌ was treated as a sequence of two vowels or as a single unit depended on the extent of its embeddedness within the syllable. In this regard Vʌ behaves more like a vowel plus resonant sequence than like the other diphthongs, and it displays similar cohesiveness to vowels plus resonants overall (Vʌ, 67% cohesiveness and VR, (55%). These results also call for a re-interpretation of the nucleus as a vowel plus resonant, rather than just a single vowel or diphthong, as in the traditional analysis of PD.

It is thus proposed that PD has three types of nuclei. The diphthongs VV and ʌV form one type of nucleus (98% cohesiveness), vowels plus /ʌ/ and /r/ the second type (55%) and vowels followed by laterals and nasals the third (37%). The gradualness of these results is similar to that observed by Derwing et al. (1987a) for English.

In this segment count task the cohesiveness of final consonant clusters was also under investigation (overall about 41% cohesiveness). The affricate /ts/, which demonstrated a remarkably different cohesiveness pattern to the other stop-fricative clusters, was much more cohesive finally (59%) than the other obstruent clusters. The palatal consonants were virtually inseparable initially and finally (99% cohesion), which suggest that they are also single units. However, medial /kʸ/ and /nʸ/ were separated 24% and 62% of the time, respectively. Again, the position of the phonological unit affects its cohesiveness.

It appears that PD speakers, unlike speakers who are not literate in an alphabetic system (see Read et al. 1986, Derwing, et al. 1987a), can segment words into units smaller than the syllable. This is not unexpected, as PD speakers are literate in an alphabetic system. However, the PD subjects tested did not always segment words into individual phonemes, even though it was previously thought that phonemes were readily accessible to adults literate in an alphabetic system. Although there was evidence of segmentations into subsyllabic units which corresponded to onset, nucleus and coda, it appears the constituency of these units fluctuates depending on their composition and their environment. This raises doubts about both the primacy of the phoneme even for adult speakers literate in an alphabetic system, as well as about the widely accepted hierarchical model of the syllable which presupposes rigid boundaries between subsyllabic units. A more acceptable model for PD syllables would be a scalar bonding model (Derwing et al., 1987a), which allows for fluctuations between units and does not dictate that any division of the syllable must necessarily culminate in individual phonemes. Much depends on the complexity of the syllable.

Endnotes

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1 The terms *body* and *head* are used to designate a CV unit. See Wiebe 1992 for a thorough discussion of these units.

2 Pronounced /plautditš/.

3 In his list of final consonant clusters, Goerzen (1972) includes /CN/ and /CL/. However, he stipulates that the final resonants /n,m,l/ are syllabic in these "clusters".

4 There are no word-final syllabic /r/s in PD; where cognates in other Germanic languages would have syllabic /r/, as in English 'farmer', PD has /ɹ/ as in /fɔrmɹ/.

5 The palatal consonants in question are /kʸ/, /gʸ/, /nʸ/ and /lʸ/.

6 Perhaps this could be influenced by English spelling. There are some in-glides, such as the vowel of *bit*, which is often [I] plus schwa, which are nevertheless always spelled with just one letter.

7 See also the discussions below about the increasing cohesiveness of resonants in "embedded" positions.

8 It is possible to have /l̩/ in final position in PD, but the stimuli did not include a monosyllabic word of this type.

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THE PREVERBAL AND POSTVERBAL NP OBJECTS IN THE CHINESE BA-CONSTRUCTION[1]

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The BA-construction is a widely-discussed topic in Chinese grammar and has drawn a great deal of attention in recent Chinese linguistic studies. The fact that the BA-construction has been so interesting to many Chinese linguists is partly due to its structural difference from the canonical svo word order in Chinese, and partly due to certain syntactic and semantic constraints imposed on its verb and other components. In recent generative linguistic studies, there are several notable analyses of the BA-construction, as proposed by Cheng (1986), Goodall (1990), Huang (1988), Li (1990), Sijbesma (1992) and Zou (1993) respectively.

The aim of this paper is to discuss the relations between the preverbal NP and postverbal NP objects in the BA-construction, to present some data that fail to be subsumed by Zou's (1993) analysis of the BA-construction, and to propose a different analysis of these data. I will show how the proposed analysis incorporates the thematic, aspectual and transitivity relations between the verb, preverbal NP object, postverbal NP object and subject of the BA-constructions, and how it captures the morpho-syntactic relation between the verb and functional categories in the BA-constructions. I will also provide both empirical motivation and theoretical arguments for the proposed analysis.

1. ZOU'S (1993) ANALYSIS OF THE BA-CONSTRUCTION

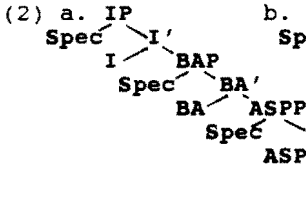
Zou (1993) postulates the following analysis of the Chinese Objective BA-construction:

[1] I am indebted to Joseph Aoun, Lisa Cheng, Hajime Hoji, James Huang, Audrey Li, Barry Schein, Dingxu Shi, Zheng-Fang Sun, Mario Saltarelli, Guo-Ming Song, Jean-Roger Vergnaud, and Maria-Luisa Zubizarreta for their helpful advice and valuable comments. I am also grateful to Thomas Giannotti, Jackson Henry, Burckhard Mohr, Vanessa Wenzell, and Agnes Yamada for their strong encouragement and support. Any errors are exclusively my own. This piece of research was funded partly by the Humanities Graduate Fellowship from the University of Southern California, and partly by the RSCAAP mini-grant from California State University, Dominguez Hills.

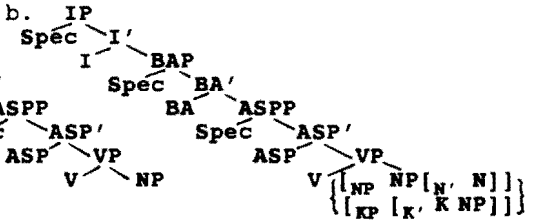
(1) a. BA is the head of a functional category and selects an aspect phrase as its complement.
b. The aspect phrase is also a functional category and its head selects a VP as its complement.
c. The preverbal and postverbal NPs form a single noun phrase at D-structure; and both the preverbal noun phrase and the noun phrase formed by the preverbal NP and postverbal NP are based-generated as complements of V.

This analysis is structurally represented below:[2]

(2) a.



b.



(2a) represents the BA-construction containing preverbal NP object but no postverbal NP object, and (2b) represents the BA-construction containing both preverbal NP and postverbal NP objects.

Under this analysis, the BA-construction with the structure of (2a) is simply derived by verb-raising and NP-movement, as shown by (3):

(3) a. **wo ba na ge juzi bo-le.**
I BA that CL orange peel-ASP
'I peeled that orange.'
b. $[_{IP}$ **wo** $[_{BAP}$ $[_{BA}$ **ba**$]$ $[_{ASPP}$ **na ge juzi**$_i$
I BA that CL orange
$[_{ASP}$ **bo**$_j$**-le**$]$ $[_{VP}$ $[_{V}$ $t_j]$ $[_{NP}$ $t_i]]]]]$
peel-ASP

The same analysis also derives the BA-construction with the structure of (2b) by means of verb-raising and NP-movement, in which there is an INHERENT possessive relation or partitive relation between the preverbal NP

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[2] The following special abbreviations are used in this paper:

ASP(P)	--->	aspect marker (phrase)
BAP	--->	BA-phrase
CL/K	--->	classifier, i.e. measure word
CRS	--->	currently relevant state marker

and postverbal NP objects, as shown by (4) and (5):[3]

(4) a. **wo ba na ge juzi bo-le pi.**
I BA that CL orange peel-ASP skin
'I peeled the skin of the orange.'
(**na ge juzi** is POSSESSOR and **pi** is POSSESSEE)

b. $[_{IP}$ **wo** $[_{BAP}$ $[_{BA}$ **ba**$]$ $[_{ASPP}$ **na ge juzi**$_i$
I BA that CL orange
$[_{ASP}$ **bo**$_j$**-le**$]$ $[_{VP}$ $[_{V}$ **t**$_j$$]$ $[_{NP1}$ $[_{NP2}$ **t**$_i$$]$ $[_{N}$ **pi**$]]]]]]$
peel-ASP skin

(5) a. **wo ba yifu reng-le yi jian.**
I BA clothes throw-ASP one CL
'I threw away a piece of the clothes.'
(**yifu** is WHOLE and **yi jian** is PART)

b. $[_{IP}$ **wo** $[_{BAP}$ $[_{BA}$ **ba**$]$ $[_{ASPP}$ **yifu**$_i$ $[_{ASP}$ **reng**$_j$**-le**$]$
I BA clothes throw-ASP
$[_{VP}$ **t**$_j$ $[_{KP}$ $[_{K}$ **yi jian**$]$ $[_{NP}$ **t**$_i$ $]]]]]]$
one CL

2. THE PREVERBAL AND POSTVERBAL NP OBJECTS

Though Zou's (1993) analysis correctly captures the INHERENT possessive and partitive relations between the preverbal and postverbal NP objects as the spec-head and head-complement relations, as in (4) and (5), it fails to account for other relations between the two NP objects, as exemplified below (cf. Shi 1993):

(6) **ta ba na ben shu gei-le pengyou.**
he BA that CL book give-ASP friend
'He gave his friend that book.'
(**na ben shu** is POSSESSEE and **pengyou** is POSSESSOR)

(7) **Lisi ba zhuozi da-le yi ceng la.**
Lisi BA table apply-ASP one CL wax
'Lisi painted the table with a layer of wax.'
(**zhuozi** is PATIENT and **yi ceng la** is INSTRUMENT)

(8) **wo ba yifu bao-le yi ge xiaobao.**
I BA clothes pack-ASP one CL bundle
'I packed the clothes into a bundle.'
(**yifu** is PATIENT and **yi ge xiaobao** is RESULT)

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[3] The INHERENT possessive or partitive relation between the preverbal NP and postverbal NP objects means that the two NPs are related to each other before the verbal action takes place. Thus, in (4) the skin of the orange is always part of the orange no matter whether one peels it or not; and in (5) a piece of the clothes is always part of the clothes no matter whether one throws it away or not (cf. Cheung 1973:379).

(9) **Lisi ba xinfeng tie-le yi zhang youpiao.**
Lisi BA envelope paste-ASP one CL stamp
'Lisi pasted a stamp on the envelope.'
(**xinfeng** is LOCATION and **yi zhang youpiao** is PATIENT)

In other words, Zou's analysis does not apply to the NON-INHERENT relations between the preverbal and postverbal NP objects in (6) through (9), as it is totally inadequate to treat these two NP objects as two constituents of the single noun phrase at D-structure.[4]

There are two additional pieces of evidence that argues for treating the preverbal NP and postverbal NP objects in (4) and (5) as members of the single noun phrase at D-structure, but argues against the same treatment of the preverbal and postverbal NP objects in (6) through (9). First, the two NP objects in (4) and (5) can be moved together to the preverbal position, but this option is not available to the two NP objects in (6) through (9):

(10) a. **wo ba na ge juzi-de pi bo-le.**
I BA that CL orange's skin peel-ASP
'I peeled the skin of that orange.'
b. **wo ba yi jian yifu reng-le.**
I BA one CL clothes throw-ASP
'I threw away a piece of the clothes.'
(11) a.***ta ba pengyou-de na ben shu gei-le.**
he BA friend's that CL book give-ASP
b.***Lisi ba zhuozi-de yi ceng la da-le.**
Lisi BA table's one CL wax apply-ASP
c.***wo ba yifu-de yi ge xiaobao bao-le.**
I BA clothes' one CL bundle pack-ASP
d.***Lisi ba xinfeng-de yi zhang youpiao tie-le.**
Lisi BA envelope's one CL stamp paste-ASP

Given the fact that only the constituents of the same phrase can undergo movement together (Radford 1988), the well-formedness of (10ab) argues for treating the two NP objects in (4) and (5) as members of the same noun phrase at D-structure, while the ill-formedness of (11abcd) argues for treating the two NP objects in (6) through (9) as two separate noun phrases at D-structure.

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[4] The reason is simply that the preverbal NP and postverbal NP objects in (6) through (9) are not related to each other until the verbal action takes place (Cheung 1973): in (6) **pengyou** was not the possessor of **na ben shu** until it was given to him/her; in (7) there was no **yi ceng la** on **zhuozi** until it was applied; in (8) **yifu** is not in the shape of **yi ge xiaobao** until it was packed; and in (9) there was no **yi zhang youpiao** on **xinfeng** until it was pasted there.

Second, if the postverbal NP object is definite in (4) and (5), the specificity effect will be displayed. However, such an effect will not show up in (6) through (9) when their postverbal NP object is definite:

(12) a. ***wo ba na ge juzi bo-le zhe ceng pi.***
I BA that CL orange peel-ASP this CL skin
b. ***wo ba yifu reng-le Lisi-de yi jian.***
I BA clothes throw-ASP Lisi's one CL

(13) a. **ta ba na ben shu gei-le wo-de pengyou.**
he BA that CL book give-ASP my friend
'He gave my friend that book.'
b. **Lisi ba zhuozi da-le zhe ceng la.**
Lisi BA table apply-ASP this CL wax
'Lisi painted the table with this layer of wax.'
c. **wo ba yifu bao-le zhe ge xiaobao.**
I BA clothes pack-ASP this CL bundle
'I packed the clothes into this bundle.'
d. **Lisi ba xinfeng tie-le na zhang youpiao.**
Lisi BA envelope paste-ASP that CL stamp
'Lisi pasted that stamp on the envelope.'

According to the Specificity Condition that specificity effects are derived by the extraction out of definite noun phrases (Fiengo and Higginbotham 1981), the ill-formedness of (12ab) strongly argues for the treatment of the preverbal and postverbal NP objects in (4) and (5) as members of the single noun phrase at D-structure, and the absence of specificity effects in (13abcd) supports the treatment of the two NP objects in (6) through (9) as two separate noun phrases at D-structure.[5]

In conclusion, Zou's analysis of the preverbal and postverbal NP objects in the BA-construction only applies when there exists an inherent relation between the two NP objects, but it cannot be extended to account for the non-inherent relation between the two NP objects. Thus, a different analysis of the non-inherent relation is in order. In what follows, I will examine the situation types of verbs being used in the BA-construction and

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[5] The contrast between the two NP objects in (4) and (5) and the ones in (6) through (9) is parallel to the presence and absence of specificity effects in the English sentence, as shown below:

i) ***Who$_i$ did you buy this/John's picture of t_i?***
ii) ***Who$_i$ did you buy a picture of t_i?***

In (i) **who** is moved out of a definite noun phrase, resulting in the specificity effect, while in (ii) **who** is moved out of an indefinite noun phrase, yielding no specificity effect.

explore the relationship between these situation types and the transitivity alternations allowed in the BA-construction. Based on the results of these examination and exploration, I will propose an analysis of the non-inherent relation between the preverbal NP and postverbal NP objects in the BA-construction.

3. SITUATION TYPES AND TRANSITIVITY ALTERNATIONS IN THE BA-CONSTRUCTION

It is well-known that the situational aspect is usually classified into four types: STATES, ACTIVITIES, ACCOMPLISHMENTS and ACHIEVEMENTS, and that the verbal constellations of these four types are termed as STATIVE VERBS, ACTIVITY VERBS, ACCOMPLISHMENT VERBS and ACHIEVEMENT VERBS (cf. Dowty 1979, Smith 1991). According to Liu (1992), the BA-construction can only be used in a situation with a natural final point indicating a change of state or completion of process. Of the four situation types of verbs, stative verbs only describe stable situations and do not indicate any change of state or completion of process. Thus, they are not able to occur in the BA-construction, as shown below:

(14) a.***wo ba shu yongyou-le.**
I BA book own-ASP
b.***ta ba baba xiang-le.**
he BA father resemble-ASP
c.***wo ba zhe ge wanju xihuan-le.**
I BA this CL toy like-ASP

Besides stative verbs, activity verbs are not compatible with the BA-construction either, due to the fact that activity verbs only depict atelic events which do not have natural final points. In other words, activities only *terminate* or *stop* arbitrarily, but do not *finish* naturally (cf. Smith 1991, Liu 1992):

(15) a.***ta ba na liang che tui-le.**
he BA that CL cart push-ASP
b.***Lisi ba fayu xue-le.**
Lisi BA French study-ASP
c.***wo ba lu zou-le.**
I BA road walk-ASP

In contrast with stative verbs and activity verbs, accomplishment verbs and achievement verbs both describe telic events which have natural final points indicating a change of state or a completion of process (Tai 1984). Thus, accomplishment and achievement verbs should be able

to occur in the BA-construction.[6] This prediction is borne out by the well-formedness of (3) through (9), where the verbs are either accomplishment verbs or achievement verbs.

In her study of the transitivity alternation in Chinese, Cheng (1989) observes that of the four situation types of verbs, only accomplishment and achievement verbs allow the transitivity alternation to become intransitive verbs. Thus, the logical object of accomplishment and achievement verbs can appear preverbally as a subject. But this option is not available to the logical object of stative or activity verbs, as shown by the following contrast:

(16) Stative Verbs:
a.***shu yongyou-le.**
book own-CRS
b.***baba xiang-le.**
father resemble-CRS
c.***zhe ge wanju xihuan-le.**
this CL toy like-CRS

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[6] However, Liu (1992) argues that only accomplishment verbs, not achievement verbs, can occur in the BA-construction, due to their difference that the former focuses on both the process and the final point of an event, while the latter only focuses on the final point of an event. This, in fact, is not true, as many achievement verbs do occur in the BA-construction, as exemplified below:

i) **Lisi ba mubiao dazhong-le.**
Lisi BA target hit-ASP
'Lisi hit the target.'
ii) **Zhangsan ba na zhang baozhi si-le**
Zhangsan BA that CL newspaper tear-ASP
'Zhangsan tore that newspaper.'
iii) **ta ba men ti-le yi ge dong.**
he BA door kick-ASP one CL hole
'he made a hole in the door by kicking.'

That some achievement verbs may not occur in the BA-construction is attributable to a semantic requirement imposed on the verb and its object in the BA-construction: the object has to be "affected" by the verbal action (cf. Smith 1991). This semantic requirement explains the well-formedness of (i), (ii) and (iii) above and the ill-formedness of (iv), (v) and (vi) below:

iv)***ta ba na ke shu kanjian-le.**
he BA that CL tree see-ASP
v)***wo ba qiang-sheng tingjian-le.**
I BA gun-shots hear-ASP
vi)***tamen ba shanding dadao-le.**
they BA summit reach-ASP

(17) Activity Verbs:
a.*na liang che tui-le.
that CL cart push-ASP
b.*fayu xue-le.
French study-ASP
c.*lu zou-le.
road walk-ASP

(18) Accomplishment Verbs:
a. na ge juzi bo-le.
that CL orange peel-ASP
'That orange was peeled.'
b. zhe tiao maojin xi-le.
this CL towel wash-ASP
'This towel was washed.'
c. na ge pinguo chi-le.
that CL apple eat-ASP
'That apple was eaten.'

(19) Achievement Verbs:
a. ta-de qianbao zhaodao-le.
his wallet find-ASP
'His wallet was found.'
b. na ge mubiao dazhong-le.
that CL target hit-ASP
'That target was hit.'
c. na zhang baozhi si-le
that CL newspaper tear-ASP
'That newspaper was torn.'

In fact, this type of transitivity alternations is also available to the accomplishment and achievement verbs which take two objects: one object appears preverbally as subject and the other object remains postverbally. These two objects are on a par with the preverbal NP and post-verbal NP objects in the BA-construction which are not members of a single noun phrase at D-structure and are not related to each other inherently, as shown below:

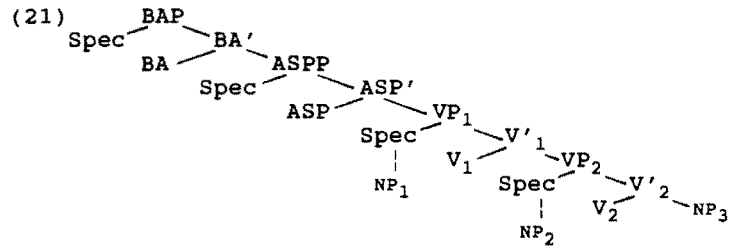
(20) a. na ben shu gei-le wo-de pengyou.
that CL book give-ASP my friend
'That book was given to my friend.'
b. na zhang zhuozi da-le yi ceng la.
that CL table apply-ASP one CL wax
'The table was painted with a layer of wax.'
c. na xie yifu bao-le yi ge xiaobao.
that CL clothes pack-ASP one CL bundle
'The clothes were packed into a bundle.'
d. na ge xinfeng tie-le yi zhang youpiao.
that CL envelope paste-ASP one CL stamp
'A stamp was pasted onto the envelope.'

The fact that the verbs showing transitivity alternations in (20abcd) are identical to the verbs taking the preverbal and postverbal NP objects in the BA-constructions of (6) through (9) naturally suggests that the preverbal NP object in (6) through (9) can be treated as "subject", and their postverbal NP object still needs to be treated as object. Thus, the results of examining the situation types of verbs and their relationship to the transitivity alternation point out a right track on which we can build an analysis of the non-inherent relation between the preverbal and postverbal NP objects in the BA-construction. This analysis is presented in the following section.

4. AN ANALYSIS OF THE NON-INHERENT RELATION BETWEEN THE PREVERBAL AND POSTVERBAL NP OBJECTS

Given the fact that the preverbal NP and the postverbal NP objects in the BA-constructions of (6) through (9) can act as subject and object in the non-BA sentences of (20abcd), a natural analysis of their non-inherent relation is to take the preverbal NP as "inner subject" of VP and to treat the postverbal NP as complement of V, assuming the VP-shell hypothesis (Larson 1988) and the VP-internal subject hypothesis (Kuroda 1988). This analysis of (6) through (9) is represented below:

(21)



(21) is intuitively understood as follows: i) V_2 takes NP_3 as its complement, forming a small predicate V'_2; ii) V'_2 is predicated of the "inner subject" NP_2, forming VP_2; and iii) VP_2 is, in turn, predicated of the "outer subject" NP_1 to yield a full sentence.

Under this analysis, the BA-constructions in (6) through (9) can be simply derived by verb-raising and NP-movement, as illustrated by the derivation of (6), which has the following structural representation in terms of X'-theory and thematic relation:

(6′) [$_{BAP}$ [$_{BA}$ **ba**] [$_{ASPP}$ [$_{ASP}$ **-le**] [$_{VP1}$ [$_{NP1}$ **ta**] [$_{V'1}$ [V_1]
BA *-ASP* *he*
[$_{VP2}$ [$_{NP2}$ **na ben shu**] [$_{V'2}$ [$_{V2}$ **gei**]
that CL book *give*
[$_{NP3}$ **pengyou**]]]]]]]
friend

In (6′), NP_3 **pengyou** receives a theme θ-role from V_2 **gei**, NP_2 **na ben shu** receives a θ-role from V'_2 by virtue of its "inner subject" status, and NP_1 **ta** receives a θ-role from VP_2 by virtue of its "outer subject" status. NP_1 **ta** moves to the Spec of BAP to get Case from BA by the spec-head "agreement". NP_2 **na ben shu** moves to the Spec of ASPP to get Case from ASP by the spec-head "agreement". V_2 **gei** is raised to ASP via the empty V_1 to amalgamate with the aspect marker **-le**. The amalgamated **gei-le**, in turn, assigns Case to NP_3 **pengyou** in situ:

(6″) [$_{BAP}$ **ta**$_i$ [$_{BA}$ **ba**] [$_{ASPP}$ **na ben shu**$_j$ [$_{ASP}$ **gei**$_k$**-le**]
he *BA* *that CL book* *give-ASP*
[$_{VP1}$ [$_{NP1}$ t_i] [$_{V'1}$ [V_1 t_k·] [$_{VP2}$ [$_{NP2}$ t_j] [$_{V'2}$ [$_{V2}$ t_k]
[$_{NP3}$ **pengyou**]]]]]]]
friend

The arguments for the verb-raising and NP-movement in these BA-constructions are presented as follows. First, the verb-raising is morphologically driven, because the aspect marker **-le** is a bound morpheme requiring a verb host. Otherwise, the ban against unhosted bound morpheme would be violated (Chomsky 1991). This verb-raising is also licit under the Head Movement Constraint (Chomsky 1986): i) the verb is first raised from V_2 to V_1 that θ-governs and L-marks the maximal projection VP_2; and ii) the verb is then raised from V_1 to ASP that θ-governs the maximal projection VP_1.

Second, the movement of NP_2 to the Spec of ASPP is forced by the Case Filter and BA-stranding, as evidenced below:[7]

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[7] This corresponds to Huang's (1982:45) analysis that the real motivation for this NP movement is not merely to satisfy the Case Filter. Take (3a) for example, which is rewritten below as (i):

i) **wo ba** <u>**na ge juzi**</u> **bo-le**.
I BA that CL orange peel-ASP
'I peeled that orange.'

If all that matters were the Case Filter, **na ge juzi** in (i) could be assigned Case in situ by the raised verb **bo**, just as it gets Case from the same verb in (ii):

(22) a.*ta ba gei-le na ben shu pengyou.
he BA give-ASP that CL book friend
b.*Lisi ba da-le zhuozi yi ceng la.
Lisi BA apply-ASP table one Cl wax
c.*wo ba bao-le yifu yi ge xiaobao.
I BA pack-ASP clothes one CL bundle
d.*Lisi ba tie-le xinfeng yi zhang youpiao.
Lisi BA paste-ASP envelope one CL stamp

This NP-movement is also legitimate under the constraints on NP-movement, due to the verb-raising (Chomsky 1992). It crosses no barrier, thus no Subjacency violation: VP_2 is L-marked by V_1, and VP_1 is L-marked by the amalgamated **gei$_k$-le**. Its trace t_j is A-bound by **na ben shu$_j$** in the Spec of ASPP that is the smallest maximal projection containing t_j, its governor **gei$_k$-le** and its accessible SUBJECT **na ben shu$_j$**, satisfying Binding Principle A. It also satisfies the "Shortest Movement" Condition (Chomsky 1992) in the following manner: i) when the verb **gei** is raised from V_1 to ASP to form the chain (**gei$_k$-le**, t_k), its minimal domain is {Spec of ASPP, Spec of VP_1, VP_2}; ii) since the Spec of ASPP and the Spec of VP_1 are in the same minimal domain, they are equidistant from NP_2 which is contained by VP_2; and iii) thus, NP_2 can move to the Spec of ASPP by crossing the Spec of VP_1 which is base-filled with NP_1 or its trace.

Third, the movement of NP_1 to the spec-position of BAP is also forced by the Case Filter, and it is licit under Subjacency and Binding Principle A, also due to the verb-raising: i) it crosses only the ASPP barrier, as VP_1, which is L-marked by the amalgamated **gei$_k$-le**, does not form a barrier;[8] and ii) its trace t_i is A-bound by its antecedent **ta$_i$** in the Spec of BAP which is the smallest maximal projection containing t_i, its governor **gei$_k$-le** and its accessible SUBJECT **ta$_i$**, satisfying Binding

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ii) **wo bo-le na ge juzi.**
I peel-ASP that CL orange

Unfortunately, the resulting sentence is not grammatical:

iii)***wo ba bo-le na ge juzi**
I BA peel-ASP that CL orange

Thus, the ungrammaticality of (iii) renders this NP movement a "last resort" (Chomsky 1991), or the ban against BA-stranding would be violated.

[8] In fact, ASPP may not be a real barrier because it has the same functional role as IP, which is not a barrier by definition (Chomsky 1986:14).

Principle A.[9]

In this paper, I have discussed the inherent and non-inherent relations between the preverbal NP and postverbal NP objects in the Chinese BA-construction, and presented both semantic and syntactic evidence that the non-inherent relation should be analyzed in a way that differs from the analysis of the inherent relation. I have also examined the situation types of verbs used in the BA-construction and explored their relationship to the transitivity alternation being allowed in the BA-construction. Based on the results of these studies, I have proposed an analysis to account for the non-inherent relation between the preverbal and postverbal NP objects in the BA-construction, which not only incorporates the thematic, aspectual and transitivity relations between the verb, preverbal NP object, postverbal NP object and subject of the BA-construction, but is empirically and theoretically motivated as well.

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[9] It appears that ASPP might be a governing category for the NP-trace t_i (in which t_i is not A-bound), since ASPP is a maximal projection smaller than BAP and contains t_i, its governor **gei$_k$-le** and the SUBJECT **na ben shu**. However, the SUBJECT **na ben shu** is not accessible to t_i, because coindexing **na ben shu** with t_i would lead to a violation of Binding Principle C: that is, **na ben shu** would share the same index with **ta$_i$**, which is the antecedent of t_i, by transitivity of indexing; and then **na ben shu** would be A-bound by **ta$_i$**, violating Binding Principle C. Thus, ASPP is not a governing category for t_i because it lacks an accessible SUBJECT for t_i.

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Subject-Object Asymmetry in Noun Incorporation*

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0. Introduction

The purpose of this paper is to provide a principled account of the limited distribution of Noun Incorporation (NI) within the Minimalist Program put forth by Chomsky 1992. The descriptive generalization about the distribution of NI given by Baker 1988 is that in general only direct objects (or theme arguments) can undergo incorporation. Under Baker's syntactic analysis of NI, this generalization can nicely be accounted for in terms of the Empty Category Principle (ECP). However, his analysis encounters a serious problem when we attempt to integrate it with some recent innovations of the theory of phrase structure. This paper argues that the Minimalist Program, together with the hypothesis that NI is a substitution operation, can resolve the problems with Baker's analysis, while still capturing the basic facts about the distribution of NI.

1. The Basic Generalization

As Baker 1988 shows, the core fact about the distribution of NI is that in regular transitive sentences, the object can incorporate, but the subject cannot. This generalization holds, for example, in Mohawk, as shown in (1) (Baker 1992: 4).

(1)a. Kikv a'shar-e' ka-kwetar-vs ne ka-na'tar-o.
this knife-suf NsS-cut-hab NE pre-bread-suf
'This knife cuts bread'

b. Kikv a'shar-e' ka-na'tar-a-kwetar-vs.
this knife-suf NsS-bread-∅-cut-hab
'This knife cuts bread'

c. #Kikv w-a'shar-a-kwetar-vs ne ka-na'tar-o.
this NsS-knife-∅-cut-hab NE bread
NOT: 'This knife cuts bread'

(1c) is grammatical, but under an irrelevant interpretation, in which the bread is cutting the knife. This shows that the possibility of incorporation is limited to the direct object.

The other major contrast to be captured by this generalization is the fact that in ditransitive sentences, the direct object (theme) can incorporate, while the indirect object (goal) cannot, as illustrated in (2) (Baker forthcoming):

(2)a. Athvno t-a'-khey-u-' ne owira'a.
ball cis-fact-1sA/FsO-give-punc NE baby
'I gave the ball to the baby'

* I wish to thank Jun Abe, Mark Baker, and Masanori Nakamura for their valuable comments and suggestions. Thanks are also due to Alan Libert and Anna Maclachlan for stylistic improvements.

b. t-a'khey-athvno-tsher-u-' ne owira'a.
cis-fact-1sA/FsO-ball-nom-give-punc NE baby
'I gave the ball to the baby'
c. #t-a'-ke-wir-u-' ne athvno'.
cis-fact-1sA-baby-give-punc NE ball
NOT: 'I gave the ball to the baby'

Note that (2c) is grammatical with a bizarre meaning, in which the baby is interpreted as the theme of the verb, but it does not have the intended meaning, in which the baby is interpreted as the goal of the verb.

A further confirmation of this generalization comes from the fact that the surface subject of unaccusative verbs can be incorporated, as shown in (3), while that of unergative verbs cannot, as shown in (4).

(3)a. Wa'-ka-wir-v'-ne'.
fact-NsS-baby-fall-punc
'The baby fell'
b. Onv wa'-o-'sere-ht-a-ke'toht-e'.
now fact-NsS-car-nom-appear-punc
'The car stuck out'

(4)a. *Wa'-t-ka-wir-asvtho-'.
fact-dup-NsS-baby-cry-punc
'The baby cried'
b. *Wa'-ka-nahskw-a-niye-'.
fact-NsS-animal-bark-punc
'The animal barked'

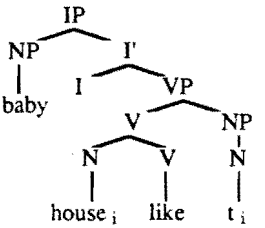
To sum up, the core fact about the distribution of NI is that only direct objects (or theme arguments) can incorporate, but deep subjects, indirect objects, and others including adjuncts cannot incorporate.[1]

2. Problems with Baker (1988)

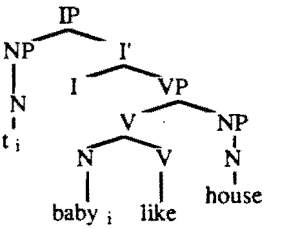
One of the empirical consequences of Baker's 1988 theory is that it is possible to explain the limited distribution of NI in terms of the ECP. To see this, let us take the core pattern of NI: direct objects can incorporate, but subjects cannot. Baker's 1988 analysis crucially relies on traditional phrase structure, in which the direct object is governed by the verb, while the subject is not. He proposes a structure like (5a) for object incorporation, and a structure like (5b) for subject incorporation.

[1] Some exceptions to this generalization have been reported in the literature, for instance, Evans 1993 gives a few potential examples of subject incorporation in Mayali. It seems that they can be analyzed as basic objects of unaccusative verbs, rather than basic subjects (see Baker forthcoming). Shibatani 1990 observes that adjunct nominals may incorporate in Ainu. We assume with Baker (ibid.) that they are formed as compounds in the lexicon.

(5)a.



b.



In (5a) the trace of the incorporated noun is governed by its antecedent, satisfying the ECP, while in (5b) the trace of the incorporated noun is not. To be more precise, in (5a) the trace is c-commanded by its antecedent, and a government relation holds between the two, since the NP which contains the trace, but not the noun root, is selected by the verb, creating no barrier for the government; hence, it satisfies the ECP. In (5b), on the other hand, the trace is not c-commanded by the noun, and there is a barrier between the two, namely VP which contains the trace, but not the noun, preventing the trace from being governed by the noun root. In this way, the subject-object asymmetry can nicely be handled.

However, the problems with this analysis arise with recent innovations in the theory of phrase structure. Two major modifications are relevant here. The first change is that subjects are assumed to be base-generated within VP (Fukui and Speas 1986, Kitagawa 1986, Koopman and Sportiche 1991, Kuroda 1988). Baker 1991 claims that this hypothesis is well motivated in Mohawk by showing that subject pronouns in this language do not c-command into adjunct clauses.[2]

Under this hypothesis, Baker's ECP approach to the subject-object asymmetry in NI must be revised. Since it turns out that subjects, as well as the objects, are potentially governed by the verb, we wrongly predict that subject incorporation is allowed without violating the ECP.

The second change that is relevant in this connection is the modified structure of ditransitive sentences. In the structure of the ditransitive sentences proposed by Larson 1988 and adopted by many researchers, the direct object is generated in the Spec of the lower VP-shell and the indirect object in the complement position, as illustrated in (6).[3]

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[2] Baker 1991 provides the following examples, in which the agreement on the verb indicates that the post-verbal NP is the object in (ia) and the subject in (ib). Nevertheless, the possessor of the NP can be coreferent with the pronoun associated with the verb in both cases.

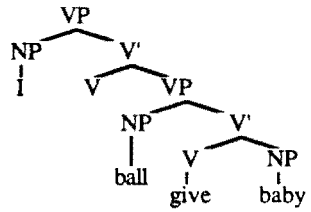
(i)a. Wa'-t-ha-ya'k-e' Sak rao-'sharc'.
fact-dual-1sS-bread-punc Sak MsP-knife
He broke **Sak**'sknife' (coreference OK)

b. Ro-ya'takehnhv-s Sak rao-'sharc'.
MsO-help-hab Sak MsP-knife
'That knife of **Sak**'s helps **him**' (coreference OK)

Assuming that lexical NPs are in adjunct positions, coindexed with a null pronoun in argument positions (Baker 1991), the possibility of coreferent interpretation in (ia) indicates that the subject pronoun is not high enough to c-command the name in the adjunct, resulting no Condition C violation. This confirms that the VP-internal Subject Hypothesis holds in Mohawk.

[3] We assume, following Larson 1988, that the layered VP structure is created only when the verb takes three arguments. This implies that for regular transitive sentences we have a single VP

(6)



In (6), the direct object is syntactically parallel to the subject, in that both are generated in specifier positions.[4] If so, it is expected that both subject and the direct object behave similarly in terms of NI. In particular, if one assumes that a verb governs an NP in the specifier position, then it is expected that the subject, as well as the direct object, should incorporate into the verb without violation of the ECP. Contrary to this prediction, however, only the direct object may incorporate, as we described above. The ECP approach fails to account for the contrast between the subject and the direct object of ditransitive verbs. Moreover, the ECP approach has a potential problem as to why the indirect object in (6) may not incorporate. Since the indirect object is governed by the verb in a strict sense, it is expected to be able to incorporate into the verb, contrary to fact. Thus, Baker's 1988 analysis of NI should be revised in accordance with the current theoretical assumptions.

3. A Minimalist Approach to Noun Incorporation

3.1. NI as a Substitution Operation

In order to resolve these problems, let us first establish some hypotheses about NI. First, following Rizzi and Roberts (R&R) 1989, we argue that head movement can be either substitution or adjunction. They argue that in the cases where head movement results in a visible amalgam of the two heads, as in NI, a structural slot is created for the incorporee as a function of the lexical properties of the incorporation host, which triggers substitution of the incorporee.[5] If the potential host does not provide a structural slot via morphological selection, a head may adjoin to the host.[6]

Let us interpret R&R' 1989 proposal within the Minimalist Program, in particular, let us consider how we formalize the notion of head movement of the substitution type. In the Minimalist Program, a syntactic transformation proceeds

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structure whose Spec is filled by the subject and whose complement position is filled by the object.

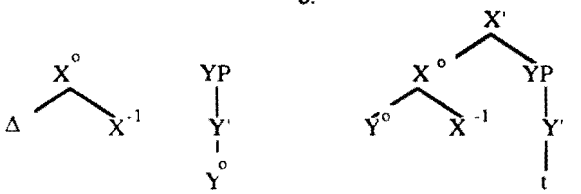
[4] See Baker 1992 for the motivation to adopt the layered VP structure for ditransitive constructions in languages like Mohawk.

[5] Although we accept the basic idea of R&R 1989, we differ from them in assuming that a visible amalgam of the two heads is not a direct indication of substitution of a head to another head. In particular, we assume, contrary to R&R, that verb movement to INFL (AGR and T in our system) is in general adjunction, rather than substitution.

[6] An instance of head movement of the adjunction type is cliticization. The hypothesis that cliticization and NI involve two different types of head movement provides an interesting account for certain differences between the two phenomena. See Zushi in preparation for more detail.

exactly like a generalized transformation (GT) does. With a slight modification of the derivational system put forth by Chomsky 1992, we propose that NI proceeds in the following manner. Take Y^o from the lexicon, which projects to YP, and also take X^{-1} from the lexicon.[7] At this point, the GT targets X^{-1}, adds Δ at its sister position, forming X^o, as illustrated in (7a). Then, it substitutes Y^o for Δ, and at the same time, it combines the complex head, X^o, and YP, creating X', in accordance with the X'-schema. This process is illustrated in (7b).

(7)a. b.



Notice that the insertion of Δ, substitution of Y^o for Δ, and creation of X' by combining X^o with YP are inner workings of a single operation of GT. By this operation, the target, X^{-1} is extended to a larger phrase structure, X'. In this way, NI as a substitution satisfies Chomsky's 1992 version of Strict Cycle Condition. This proves to be crucial to solve the problems pointed out in section 2. Before proving this, however, we will touch upon another important aspect of NI, namely, what triggers NI.

3.2. Noun Incorporation Trigger

Consider the pair of sentences in (8): NI takes place in (8a), while it does not take place in (8b):

(8)a. Ra-wir-a-nuhwe'-s.
MsS-baby-Ø-like-hab
'He likes the babies'

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[7] We follow R&R 1989 and Roberts 1991, 1993 in assuming that standard assumptions about X-bar theory can be extended so as to include projections below X^{-1} level. The idea that the incorporation trigger is an X^{-1}, rather than an X^o, is empirically motivated by the fact that one can see morphologically different forms of the same verb depending on whether it has an incorporated noun or not. Observe the following examples from Mohawk (Mark Baker, personal communication; see also Guasti 1992):

(i)a. Ke-nuhs-**ohare**-s.
1sS-house-wash-past
'I washed the house'

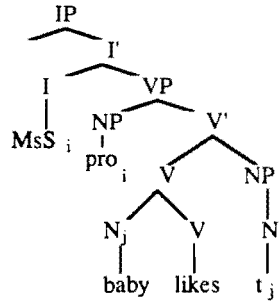
b. Ke-**nohare**-s ne ka-nuhs.
1sS-wash-past NE suf-house
'I washed the house'

Here, the verb form in (ia), where NI occurs, is different from that in (ib), where no NI occurs. Note that the difference cannot be due to some phonological process, since such change does not occur in other environments.

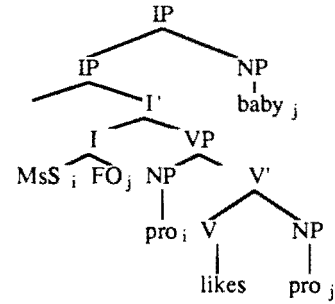
b. Shako-nuhwe's ne owira'a.
MsS/FO-like-hab NE baby
'He likes the babies'

It appears that (8a) is derived from (8b) by free application of NI, as Baker 1988 argues. It has been argued, however, that the structure of (8a) is rather different from that of (8b). Baker 1991 convincingly shows that full NPs in sentences like (8b) are not in their usual argument positions, but rather they are adjoined to the clause, being coindexed with *pros* in the argument positions.[8] But a noun root can be generated in an argument position, in which case, the noun root incorporates into the verb (see Baker 1991, forthcoming). Assuming the basic idea of this analysis, the structure for (8a) and (8b) will be (9a) and (9b), respectively.[9]

(9)a.



b.



In (9b), the masculine subject agreement licenses the subject *pro*. Likewise the feminine object agreement licenses the object *pro* (Rizzi 1986).[10] Moreover, the NP adjoined to the clause is coindexed with the object *pro*, thereby being interpreted as the object of the verb. In (9a) the object has been generated in the complement position, from where it incorporates into the verb, leaving a trace. This amounts to saying that when a noun root is generated in the complement position, NI obligatorily moves that noun root into the verb. The question then is what forces NI? Taking the basic idea of Baker forthcoming, we argue that the following licensing condition holds in incorporating languages:

(10) A phrase XP can be licensed by a head Y only if the N-features of XP can be checked off within a word containing Y.

Here, N-features can be Case and/or φ-features, and the licensing device is θ-role assignment, which is subsumed under Full Interpretation. The configuration for the

[8] See Baker 1991, forthcoming for an extensive discussion on the adjunct status of full NPs in languages like Mohawk.

[9] For the sake of simplicity, the split-INFL system is not used here.

[10] Here, we put aside the question of whether verbs in the relevant languages are projected onto syntactic structure as fully inflected forms.

N-feature checking here is a head-to-head relation.[11] Given this condition, it follows that a noun root generated in an argument position must incorporate into a head when it is possible, rendering its maximal projection licensed through θ-role assignment.[12] Notice that the claim that NI is part of the process of building up syntactic structure suggests that this operation must be done in overt syntax. This implies that if the N remains in the argument position until LF, it would not be able to check its N-feature, resulting in a violation of Full Interpretation. Consequently, NI must obligatorily take place in overt syntax.

3.3. Solution to the Problems with Baker's (1988) Analysis

Having established the basic analysis of NI, let us consider how our theory resolves the problems with Baker's 1988 analysis, while accounting for the generalization about the distribution of NI.

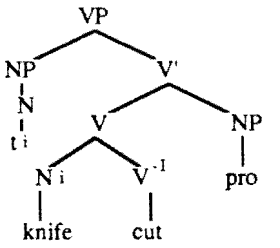
The first problem to be considered is the subject-object asymmetry in NI. The relevant examples in (1) are repeated below:

(11)a. Kikv a'shar-e' ka-na'tar-a-kwetar-vs.
this knife-suf NsS-bread-Ø-cut-hab
'This knife cuts bread'

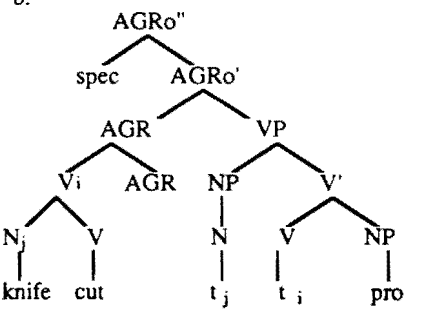
b. #Kikv w-a'shar-a-kwetar-vs ne ka-na'tar-o.
this NsS-knife-Ø-cut-hab NE bread
NOT: 'This knife cuts bread'

There are two theoretically possible derivations to incorporate the basic subject into a verb. First, the N moves down to the V, as illustrated in (12a). Second, the N incorporates into the V which has raised to some higher head position, say AGR-o, as illustrated in (12b). Note that we assume, following Chomsky 1992, that verb movement to AGR-o (and to some higher heads) is an adjunction operation.

(12)a.



b.



[11] We assume that when *pro* occurs in an argument position, N-feature checking (or licensing of *pro*) can be achieved via coindexing *pro* with agreement morpheme on a verb at least in languages like Mohawk (see Baker forthcoming). When NI is not allowed, this process will be the only way to license the NP.

[12] This will not violate the principle of Greed, if one assumes that a head and its maximal projection are not distinct entities.

The derivation in (12a) is straightforwardly ruled out by the Strict Cycle Condition.[13] Since NI moves the N to the domain that the cycle has already passed, it does not make the phrase structure larger, violating the Strict Cycle Condition.[14] In (12b), the problem is that the slot for the N cannot be created by a GT after the V adjoins to AGR-o. Since it must go deeper into the complex head AGR-o, creation of the slot itself violates the GT or the Strict Cycle Condition. Thus, both of the derivations are ruled out, rendering subject incorporation impossible. On the other hand, incorporation of the object of the regular transitive verbs is allowed. Assuming that the object is base-generated in the complement position of the verb, it can incorporate into the verb prior to its raising to AGR-o.

Notice, however, that under the phrase structure proposed by Larson 1988 which we adopt here, a direct object of the ditransitive verb is projected as a "subject" of the inner VP, rather than as a "complement" of the verb. As we pointed out in section 2, the problem that this structure causes for NI is that although the direct object is syntactically parallel to the subject, it may incorporate. This is shown in (2b), repeated here in (13).

(13) t-a'khey-athvno-tsher-u-' ne owira'a.
cis-fact-1sA/FsO-ball-nom-give-punc NE baby
'I gave the ball to the baby'

A key to explaining this fact, while keeping our account of the prohibition of subject incorporation is the different type of verb movement. In Larsonian VP structure the verb is assumed to move into an empty V position.[15] Crucially, we assume, following Chomsky 1992, that this verb movement is substitution, rather than adjunction (see also Roberts 1993). This proves to be important to distinguish incorporation of the direct object from that of the subject. If this verb movement is substitution, we may have the following derivation in (14), where the N incorporates into the higher V position:

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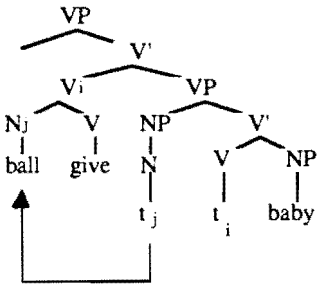
[13] Baker forthcoming argues that a noun under Spec of VP can move down, incorporating into the base position of the verb, if one assumes that m-command is sufficient for antecedent-government between heads, rather than strict c-command. Since his analysis relies on some different assumptions from ours, a direct comparison between the two analyses is difficult.

[14] The derivation in (12a) could be ruled out by some version of the Proper Binding Condition or whatever accounts for these effects. Although this analysis seems reasonable, it requires independent accounts of other properties of NI such as the impossibility of multiple NI and of long-distance NI. As we will see in section 4, these properties directly follow from our approach without recourse to other principles. Moreover, our approach provides an interesting account of certain differences between NI and cliticization, another instance of head movement. Space limitations preclude a thorough discussion of the comparison between the two phenomena, but see Zushi in preparation.

[15] We crucially follow Larson's 1988 original conception of this higher V position, where it is created for X-bar theoretic reasons. Others have analyzed the higher V as a (null) causative verb (Hale and Keyser 1992, Travis 1991). On the latter theory, it is not clear how the contrast between the subject and the direct object of the ditransitive verb in terms of NI can be explained.

(14)



The derivation in (14) is valid, satisfying the Strict Cycle Condition, if verb raising and NI are both taken to be inner workings of a single GT.[16] In fact, this is the only possible derivation. An alternative derivation in which the direct object incorporates into the verb prior to its raising to the empty V position is ruled out for the same reason that rules out the derivation in (12a).

Now, consider the structure (14) again. If this structure is right, our theory predicts that incorporation of the goal NP must be possible, since it is generated under the complement position of the verb. Contrary to this prediction, however, incorporation of the goal NP is not allowed, as shown in (2c), repeated as (15).

(15) #t-a'-ke-wir-u-' ne athvno'.
cis-fact-1sA-baby-give-punc NE ball
NOT: 'I gave the ball to the baby'

To explain this fact, we basically adopt Baker's 1988 idea that the goal argument is categorically realized as a PP with an empty head, and that it is the presence of an empty P that blocks incorporation of the goal N.[17] A partial structure for (15) will then be (16). In (16) there are two derivations to be considered: (i) the N passes through the P, first incorporating and then moving on to the verb (cf. Roberts 1991);[18] (ii) the N directly incorporates into the verb, skipping over the P. The derivation (ii) is blocked by the alternative derivation, (i), which is more economical in the sense that it keeps the shortest steps. Under the economy principle, the possibility of the derivation (i) rules out (ii) even if (i) proves to be ill-formed for other reasons. We argue that in fact (i) is independently ruled out. Recall that the empty P is theta theoretically motivated. The licensing condition in (10) requires

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[16] Our analysis is incompatible with the idea that some projection such as Aspect-P or AGR-oP intervenes between the two VPs in the structure like (14) (Travis 1991, Baker forthcoming). If it were the case, it is not clear how to explain the asymmetry between the impossibility of subject incorporation and the possibility of direct object incorporation in the ditransitive sentences. But see Baker forthcoming for a plausible direction.

[17] The presence of an empty P is motivated by the Case theoretic considerations in Kayne 1984 and Czepluch 1982, and also on thematic grounds, as discussed in Baker 1988.

[18] In Baker 1988, the excorporation in question is ruled out by morphological theory, which says that Move-α cannot move part of a word to some other place in the string; in Roberts 1989, it is ruled out by his version of Relativized Minimality.

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incorporable Ns like (17a), it is impossible to incorporate both of them at the same time, as shown in (17c).[21]

4.2. Long-Distance Noun Incorporation

The second consequence is that NI must be strictly local, which follows from the principle of economy and that of Greed. Thus, an N cannot incorporate into a head, skipping over another head. If this is on the right track, we must modify Baker and Hale (B&H)'s 1990 analysis of determiner stranding, where they admit a violation of this locality condition in cases like the following:

(18)a. [Yede seuan-ide] a-mu-ban. (Southern Tiwa; B&H 1990: 291)
that man-suf 2sS:A-see-past
'You saw that man'

b. [Yede t_i] a-**seunan**$_i$-mu-ban.
that 2sS:A-man-saw-past
'You saw that man'

Assuming that demonstratives head their own projection, selecting NPs as complements (Abney 1987), B&H argue that in (18b) the N inside the DP moves out of it, stranding the demonstrative. The underlying assumptions of B&H are: (i) the NI version and the non NI version share the same D-structure; (ii) the demonstrative and the noun form a constituent. The first assumption implies that sentences like (18b) are derived from the sentences like (18a) by NI. As we discussed in 3.2, however, this assumption is no longer tenable. Furthermore, the second assumption is weakened by the fact that the demonstratives in the relevant languages can split off from the NPs that they are semantically associated with, forming discontinuous expressions, as shown in (19) from Mohawk:

(19)a. Ne **thikv** v-t-k-yena-'. ne **athvno'**.
NE that fut-cis-1sS-catch-punc NE ball
'I will catch that ball'

b. Ne **kikv** wake-tshvry-u ne **kahure'**.
NE this 1sO-find-stat NE gun
'I found this gun'

This fact casts doubt on the analysis that the demonstratives head their own projection, taking NPs as their complements. Since both of the underlying assumptions in B&H are untenable, their analysis of long-distance NI should be abandoned. We will not, however, present an alternative analysis here due to the page limitation. But see Baker forthcoming for an analysis of discontinuous expressions, and Zushi in preparation.for a plausible analysis of long-distance NI.

4.3. No Incorporation at LF

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[21] In Baker's 1988 theory, multiple NI is ruled out for Case-theoretic reasons. Assuming that a single verb cannot enter into the same Case-indexing relationship with more than one NP, in the multiple NI structure, one of the incorporated nouns cannot be Case-indexed, violating the Visibility Condition. It is not clear how this rules in multiple cliticization if cliticization is driven by Case theory (see R&R 1989, Zushi in preparation.).

The third consequence is that our theory does not allow incorporation of the substitution type to take place at LF.[22] This has an implication for Baker's 1988 *Abstract Incorporation* or *Reanalysis*, LF counterpart of syntactic incorporation. He proposes V-Reanalysis parallel to VI, which appears in Romance causatives, N-Reanalysis parallel to NI, which appears in Possessor Raising, and P-Reanalysis parallel to PI, which appears in pseudo passives in English. Although his analysis nicely unifies apparently unrelated phenomena, the LF incorporation approach to those phenomena should be abandoned according to our view of incorporation. It is worth mentioning here that an alternative analysis has been proposed to each of the phenomena that Baker analyzes as involving Reanalysis. The notion of excorporation proposed by Roberts 1991 and developed by Guasti 1992 can dispense with LF V-Incorporation in Romance causatives. Baker forthcoming proposes an alternative analysis of possessor raising, in which it is taken as a sort of applicative construction. Moreover, an alternative approach to pseudo passive, based on Case theoretic considerations, is proposed by Watanabe 1993. If such analyses are on the right track, LF incorporation becomes unnecessary, a desired result.

5. Conclusion

In this paper, we examined the subject-object asymmetry established in Baker 1988 within the Minimalist Program of Chomsky 1992. It has been argued that our treatment of NI as substitution (cf. Rizzi &Roberts 1991), together with the Strict Cycle Condition of Chomsky 1992 enables us to account for the restricted distribution of NI in a straightforward manner, overcoming the difficulties with Baker 1988. Some immediate consequences of our proposal were also discussed.

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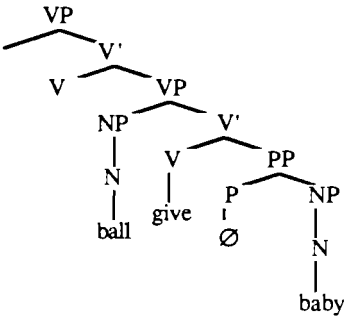
Baker, Mark, and Ken Hale. 1990. Relativized Minimality and pronoun

[22] As we pointed out above, we assume that standard cases of verb movement are adjunction, as argued by Chomsky 1992, rather than substitution, as argued by R&R 1989 and Roberts 1991. The latter assume that verb movement to AGR via Tense is triggered by selectional properties of AGR and Tense, by which a verb picks up tense and agreement marking. This view is slightly different from our view, in which verb movement is driven by V-feature checking. Under the checking theory, verb movement to AGR could take place at LF if V-feature of AGR is weak, rendering feature discharge at PF unnecessary. This is the case in English (lexical) verb movement (see Chomsky 1992). But our theory of substitution of heads is incompatible with LF movement. For this reason, we assume that verb movement of this sort is an adjunction operation.

(16)



that the N-features of the goal NP must be checked off within the word containing the P. Once the N-features can be checked off with the P, then no further movement is required. If the N moves on, this will violate the principle of Greed.[19] Therefore, there would be no convergent derivation to incorporate the goal N.[20]

4. Further Consequences

4.1. Multiple Incorporation

An immediate consequence of our analysis of NI as a substitution operation is that no multiple NI is possible. By multiple NI, we mean the cases where an N incorporates into a V,forming a complex [$_V$ N_1 V], and then another N incorporates into the same head, forming [$_V$ N_1 N_2 V]. This is directly ruled out by the Strict Cycle Condition, since the second incorporation does not make the phrase structure larger. As Baker 1988 shows, multiple NI is in fact impossible across languages. Observe the following paradigm from Niuean (Seiter 1980:72).

(17)a. Kua fā fakahū tuai he magafaoa e tau **tohi** he **vakalele**.
perf-hab-send-perf erg-family abs-pl-letter on airplane
'The family used to send the letters on an airplane'

b. Kua fā fakahū **vakalele** tuai he magafaoa e tau tohi.
perf-hab-send-letter-airplane-perf erg-family abs-pl-letter

c. *Kua fā fakahū **tohi vakalele** tuai e magafaoa.
perf-hab-send-letter-airplane-perf abs-family

Niuean allows "robust" NI, and it also allows incorporation of instrumental/means phrases of certain types, as shown in (17b). However, when a clause contains two

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[19] I owe this idea to Yuji Takano (in prep, personal communication), who argues that a similar idea provides a principled account for the Relativized Minimality effects.

[20] Another possible derivation is that the N first adjoins to the empty P, and then moves on, incorporating into the verb. This derivation could be ruled out by the Uniformity Condition on chains in Chomsky 1992, if one assumes that members of the chain formed by NI must be narrowly L-related.