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Constraining Sign Language Handshapes:
Toward a Phonetically Grounded Account
of Handshapes in
Taiwan Sign Language and American Sign Language
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0. Introduction

Researchers claim that sign language handshapes are composed of distinctive features (Battison, 1978; Mandel, 1980; Corina and Sagey, 1988; Sandler, 1989; Ann, in prep. among others). These proposals use features to describe how handshapes are articulated. To this end, the relevant features in such proposals tend to describe two things: first, one set of features names which finger(s) are 'active' in a handshape (= finger features or features for selected fingers). Another set of features describe the position of the 'active' fingers, regardless of which fingers these are, (= configuration features)[1]

In this paper, I show that recent feature theories (Corina and Sagey, 1988; Sandler, 1989) for sign language handshapes make two incorrect predictions about the "one-finger" handshapes of American Sign Language (ASL) and Taiwan Sign Language (TSL). These predictions are first, that any of the five fingers may act alone in a handshape; and second, that any finger feature may combine with any configuration feature. I argue that neither prediction is completely correct and show that this has to do with the physiology of the hand. To this end, I examine two kinds of effects which result from the physiology. First, I show that the absence of some predicted handshapes in both ASL and TSL falls out from the fact that the handshapes are physiologically impossible. Second, I show that when a physiologically difficult combination of finger features and configuration features occur, the resulting handshape can be rare in one language, and unattested in another. I argue that extending the empirical coverage of Grounding Theory (Archangeli and Pulleyblank, in prep.) from spoken language sounds to sign language handshapes can explain how the physiological facts about fingers account for the patterns in "one-finger" handshapes.

The organization of the paper is as follows: in section 1, I outline two recent feature theories proposed for ASL handshapes, and point out the two incorrect predictions. In section 2, I present handshape data from ASL and TSL, and explain the crosslinguistic patterns in those handshapes. In section 3, I explain the relevant physiology of the hand. In section 4, I show how the physiological facts discussed in section 3 explain the patterns in the ASL and TSL handshapes discussed in

section 2. In section 5, I give a brief explanation of Grounding Theory and show how it can incorporate physiological facts to explain the patterns in handshapes in ASL and TSL. Conclusions are presented in section 6.

1. Recent Feature Theories Predict Unattested Handshapes

In this section, I present the relevant parts of two recent distinctive feature theories (Corina and Sagey 1988; Sandler 1989) which propose features for fingers and features for configurations. For my purposes, what is crucial is not the differences between the proposals but two of the predictions made by both the proposals. In the following subsections, I discuss the features for finger selection, the features for finger configuration, and the predictions made by the two proposals.

1.1 Features for Finger Selection

Both Corina and Sagey (1988) and Sandler (1989) try to capture the fact that each finger is relatively independent. The features proposed in both theories for each of the fingers are shown in (1):

1. [T] = Thumb
    [I] = Index
    [M] = Middle
    [R] = Ring
    [P] = Pinky

The features in (1) might be used to describe the handshapes in (2a) and (2b).

2. (a)   (b)

The handshape in (2a) might be described as [I] since the index finger appears to be 'active', while the rest of the fingers seem not to be involved in the handshape. The handshape in (2b) might be described as [T], since the thumb seems 'active', while the rest of the fingers seem not to be active.

1.2 Features for Finger Configurations

In addition to the features for finger selection, both proposals have features for the possible finger configurations. In 1.2.1, I introduce briefly the physiology of the hand relevant to the features for finger configuration.

1.2.1 Possible Configurations

Any finger can be flexed (that is, towards a "closing" position) or extended at each joint. Proceeding outward from the palm, the first joint on all five

fingers is the knuckle, or metacarpophalangeal (MCP) joint, shown in (3a). The second joint on the I, M, R and P is the proximal interphalangeal (PIP) joint, shown in (3b). Finally, the joint closest to the fingertip of the I, M, R and P is the distal interphalangeal (DIP) joint, shown in (3c). The PIF and DIP joints generally function as a unit (Brand, 1985).
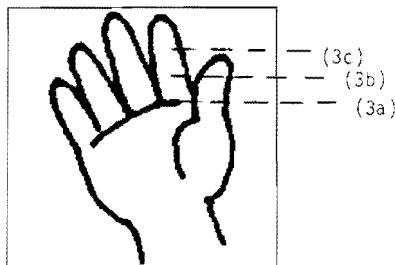
3.

   The combinations of flexion and extension of these joints yield four logically possible configurations of the hand. First, the fingers can be "extended", as shown in (4), in which there is no flexion at MCP, PIP or DIP joints.

4.

Second, the fingers can be "curved", as shown in (5), in which the fingers are flexed at the PIP and DIP joints, and not flexed at the MCP joint.

5.

Third, the fingers may be flexed at the MCP joint, and not flexed at the PIP and DIP joints, or "bent", as shown in (6):

6.

Finally, the fingers may be flexed at the MCP, PIP and

DIP joints, or closed, as shown in (7).

7.

       With this understanding of how the possible
configurations of handshapes are made, let us return to
the discussion of the two proposals for ASL handshape
features.
       Sandler's (1989) proposal comprises four (relevant)
features for finger configuration given in (8):

8.   [open] [closed] [bent] [curved]

In this system, each of the configurations in (4)-(7)
would be assigned the appropriate feature. For example,
(4) is [+open], (5) is [+curved], (6) is [+bent] and (7)
is [+closed].
       Corina and Sagey's (1988) proposal has two
(relevant) features for finger configuration given in
(9):

9.   [bent] [curved]

Random combinations of these two bivalent features yield
all four logically possible configurations of the
fingers. In Corina and Sagey's system, the handshapes in
(4)-(7) are assigned the features as indicated in (10):

10.   handshape in (4) = [-bent -curved]
      handshape in (5) = [-bent +curved]
      handshape in (6) = [+bent -curved]
      handshape in (7) = [+bent +curved]

       Sandler (1989) uses four features to describe the
configurations, and Corina and Sagey (1988) use two
features.
1.3   The Predictions for Finger Configurations
       Both Corina and Sagey (1988) and Sandler (1989)
place the features they propose in feature geometries
shown in (11a-b).

11.
(a) Relevant Portion of Sandler (1989) Feature Geometry

```
                                        fingers
     [T]                          
            [I] [M] [R] [P]
                              [open]
                                  [closed]
                                      [bent]
                                          [curved]
```
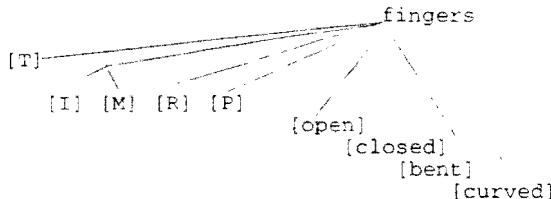
(b) Relevant Portion of Corina and Sagey (1988) Feature
    Geometry

```
Hand Configuration Node

Radial/Ulnar Node

Finger Nodes          [T]   [I]   [M]   [R]   [P]
                    [bent] [bent] [bent] [bent] [bent]
                    [curved][curved][curved][curved][curved]
```
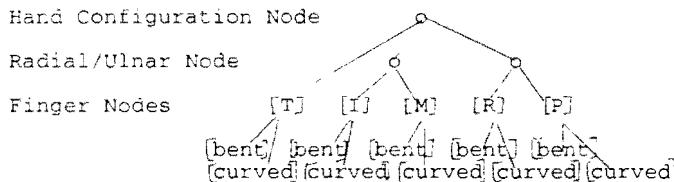
Two predictions of concern here are, first, that
each of the five fingers, T, I, M, R or P, can act alone;
second, that any finger feature might be allowed to
combine with any configuration feature[3,4] I argue that
the facts do not bear out this prediction. Specifically,
in section 2, I discuss one class of handshapes from ASL
and TSL, which I call the "one-finger" handshapes.

2.   The Patterns of "One-finger" handshapes of TSL and ASL

In this section, I present the relevant data from
both ASL and TSL, and point out the crosslinguistic
patterns concerning handshapes. In "one-finger"
handshapes, such as (2a) and (2b), one finger has a
particular configuration, while the rest of the fingers
have another configuration. Thus, "one-finger" handshapes
are composed of two groups of fingers: the first group is
the lone finger, and the second group is the rest of the
fingers, which (for this discussion) are all closed. The
"one finger" (either T, I, M, R or P) in the handshapes
I examine here can have three configurations: it can be
extended, bent or curved. I omit an examination of
closed, the fourth logically possible configuration, from
this discussion.

The patterns in TSL and ASL that result when finger
features and configuration features combine are indicated

in (12)[5].

12. TSL and ASL handshapes involving one finger
    (X = attested, 0 = unattested, r = rare')

	FINGER CONFIGURATIONS					
	TSL			ASL		
	Extended	Curved	Bent	Extended	Curved	Bent
T	X	X	X	X	0	X
I	X	X	X	X	X	X
M	* 0 *	0	Xr	* 0 *	0	0
R	* 0 *	0	Xr	* 0 *	0	0
P	X	X	X	X	0	X

Four patterns in (12) require explanation. Pattern 1 (boxed by asterisks) indicates that M and R are unattested with [extended] in TSL and ASL. Pattern 2 (boxed by double lines) shows that M and R are unattested with [curved] in TSL and ASL. Pattern 3 (boxed by a single line) has two parts. First, in TSL, M and R with [bent] are attested but rare, and second, in ASL, M and R with [bent] are unattested. Finally, Pattern 4 (underlined) illustrates that T and P do not combine with [curved] in ASL, and are rare in TSL.

In both Sandler's (1989) and Corina and Sagey's (1988) theories, since any of the selected finger features are predicted to combine with any of the configuration features, Patterns 1-4 have no explanation. In section 3, I show how an examination of the physiology of the hand helps to explain these patterns.

3.0 The Physiology of the Hand Relevant to Handshapes

Mandel (1980, 1981) suggests that serious consideration of the physiology of the hand can add to our understanding of signs. For example, Mandel (1980) suggests that the extensors in the hand can help explain which fingers are easier to extend. Following up on this line of thought, in this section, I discuss the extensors and the flexors of the hand in turn.

3.1 The Extensors

Extensors are muscles responsible for causing fingers to extend, primarily at the MCP joint. The names of the extensors in the hand are given in (13); each can

be located in the illustration of the dorsal side of the
hand in (14).

13. Names of Extensors

Common Extensors
a. for I, M, R and P = *extensor digitorum communis*
b. for T = *extensor pollicis brevis*

Independent Extensors
c. for T = *extensor pollicis longus*
d. for I = *extensor indicis proprius*
e. for P = *extensor digiti minimi*

14. Dorsal side of the Hand
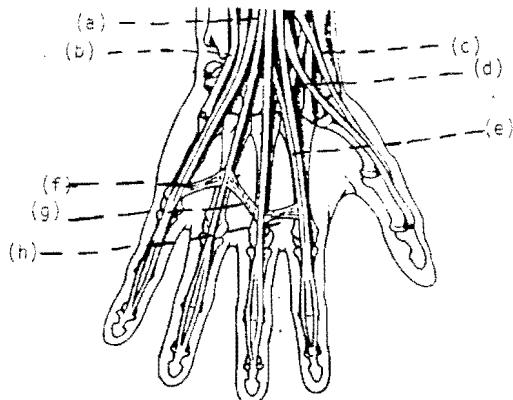
(picture from Tubiana, 1981; my labelling of extensors)

A common extensor, the *extensor digitorum communis*,
extends the I, M, R and P at the MCP joint. The extensor
which has this function for the T is the *extensor
pollicis brevis*. Thus, each of the five fingers has one
extensor: the I, M, R and P have the *extensor digitorum
communis* and the T has the *extensor pollicis brevis*. In
addition to the common extensor, the T, I and P each have
one independent extensor (Brand, 1985). The *extensor
pollicis longus* (for the T), *extensor indicis proprius*
(for the I) and *extensor digiti minimi* (for the P) are
shown in (14). It is clear that there is an asymmetry in
the fingers with respect to extensors: the T, I, and P

each have two extensors, the common extensor and the
independent extensor; while the M and R each have only
one extensor, the common extensor (Mandel, 1980).

The common extensor cannot fully extend either M or
R when the rest of the fingers are closed. However, the
common extensor can get M or R into a "bent" position
with some difficulty. I argue in sections 4 and 5 that
this physiological asymmetry has implications for the
phonologies of ASL and TSL.

3.2 The Flexors

Flexors are muscles that cause the fingers to flex
(close) at any joint. The I, M, R and P are all closed by
the *flexor digitorum profundus* and the *flexor digitorum
superficialis*. The T is closed by the *flexor pollicis
longus* and the *flexor pollicis brevis*. (The flexors are
not labelled in (14) since they are located on the volar
side of the hand.) Note that (unlike the situation with
the extensors) there is no asymmetry in the flexors: all
the fingers have the same number of flexors. The
significance of this fact will be discussed in sections
4 and 5.

3.3 Summary of the Physiology of the Hand

The common extensors facilitate extension of T, I,
M, R and P at the MCP joint when I, M, R and P or all
five fingers act together. However, when one finger such
as the T, I or P is extended alone, it is the independent
extensors that do the work. Since both M and R lack
independent extensors, they must rely upon the common
extensor to extend them at the MCP joint.

4. How the Physiology helps explain Patterns 1-4

In this section, I re-examine the patterns to be
explained from (12), in light of the physiology presented
in section 3. I claim that the physiology is partially
responsible for the patterns we find in sign language
handshapes. I show that the two predictions (first, that
it is possible for any one finger to act alone, and
second, that any finger can combine with any
configuration feature) are incorrect. Rather, some
combinations of features are subject to physiological
constraints, which I argue are sometimes absolute and
sometimes not. I give explanations for Patterns 1-4 in
(12) in turn.

Pattern 1 was that a fully extended M or R was
unattested in both ASL and TSL. An understanding of the
physiology makes the explanation for Pattern 1 clear:
full extension of M or R is impossible due to their lack
of independent extensors. However, the lack of
independent extensors in M and R has another less obvious
implication. Recall from section 1.2.1 that curving a
finger necessitates both extension at the MCP joint and
flexion at the PIP and DIP joints. Both M and R can flex

at the PIP and DIP joint, but neither M nor R can fully
extend at the MCP joint. For this reason, curving M or R
is impossible. The explanation for Pattern 2, (= neither
a curved M nor a curved R is attested in ASL and TSL), is
clear: it is physiologically impossible to curve M and R.

The two parts of Pattern 3 are first, both M an R
can take on a bent configuration in TSL, but both of
these are rare. Second, neither M nor R can assume a bent
configuration in ASL. I claim the explanation for this
falls   out   from   the   fact   although   it   is   not
physiologically impossible for M and R to take on a
"bent" configuration, it is uncomfortable[7].   I explain
this further in section 5.

The two parts of Pattern 4 are first, that neither
T nor P combine with [curved] in ASL, and second, that
the combination of T or P with [curved] is rare in TSL.
This is similar to Pattern 3, in which a handshape was
unattested in one language and rare in the other. Unlike
Pattern 3, a plausible physiological explanation is not
readily available for Pattern 4. Although it seems to be
the case that many people find curving the P difficult,
there is as yet no physiological fact having to do with
the extensors, flexors or junctura tendinae that might
straightforwardly explain this. An answer may still be
found in other aspects of the physiology, such as the
nerval system of the hand. It is also possible that a
perceptual (= the analog of acoustic) consideration might
be responsible. In the absense of such an explanation, I
am forced to conclude that Pattern 4 is an accident.

5.   Extending Grounding Theory to Handshapes

In this section, I briefly introduce three of the
fundamental ideas of Grounding Theory (Archangeli and
Pulleyblank,   in   prep.).   I   show   how   Grounding   can
incorporate the physiological facts discussed in section
3 to explain the patterns of handshapes in TSL and ASL.

First, the aim of Grounding Theory is to restrict
the possible combinations of phonological features.
Grounding Theory does this by stating that if a language
has a constraint, the constraint is phonetically based (=
grounded). That is, a language will never require a
constraint that is not phonetically motivated. Second,
the strength of the phonetic basis of a constraint
correlates to the strength of the constraint across
languages. Thus, a constraint which has strong phonetic
motivation is predicted to hold universally. We expect
crosslinguistic variation with respect to a constraint
which has less strong phonetic motivation: some languages
will invoke it, some will not. Third, Grounding Theory
claims that in the unmarked case, a language will invoke
as many constraints as possible. Thus, languages are
predicted to prefer to constrain their phonological

systems, rather than not: the fewer constraints a
language has, the more marked it is. I consider
physiological motivation for constraints on sign language
handshapes the analog of "phonetic" motivation for
constraints on sounds.

From the data we have seen, it seems that a theory
with explanatory and predictive value should be able to
exclude handshapes on physiological grounds, some
absolutely and some by degrees. Grounding Theory
(Archangeli and Pulleyblank, in preparation) has this
property.

5.1 Constraints on Sign Language Handshapes

Patterns 1 and 2 were that neither M̲ nor R̲ could
extend or curve in TSL and ASL. The explanation (that
these empirical facts were due to the lack of independent
extensors for M̲ and R̲) corresponds to the existence of
strongly physiologically motivated constraints (=
grounded path conditions) such as those in (15):

15. If [M], then not [extended]
     If [R], then not [extended]

Because the physiological motivation is strong, (15) is
predicted to be invoked universally: no crosslinguistic
exceptions are predicted.

Pattern 3 was that both M̲ and R̲ could assume a bent
configuration in TSL, although both configurations are
rare. In ASL, neither M̲ nor R̲ can be bent. I noted that
it is physiologically possible, but uncomfortable to put
M̲ or R̲ in a bent configuration. I propose that this fact
corresponds to a weaker constraint, shown in (16):

16. If [M], then not [bent]
     If [R], then not [bent]

The constraints in (16) are weaker than those in (15),
since as noted, it is not impossible to configure M̲ and
R̲ as bent, but only uncomfortable, particularly for R̲.
Because the physiologial motivation for the constraints
in (16) is not as strong as for the constraints in (15),
the prediction is that crosslinguistically (16) is only
sometimes invoked. In the data provided here, ASL invokes
(16) and TSL does not. Since the third tenet of Grounding
Theory is that it is less marked crosslinguistically to
invoke the constraints, the prediction is that more sign
languages will be like ASL (i.e. they will invoke (16)),
and fewer signed languages will be like TSL (i.e. they
will not invoke (16)).

6. Conclusion

This study demonstrates that three of the four
patterns in attested and unattested "one-finger"

handshapes in ASL and TSL can be explained by
physiological facts. This is not to say that ASL and TSL
handshape inventories are solely the result of
physiology, for their inventories are not the same.
However, similar patterns exist across the inventories of
both languages: for example, first, neither language has
certain handshapes (Patterns 1 and 2), and second, where
a handshape is unattested in one language, it is rare in
the other (Patterns 3 and 4). In the present analysis,
Patterns 1 and 2 are the result of feature combinations
which are physiologically impossible. These facts have
not yet been incorporated into either a feature geometry
or a set of constraints on feature combinations for
handshapes. To explain Pattern 3, I use Grounding Theory
to propose physiological constraints on feature
combinations. The physiological facts relevant to Pattern
3 are clear; there is a physiological basis for a
condition. In addition, because Grounding Theory states
that in the unmarked case, languages will invoke as many
physiologically grounded constraints as possible, there
are strong predictions made about the variations in
handshapes we should find crosslinguistically. It is
predicted that more languages will be like ASL (and adopt
the constraint for Pattern 3), than like TSL (and ignore
the constraint for Pattern 3). This is supported by data
from the "one finger" handshapes of ASL and TSL.

Endnotes

1. I do not discuss this distinction between 'active' and
'inactive' fingers in a handshape in this paper. For more
discussion, see Mandel, 1980; Sandler, 1989; Corina and
Sagey, 1988; Ann, 1991. For the purposes of this paper,
I appeal to the readers' intuitive understanding of the
terms.

2. The abbreviations for thumb, index, middle, ring and
pinky are enclosed in square brackets when they are used
as features: [T], [I], [M], [R], [P]. In any other
context, they are underlined: T, I, M, R, P.

3. Other predictions are made as well that concern which
sets of fingers might act together, and what
configurations these sets of fingers might assume. Since
these predictions do not have to do with "one-finger"
handshapes, I do not discuss them further in this paper,
but see Ann (in prep.).

4. In the case of Corina and Sagey's proposal, a finger
feature would combine with a set of configuration
features, composed of some combination of + and - values
for [bent] and [curved].

12

5. In (12) the use of the terms "extended", "bent" and "curved" is meant to be purely descriptive.

6. Rare means used in fewer than three signs.

7. Most people feel that bending M is much easier than bending R. This is because of the relationships between the fingers caused by the *junctura tendinae*. Three *junctura tendinae* are of interest here: the one that connects the M to I (labelled in 14f), the one that connects M to R (14g), and the one that connects R to P (14h). When (14f) and (14g) are stretched, (i.e. when the I and R are closed, with M as extended as possible) the result is a slighly increased degree of freedom in M. Conversely, when (14g) and (14h) are stretched (i.e. when the M and P are closed with the R as extended as possible), P is pulled down toward the palm. Thus, M emerges as the more independent of M and R. I thank Sandy Sasarita for useful discussion of this phenomenon.

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On the Position of (Postverbal) Subjects in Spanish[*]
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0.   Introduction.

It is a known fact that in certain Romance languages (among others) subjects may surface in preverbal or postverbal position. In Spanish, one source of postverbal subjects is the so—called *Free Subject Inversion* (FSI) phenomenon; in this case, the subject of a declarative sentence may optionally surface after the verb. Another source of VS word order is found in interrogative sentences; here, whenever a WH—element (of a certain kind) has been moved into COMP, the subject NP must appear following the verb, this is what Torrego (1984) has called *Obligatory Inversion Rule* (OIR).

In this paper, we discuss the issue concerning the position(s) that these subjects occupy in the different stages of derivation. Within the proposal of the Internal Subject Hypothesis (ISH) (see Koopman & Sportiche (1987,1990)),   we intend to show that actually there is no process of *inversion*; in other words, postverbal subjects do not involve a special application of the rule Move—α.

This paper is organized as follows. In the first section, we deal with the phenomenon of floating quantifiers in Spanish following the proposal of Sportiche (1988)   and discuss cases involving negative polarity items ("negative doubling").   By doing so, we intend to show that the ISH holds in this language.   The second section deals with the so—called FSI phenomenon.   Here, we provide evidence against some of the previous proposals and suggest an account based on the ISH. The issue of Case assignment is also discussed.   In the third section, we show that postverbal subjects in interrogative sentences do not involve extra instances of movement, and —within the ISH— propose an account in the line of Goodall (1991a).   Here, we also suggest that the asymmetry noted by Torrego (1984) concerning the position of subjects in Wh—questions does not entail the same derivation as commonly assumed.

1.   The ISH in the Case of Spanish.

1.1 Floating Quantifiers.

Sportiche (1988)   proposes a theory of floating quantifiers (FQs), based on the assumption of a structure for IP similar to (1), linear order aside.[1]   The structure in question underlies to what has been called the Internal Subject Hypothesis. · This hypothesis claims that NP* is the canonical or D—structure position of the subject.   In this line, Koopman & Sportiche (1987) propose the existence of two classes of languages that differ in the position in which the subject NP may appear at S—structure.   In languages of Class 1 (i.e. French, English, among others), an overt subject NP is base—generated in NP*, from where it later must be moved to [Spec,IP], where nominative Case is assigned.

(1)
```
                    IP
                      \
            Spec    I'
                      \
               Iᶜ   VF
                /  \
             NP*    V'
                   /  \
                 Vᶜ    ...
```
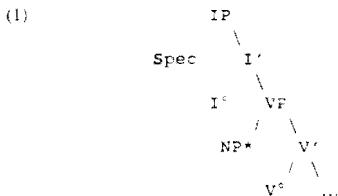
On the other hand. in languages of Class 2 (i.e. Irish. Italian. among others) a subject NP —also base—generated in NP*— may appear at S—structure in its D—structure position. or in a position other than [Spec.IP].

Another assumption at the base of the theory of FQs developed in Sportiche (1988) is that quantifiers (modifiers in general) are generated adjoined to the maximal projection they modify.[2] Thus. subjects that include a quantifier have the D—structure representation in (2):

(2)
```
                    IP
                  /  \
            Spec    I'
                      \
               Iᶜ   VP
                   /  \
             NP*    V'
                \    |
             Q   NP* Vᶜ
```
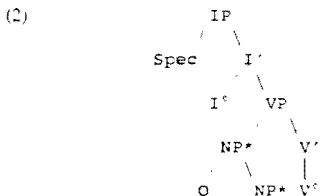
Once these assumptions have been made. a floating quantifier is simply a quantifier that has been left behind by the subject in one of the intermediate Specs which the subject reaches along its movement towards the [Spec.IP] position. In other words. as Sportiche himself suggests. there is really no process of QF. everything is reduced to the fact that quantifiers appear NP—initially and to the existence of a process of subject raising. (See Giusti (1990)).

In Spanish. a quantifier *related* to the subject may appear or *float* in different positions. as illustrated in (3)—(4).

(3) a. ?*Los hombres *todos* dedicaron un poema a María
     b. Los hombres dedicaron *todos* un poema a María
     c. Los hombres dedicaron un poema *todos* a María
     d. Los hombres dedicaron un poema a María *todos*
         "The men *all* dedicated a poem to Maria"
(4) a. Los hombres habían *todos* dedicado un poema a María
     b. Los hombres habían dedicado *todos* un poema a María
         "The men *all* had dedicated a poem to Maria"

Some comments are in order. First, all the examples except

(3a) are ambiguous between a reading in which *todos* is understood as "each one" and another in which it is understood as "all together". For case (3a), the only available reading is "all together", a fact that suggests the non-*floating* nature of this case. There are two arguments that support this view. First, another quantifier that may float is *cada uno* ("each one"), and it is not available in a context like the one of (3a). Second, this quantifier appears with the same (and only) interpretation in the same position in relation to the NP in contexts where *floating* is not available in Spanish (eg. *El niño vio a los hombres todos* "the boy saw the men all together"). It is interesting to note that some speakers do not have the possibility of having the quantifier following the NP. Note, also, that the case in discussion ((3a)) becomes totally acceptable if the quantifier is preceded and followed by distinct pauses, a possibility that we are not interested in. Secondly, most speakers consider the cases involving a quantifier in sentence-final position as marginal, but the judgement improves if some material follows the quantifier (e.g. *esta tarde* "this afternoon").[3]

Sportiche's theory of FQs offers a straightforward account of the cases in (3a-b), (3d) and (4a). For (3a), there is no Spec available to leave the quantifier *floating*: the NP subject is in [Spec.IP] and the verb occupies the head position of IP.[4] In (3b) the quantifier *todos* is in [Spec.VP]. In relation to (3d), we will assume that the quantifier is also in [Spec.VP], but in this case the Spec position follows $V°$. Notice, as noted by Sportiche (1988:p.437), "the null assumption seems to be that NP* is freely ordered with respect to VP"; in other words, there is nothing that prevents generating the Spec to the right of $V°$.[5] For the case in (4a), the quantifier occupies the Spec position of the XP headed by the auxiliary (ASPP or VP').

Let us now turn to cases (3c) and (4b) that present apparent problems to Sportiche's theory of FQs. (3c) shows a quantifier *floating* between a direct object and an indirect object. This case is somehow similar to (3d), the subject NP is generated following VP. But in (3c) the indirect object *a María* has been right-dislocated, being adjoined to VP (or IP).

Now, consider case (4b). In Sportiche's proposal this possibility is not available, since in this case the element that raises to $I°$ is the auxiliary; the verb remains in its original position. The structure of IP assumed by Sportiche is not capable of dealing with a case such as the one at hand. Here, the option of generating the subject to the right of VP does not offer a solution. Cases like (4b) seem to suggest the need of an XP immediately dominating VP.[7] In order to deal with cases like these, we propose to include the Af(fix)P suggested in Hyams & Jaeggli (1989), see (5).[8]

```
(5)              IP
            /    \
        Spec    I'
                  \
            I°   VP ASPP
                /    \
            Spec    V'
                  /   \
        (Aux)V°    AfP
                 /    \
            Spec    Af'
                  /    \
              Af°    VP
                      '\
                   NP*  V'
                      /  \
                    V°   ...
```
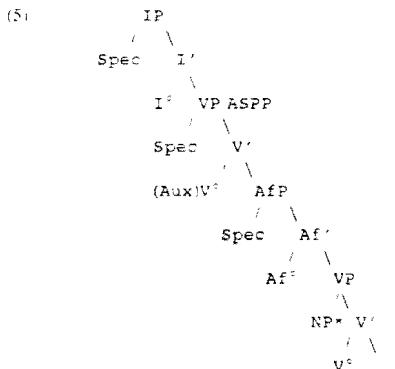
Af° (the head of AfP) is a position to which a verb has to move in order to take (part of) its verbal morphology (infinitival, participial and progressive suffixes or V-class suffix -the so-called thematic vowel in Romance).⁹

Assuming that the structure in (5) corresponds to (4b), we are now able to deal with this case. V° moves to Af° to take its participial morphology (at the same time, the auxiliary has raised to I° -as an instance of V-raising), and the NP subject raises leaving behind the quantifier in [Spec.V°]. Hence, we have the linear order: Subject-Auxiliary-Verb-Q.

Note that this suggestion does not posit a problem for a case like (4a), where the quantifier *floats* between the auxiliary and the verb. In this case we have a derivation similar to the one for (4b), but instead of leaving the quantifier behind in the position where the subject is base-generated, it moves along with the subject and it is stranded in one of the intermediate Specs.

Consider now a case of FQs in infinitival clauses. See the examples in (6):[10]

    (6)   a.   Es necesario (*todos) partir (todos)
                 "It is necessary to all leave"
           b.   Es necesario (*todos) comprar (todos) una alfombra
                 (todos)
                 "It is necessary to all buy a carpet"

Example (6a) contains an ergative verb (see Burzio (1986)) and (6b) a transitive one.

Let us begin by assuming that V° moves -at least- to Af° (in order to take its infinitival morphology).[11]   These examples suggest that the subject should be generated VP-internally and that it is unable to raise, it remains in the position it is base-generated (the difference between the two possible positions for *todos* in (6b) is related to the possibility of generating the Spec

to the left or right of VP). For an explanation of these facts see Belletti (1990) and Arnaiz (in prep.).

1.2 Negative Polarity Items.

Another piece of (indirect) evidence for the ISH in Spanish is observed in the behavior of negative polarity items.[12] As it is known, in Spanish —as in Italian (see Rizzi (1982))— these items need to co-occur with *no* (the sentential negation marker) if they appear in postverbal position, see examples in (7).

(7) a. ***(No)** ha llegado *nadie*
         "*Neg* has arrived *no one* = No one has arrived"
     b. ***(No)** ha llamado *nadie* a María
         "*Neg* has called *no one* Maria = No one has called María"
     c. Juan ***(no)** ha comprado *nada*
         "Juan *neg* has bought *nothing*"

However, if the negative quantifier is in preverbal position *no* does not appear. See (8).

(8) a. *Nadie* ha llegado
     b. *Nadie* ha llamado a María
         "*No one* has called María"

These negative quantifiers as negative polarity items need to be associated with a negative element (element that acts as a scope marker according to Rizzi (1982)) in order to fulfill the polarity requirement. Informally speaking, this "association" is obtained via c-command(a Neg° must c-command the polarity item — (7)) or via Spec-Head agreement (the negative quantifier in their way to [Spec,IP] enters into a Spec-Head relation with Neg°—(8)).[13] If this is the case, examples like (7a-b) seem to suggest that a postverbal subject is generated VP-internally, or at least in a position lower than Neg°.

2. Postverbal Subjects in Declarative Sentences.

Consider the examples in (9) as an illustration of the phenomenon under study:

(9) a. *Juan* ha contestado la pregunta
     b. Ha contestado *Juan* la pregunta
     c. Ha contestado la pregunta *Juan*
         "Juan has answered the question"[14,15]

In this section, we briefly review some of the previous accounts concerning this phenomenon, and provide evidence against these proposals, based on facts concerning FQs. At the same time, we show that this phenomenon finds a simpler account within the ISH. In other words, it is suggested that Spanish belongs to Class 2 of Koopman & Sportiche (1987)'s classification.

2.1   Against Free Subject Inversion.
     There have been several proposals in the literature that deal
with this kind of postverbal subjects. A main group of proposals
(Jaeggli (1982), Rizzi (1982), Safir (1982), Burzio (1986), among
others) has as a common denominator the suggestion that the
phenomenon at hand supposes movement, hence the denomination of
(Free Subject) *Inversion*.[16]   Under this view, the subject is
rightward moved and adjoined to VP (postponed subject), as
illustrated by (10).

     (10)   S
                         / \
                      NP   VP
                      | /   \
                     [e]_i VP   NP_i
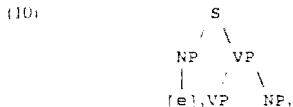
In relation to this proposal, we want to show that the phenomenon of
FQs suggests that this cannot be the case. Notice that the movement
analysis predicts a case such as (11) as possible, provided that
Sportiche (1988)'s   assumption that quantifiers are generated
adjoined to the X^{max} they modify is true.

     (11)   *Todos* contestaron el teléfono los hombres
            "All the men answered the phone"

Nothing should prevent leaving the Q in the original position of the
subject.

2.2   Postverbal Subjects and the ISH: A proposal.
     Here, we propose an account of this phenomenon that only
relies on the ISH, without the need to resort to (rightward)
movement.   The ISH allows to treat a postverbal subject as an
unmoved subject. These subjects do not raise to [Spec,IP], they
remain in their D-structure position (eg. [Spec,VP], see (1)). where
they are assigned their θ-role by V°. In Spanish, a subject may
appear at S-structure in [Spec,IP] or [Spec,VP]. Observe that this
proposal gives a straightforward account for the so-called Free
Subject Inversion phenomenon (see Bonet (1989) for a similar
proposal for Catalan).   To illustrate this, let us consider the
cases in (9). (9a-b) have the same D-structure representation (see
(5)).   The subject NP is generated in [Spec,VP]. In (9a), the
subject raises to [Spec,IP]. At the same time, the auxiliary raises
to I° as an instance of V-raising and V moves to Af°, as we have
proposed above. The difference with (9b) is that here the subject
does not raise. it stays in [Spec,VP].   (9c) follows a similar
derivation to (9b). however in this case, the subject has been
generated to the right of VP.
     The proposal advanced here has the advantage of explaining the
FSI phenomenon by recurring only to the ISH. In other words, the
possibility of having postverbal subjects in Spanish follows from
the structure of the sentence and from Case assignment (an issue to

which we turn immediately).

2.3   Postverbal Subjects and Case Assignment.

It has been suggested that postverbal subjects remain in their D—structure position. This would mean that these NPs are able to be assigned nominative Case in that position. In regard to this issue, let us consider Koopman & Sportiche's (1990) suggestion concerning nominative Case assignment.

K&S propose that there are two mechanisms through which an NP may receive nominative Case. One is what they call Case assignment under government, the other is Case assignment by agreement. The former mechanism supposes that INFL assigns Case to an NP that is governed by it. See (12).   For the latter mechanism, see (13).

(12) a. **Government**
           α governs β if α I—commands β and no Barrier for β intervenes between α and β.

      b. **I-command**
           α I—commands (immediate command) β if the first constituent containing α contains β.

(13) Let H be a Case assigning head. Then if it is a Case assigner by agreement, it may assign Case to an NP in its specifier position, as a reflex of the general process of specifier—head agreement. (K&S (1990:p.18)).

According to K&S, languages vary in relation to which mechanism is at work in assigning Case to the subject. In some languages —Class 1— Case is only assigned by agreement (eg. English, French).   In others —Class 2— both mechanisms are available (eg. Arabic).

We have suggested above that Spanish is a Class 2 language, which means that both mechanisms are available. That is, a subject moved to [Spec.IP] receives its case by agreement; and a subject that remains in its D—structure position is assigned Case under government (cf. Roberts (1990)).

There is a slight complication that we need to take care of. In the examples in (9), it is possible to observe that a postverbal subject must be able to receive case in the [Spec.VP] position, even in those cases where some projections intervene between I^{o} and the subject (in this case VP/ASPP and AfP).   For these cases, we need to ensure that Case is able to reach [Spec.VP].[17] . We assume that, since selection is involved between the X^{o}s and XPs of the structure adopted, no barrier intervenes between the case assigner (the tensed I^{o}) and the NP subject (see Rizzi (1990:p.6)).   Putting it in another way, these functional categories are transparent to government, they can only be barriers by inheritance.[18]

3.   Postverbal Subjects in Wh-questions.

As first noted in Torrego (1984) —see also Goodall (1991a), Spanish shows an asymmetry concerning the position a subject must

occupy in Wh-questions. Consider the following examples:

(14) a. Qué ha ordenado Juan?
     b. *Qué Juan ha ordenado?
        "What has Juan ordered?"
(15) a. Cómo se comportó Juan hoy?
     b. *Cómo Juan se comportó hoy?
        "How did Juan behave today?"
(16) a. Dónde ha almorzado María el último mes?
     b. *Dónde María ha almorzado el último mes?
        "Where has Maria eaten last month?"
(17) a. Por qué compró Juan ese televisor?
     b Por qué Juan compró ese televisor?
        "Why did Juan buy that TV set?"
(18) a. En qué medida ha afectado la recesión al país?
     b. ?En qué medida la recesión ha afectado al país?
        "In what way has the recession affected the
        country?"

These examples show that in certain cases of questions involving Wh-
extraction the NP subject is required to surface in postverbal
position. the *Obligatory Inversion Rule* (OIR) of Torrego (1984) (see
also Uribe-Etxebarria (1990)).

In this section, we suggest that cases (a) and (b) of the
examples above do not imply the same derivation as commonly assumed.
We also want to show that the (a) cases are related to our proposal
for postverbal subjects in declarative sentences. By doing so, we
will show that the OIR does not entail an extra instance of verb
movement; as in the other case of postverbal subjects, the verb
occupies $I°$ and the subject is in [Spec,VP] at S-structure.

3.1   Wh-V-S order.

3.1.1 $V°$ is in $I°$ and the subject is in [Spec,VP]

At first sight, there seems to be two possible ways to
approach the (a) cases in (14-18). One possibility is to think that
the verb moves higher than $I°$. In this line, Torrego (1984)
proposes that a V-Preposing rule is responsible for these cases, a
WH-element of a certain kind in COMP triggers this rule. Under her
analysis, the verb is left-adjoined to S (IP in the structure
assumed here). Another option —within this view— is to suggest that
V raises to $C°$ in WH-questions (an instance of $I°$-to-$C°$ movement as
proposed in Rizzi (1982,1991)).

Note that if the OIR implied a further step in V-movement, it
would be expected that no material can appear between the Wh-element
and V. This prediction is falsified by cases like (19), where an
aspectual adverb intervenes between the Wh-element and V (for a
similar argument see Goodall (1991a)):

(19) Qué Qué plato *siempre nunca* ordena Juan en este
restaurante?
"What/What dish does Juan always never order in this
restaurant?"

On the other hand, it should be observed that the two
proposals above assume that the NP subject occupies the [Spec,IP]
(the preverbal position).

There are two arguments against this assumption. The first
one comes from negative polarity items. As said earlier, a negative
quantifier in [Spec, IP] does not require the presence of the
sentential marker *no* (see (8)). This means that we have a way to
determine the position of the subject: if the subject is in
[Spec,IP], *no* should not appear; if the subject is in a position
lower than NegP then, *no* must appear. Cases such as the ones in
(20) go against the proposals mentioned above.

(20) a. *Qué compró nadie?
b. Qué no compró nadie?
"What did no one buy?"

The second argument comes from the phenomenon of FQs (cf. Lois
(1989)). See (21).

(21) *Qué pensaban los hombres *todos*?
"What did the men *all* think?"

In (21), following the proposals under discussion, V has been moved
(V-preposing has applied or it is in C°) and the subject is in the
[Spec,IP] position. If this were the case, then (21) should be
possible as an instance of FQs (see 1.1). Note that the Q should be
able to remain in [Spec,VP].

As seen, (19), (20) and (21) argue against the possibility of
considering the existence of additional instances of movement in WH-
questions. (19) suggests that V does not move further than I°. On
the other hand, (20) and (21) show that the subject NP cannot be in
[Spec,IP]. Moreover, in this context there seems to be no process
of S-raising.

The evidence shown leads to a second way to approach this
phenomenon. Within the ISH, it is possible to claim that in WH-
questions, V-raising takes place in the usual manner, but subject
raising somehow does not apply (in the relevant cases). Notice that
if the NP subject of a WH-question remains in its D-structure
position and the verb raises to the head of IP, none of the problems
noted above arise.

Under this view, postverbal subjects in general (resulting
either from the FSI or the OIR phenomena) occupy the same position:
[Spec,VP]. Also, in both cases, V-movement applies uniformly.

The question that remains to be answered is why is it that
certain subjects of WH-question have to remain in [Spec,VP], or what
prevents these subjects from raising. We intend to answer these

questions in the next section.

3.1.2 Proposal.

We propose, following Goodall (1991a), that the WH-phrase moves into [Spec,IP] in its way to [Spec,CP] (cf. Bonet (1989)). As seen above, the subject in these Wh-questions cannot appear in [Spec,IP] (it remains in [Spec,VP]); this suggestion takes care of this fact. But, at the same time, two important questions arise. On one hand, why in the case of Spanish, Wh-extraction takes a different course? An answer to this question may be related to Rizzi (1991)'s *Wh-Criterion* [19] Let us assume that this criterion holds in Spanish (or universally); then, since this language lacks I°-to-C° movement, the Wh-element needs to move to/through a position where it will be able to comply with the *Wh-Criterion*. That position has to be [Spec,IP]; recall that according to Rizzi the [+WH] feature is a specification of I° -the main inflection (see also Goodall (1991b)). On the other hand, what is the status of [Spec,IP] in relation to the distinction A/A-bar? Our proposal suggests that it is an A-bar position. But, at the same time, there is evidence that this position is an A-position. At this time, the only alternative is to posit that [Spec,IP] is ambiguous with respect to the A A-bar distinction, a controversial issue (see Diesing (1990)). We leave this question open for further research.

3.2   Wh-S-V order.

Torrego (1984) shows that in Spanish there seems to be an asymmetry concerning the position a subject may occupy in Wh-questions (cf. (14—16) vs (17—18)). She proposes that this asymmetry is related to the nature of the constituent extracted: if a verbal complement (obliques included) is wh-extracted, then the only order available is Wh—V—S; and when an adjunct is extracted, the orders Wh—V—S and Wh—S—V are possible (cf. (15b)). Here, we want to review this proposal and suggest that the asymmetry is not related to the nature of the complement, but to the existence of two different processes of question formation in this language.

Our suggestion is that cases that present the order Wh—V—S undergo the canonical/standard process of Wh-extraction, as proposed in the previous section. The other cases, those that show the order Wh—S—V, entail a topicalization process. Consider the following contrasts:

(22) a. *Qué Juan ha preparado para la comida?
     b. ?Qué platos Juan ha preparado para la comida?
        "What/What dishes has Juan prepared for dinner?"
(23) a. *Cómo Juan se ha comportado hoy?
     b. ?De qué manera Juan se ha comportado hoy?
        "How/In what manner has Juan behaved today?"
(24) a. *Dónde María ha almorzado el último mes?
     b. ??En dónde/?En qué lugar María ha almorzado ...?
        "Where/In what place has María eaten last month?"

Concerning the (a) cases, all of the speakers consulted agreed on their unacceptability. In relation to the (b) examples, most speakers had problems with these cases when seen in isolation, but when considered in contrast, there seemed to be a considerable improvement.[20] There is also a difference in the intonation pattern between cases such as (22b), (23b) and (24b) and those that have the order Wh-V-S;the former entail a slight drop after the Wh-element (this is not the case in canonical Wh-questions). The difference between the (a) and (b) cases appears to be related to the impossibility of topicalizing a bare Wh-element (bare Wh-operators) -(22-24a). On the other hand, cases such as (22b), (23b) and (24b) present the Wh-operator within a larger constituent (i.e. [PP P WH], [DP WH NP]), hence the improvement in the judgement.

Observe that these contrasts do not seem to be related to the distinction between D-linked and non-D-linkedwh-phrases suggested in Pesetsky (1987), see in (25) parallel cases to (22b) & (24b) that include non-D-linked wh-phrases.

(25) a. ?Qué diablos Juan ha preparado para la comida?
          "What the hell has Juan prepared for dinner?'"
      b. ?En dónde'En qué diablos María ha almorzado el
          último mes?
          "Where the hell has Maria eaten last month?"

If it were the case that this distinction (D- vs. non-D-linked) plays a role in relation to the contrasts in (22-24), one would expect these examples to be ungrammatical as those involving bare Wh-elements.

Notes

*   I would like to thank Joseph Aoun, Jon Franco, Hajime Hoji, Nina Hyams, Juan Martín, Mario Montalbetti, Liliana Sánchez and María Luisa Zubizarreta for helpful comments and discussion. The usual disclaimers apply.

1.   Actually, the structure assumed in Sportiche (1988) is the one proposed by Koopman and Sportiche (1987), where the subject (NP*) is generated under V^n "some projection of V in the X-bar system such that V^n is a small clause with VP as predicate and NP* as subject". The structure in (1) only differs from that of K&S in that the subject NP (NP*) is generated in the Spec of VP (see Kuroda (1986)). For similar proposals see also Contreras (1987), Speas & Fukui (1986), Zagona (1982), among others.

2.   For a reinterpretation of this assumption in terms of DP-theory, see Benmamoun (1991a,b).

3.   Cases involving perfect forms seem to be sensible to the phonological weight of the auxiliary; this appears to be a general requirement related to the possibility of having material between

the auxiliary and the verb in Spanish: acceptability decreases with a lighter auxiliary.

4.   This possibility is allowed in certain languages (eg. Arabic and English).   For a proposal that deals with these cases see Benmamoun (1991a,b).   See also Sportiche (1988) for the case of English.

5.   This also seems to be the case in Romance NPs, see Vergnaud & Zubizarreta (1991).

6.   Here. since this issue does not affect our argumentation. we are neutral concerning the labeling of the XP projected by the auxiliary.   See Zagona (1982) and Tenny (1987) for different proposals

7.   This is not only the case of Spanish. the same is found in Catalan (see (ia). from Bonet (1989)) and Italian (see (ib)).   This option is also possible for some speakers of French (see Sportiche (1988:fn.4)).
   (i)   a.   Els nens havien recitat *tots* el poema
       "The children had recited *all* the poem"
     b.   Gli uomini hanno scritto *tutti* un poema
       "The men have written *all* a poem"
For a related proposal see Belletti (1990).

8.   See Iatridou (1990) for evidence that it is not necessary to split INFL into TP and AGRP-S in certain languages (cf. Chomsky (1988) and Pollock (1989)).   -

9.   One of the motivations for the inclusion of this category -as O. Jaeggli (p.c.) suggested to me- is the possibility of eliminating categorial specifications. In other words, the complement of Af° could be seen as an XP. whose categorial specification is defined according the kind of affix the X° takes in Af°.

10.   It is necessary to note that interestingly, these cases seem to be possible only with an interpretation that supposes a first person plural (?abstract-topic) controller (eg. <u>For us/In our case</u>).

11.   In Spanish, it is possible to show that this movement has taken place.   Consider the case of aspectual adverbs such as a *menudo* "often" and *siempre* "always". These adverbs may appear in - at least- two positions: adjoined to VP or between the subject and the verb in I°.   See (i).
   (i)   Juan (a *menudo/siempre*) va (a *menudo/siempre*) al cine
     "Juan often/always goes to the movies"
If this is the case. then an example such as (ii) shows that the movement in question takes place:
   (ii) Es necesario comprar a *menudo/siempre* cerveza
     "It is necessary to often/always buy beer"

See Belletti (1990).

12. I owe this idea to M.L. Zubizarreta (p.c.).

13. For the existence of NegP and its structural position see Belletti (1990), Pollock (1989), among others.

14. Spanish speakers differ in relation to their intuitions on the position that the postverbal subject occupies, there seems to be three groups: one that shows a preference for a subject after the complement, another that prefers the subject before it and a third group that is neutral to these preferences.

15. It is necessary to note that these cases are different from those that include ergative verbs, which according to Burzio (1986) entail a subject base-generated in complement position. See (i).
      (i)   Ha llegado Juan
            "Juan has arrived".

16. The difference among these proposals has to do with Case assignment and the nature of the empty category in subject position, for a more detailed exposition of these views see the references cited in the text. See also Chomsky (1981). For other —somehow different— proposals see Borer (1986) and Koopman & Sportiche (1987).

17. To ensure agreement in these cases, we assume Borer's (1986) proposal concerning I-subjects: Coindex an NP with INFL in the accessible domain of INFL, the notion of *accessible domain of INFL* is presented in (i).
      (i) α is in the accessible domain of $INFL_i$ iff $INFL_i$ c-commands α and there is no β_j, β_j I-subject of $INFL_j$, such that $INFL_i$ c-command $INFl_j$ and $INFL_j$ c-commands α.

18. Observe that even if one assumes Baker's (1988) *Government Transparency Corollary* and suggests —as Rizzi (1991:fn.18)— that the trace of the lowest inflectional head suffices to assign nominative Case under agreement; it is necessary to assume that in cases involving auxiliaries, V° (in Af°) does not block this government relation.

19. Rizzi (1991) defines this criterion as follows:
      The Wh-Criterion
      A. A *Wh-operator* must be in a Spec-head configuration with an $X^\circ_{[+WH]}$.
      B. An $X^\circ_{[+WH]}$ must be in Spec-head configuration with a *Wh-operator*.

20. Speakers' intuitions vary from total acceptability to the judgements presented in the text.

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REPRESENTATIONS AND OPERATIONS IN HAISLA PHONOLOGY

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0.1 Introduction.

One of the most productive word formation rules in Haisla yields words that
mean 'try to X' from words that mean 'X.' A closely related rule makes
words that mean 'go after or hunt X' from various names for animals, birds,
and other organisms. The rules both make use of a particular reduplicative
pattern of stem extension. Here are two examples:

1 kakut'a¹ 'try to think, to discover something' root: √kut- 'think'
2 c'a¹c'ik°'a 'hunt for birds' root √c'i¹k°- 'bird'

In this paper, I would like to use relationships like these to investigate
the nature of the underlying phonological representations of Haisla
expressions so as to throw light on two general questions:

  i. What operations can languages use for making complex words?
  ii. What kinds of structures do these operations work on and produce?

The issues in the analysis of Haisla that are crucial here are:

  (a) what is the basic nature of the sonorants and glides?
  (b) is 'a' the vocalic counterpart to 'h'?
  (c) are the surface schwas in items like [bək°'əs] 'monkey, Sasquatch'
 present at all in the underlying roots? That is, is the root √bk°- or
√bək°-?)

['°' marks labialized segments, i.e. it stands for superscript 'w' in
alternative spellings; 'ə' is for schwa or syllabicity of following
tautosyllabic sonorant]

Here are the representations given for the above and some further examples
in the Haisla dictionary (Lincoln and Rath, 1986, hereinafter cited as LR):

3. √kwt- 'think, guess'   kakut'a¹ 'try to think'
4. √c'yk°- 'bird'   c'a¹c'ik°'a 'hunt for birds' (also 'hawk sp.')
5. √k'nx°- ['crab']   k'a¹k'ənw'a go crabbing'
6. √dn- 'haul'   dadən'a¹ 'try to haul, drag'
7. √t's- 'hit with stone' t'at'ac'a¹ 'try to hit with stone'
8. √qhp- 'spring salmon'   qa¹qap'a & qaqa¹p'a 'go after spring salmon'

On the basis of examples like (5), (6), and (8), I will argue that the
second segments in the relevant roots should be specially represented in
some way as to reflect their syllabic potential, in other words that roots
like those of (6) and (7) are fundamentally different from each other. On
the basis of examples like (7) I will argue that roots like √t's- (or
√t'c-) should indeed be represented with no vowel at all and that the

particular operation involved in formations like (1) - (8) (problems about stress aside) should have available for its input some representation in which the nucleic content of a syllable can be directly accessed and manipulated. In this way, by specifying the nucleic part of the root as involving the addition of `a` we account for the identity of output for roots such as (7) that have no (or zero) vocalic components and those like (6) that contain an `a` (or `h`) already.

0.1 Formal preliminaries

Here's what I assume as a general formal framework: Following Montague (1970), I distinguish between rules and operations. Every Rule includes a specification of the formal operation that it invokes, but it also specifies some category or categories of objects to which the operation is to be applied and the category of the resultant objects, together with a specification of the semantic value of the resultant objects as a function of the semantic values of the input objects. I will not be concerned here with the semantic parts of the rules I discuss. I assume the general definition of an operation as a function from some set to that set. Questions (i) and (ii) are mutually dependent. For example, if the objects of the set are just strings of phonemes, then the operations must be functions from (sets) of strings to strings.

0.2 Preliminaries about Haisla.

Haisla (X̌a'islak'ala) is a cover term for two languages spoken by residents of Kitamaat Village (near Kitimat, B.C. It is a North Wakashan language and shares many characteristics with its sister languages: Kwakw'ala, Oowek'ala, Heiltsuk. Of interest here are the rich system of word-formation processes: stem extensions, modifications, and suffixing. I mention only for help in looking at examples, that among the modifications governed (for the most part) by suffixes are glottalizing (`hardening`) and voicing (`softening`) effects on the last segment of stems. In the examples above, we see glottalizing effects. In citing examples I will adapt the notation used by Boas in his Kwakw'ala materials:

      -! : glottalizing = : `voicing`   - : plain
      e.g. -!a (cf. above)   =aulh `completely` -(e)la continuative, etc.

The segmental inventory of Haisla includes three series of stops, and both glottalized and plain sonorants. Of special interest here is the almost complementary distribution of vocalic and consonantal versions of the sonorants. Lincoln and Rath have presented an analysis of the segmental system in which almost all the surface vocalic segments are derived by rule from underlying sonorants or by rules of epenthesis. Of this more anon. The examples given so far will illustrate the salient aspects of that analysis. (See Bach, 1990, for more discussion of the facts and analytical options.)

1 Analysis.

Here's a description of the patterns of stem extension we see in the
examples given so far:

   a. all forms show an initial syllable in /a/ starting with the first
   consonant of the root, stem, or word;
   b. the second syllable of the extended form retains the nucleus of the
   root, stem, or word, except in the case of forms with surface schwa in
   the root, stem, or word, in which case the second syllable has /a .

I write 'root, stem, or word" because part of our problem is to determine
what the status, and analysis of the input is.

Let us focus on items like (6), (7), and (8):

   6. √dn-   `haul'          dadan'a¹  `try to haul, drag'
   7. √t's- `hit with stone'  t'at'ac'a¹  `try to hit with stone'
   8. √qhp- `spring salmon'   qa¹qap'a  & qaqa'p'a  `go after spring salmon'

Why do (7) and (8) come out identical? Why do (6) and (7) come out
different? I will assume that it would be a good thing to choose objects
and operations in such a way that these differences and samenesses would
just follow without any special stipulations.

Let me first assure you that the patterns exhibited are not at all random,
but are completely predictable from the shape of the input item. [Note on
exceptions: 'go after Canada goose' is hanag̃aq'a, but there are many
things we don't understand about h-initial roots.] All roots of the form
CR- where R is a sonorant, work like (6), all those like (7) of the form
CO- (or CəO-) where O is an obstruent work like (7) and are identical in
final form to those like (8) which have the form Ch- (or Ca-). These facts
establish the following claim about Haisla:

In the internal economy of Haisla morphophonology, it is necessary to
distinguish sonorants and obstruents. Moreover, the sonorants can act as
the nucleus of a syllable (i.e. they can be vowel-like). (This observation
is quite in line with Boas's view of Kwakw'ala phonology, under which the
syllabic sonorants were considered to be basically vocalic in nature.)

Now let us consider a number of different views about the nature of the
input and output objects that various possible formal operations might
apply to in deriving the forms under consideration. I will take least time
on the first account:

Account I:

   The input and output elements are just strings of sounds, the operation
   (i) is this: prefix the first item in the string plus the vowel 'a' to
   the result of applying the following operation (ii) to the input element

Operation (ii) is this: if the second element of the input is an
obstruent, insert /a/ as the second element of the output (alternatively:
if the second element is /ə/ replace it by /a/), otherwise Operation (ii)
is the identity operation

We can raise familiar objections to this account. I mention only one: it
projects possible operations for natural languages that just don't seem to
occur. It happens that the phonological laws of Haisla demand that words
start with a single consonantal segment, but the general view underlying
Account I would allow us to describe a language just like Haisla, but that
would yield forms like these:

    *? iaipa from ipa (/a/ inserted after the first segment)
    *? iaiapa from ipa (a inserted by something like operation (ii)).

This would work for the examples given. From a general point of view, this
account makes what is probably the simplest assumption possible about the
objects that the operation applies to: they are just strings of sounds.
Let us call this view the "segmental" theory or approach. It is the view
of the first phase of segmental generative phonology as exemplified in the
classic Sound Pattern of English (Chomsky and Halle, 1968). The sounds
themselves must be considered complex elements, for example, sets of
distinctive feature specifications as in the classic theory.

But there is more to a sound system than just strings of sounds. In later
developments in generative phonology, as well as in much earlier work in
non- generative frameworks, more structure has been assumed and argued for.
Traditional terms such as "syllable," and "foot," suggest an organization
of sounds into larger or higher units. Given some such prosodic view
of sound structures we might consider an alternative:

Account II:

    Prefix a syllable in / a /, with its onset copied from the stem. to the
    stem modified by a second operation (the prosodic analogue of the second
    operation above).

McCarthy and Prince ([1986], 1990) have argued for the kind of general
theory that would force a formulation like Account II rather than one like
Account I. Note that this account circumvents the difficulty we noted with
the first straw account. Faced with a hypothetical language like our
modified Haisla, in which empty or absent onsets were allowed, the results
of our new operation would necessarily (if we do all our homework right)
yield forms that conform to the universal and particular constraints on
prosodic structure of the language.

Our second account as it stands still does not meet the optimum of having
the results follow without stipulation. Before turning to my third
account, which is to be the favored solution here, let me note that the
second. prosodic account allows us to use the analytic vocabulary of

prosodic theories, but in principle still leaves open the exact way in
which these analytic tools may be deployed. In particular, it is
consistent with this approach to view the objects of the phonological
hierarchy not as finished off structures but as collections of elements of
various sorts together with the operations or relationships that unite
them. I will exploit this freedom in the third account to be presented
here, inspired by McCarthy's approach to Arabic.

Let us analyse a Haisla form into three pieces a prosodic structure devoid
of segmental content, and two sequences of segments: the consonantal
segments and the vocalic (or nucleic, or sonorant) segment. For
typographical convenience, I use CV skeletons for the prosodic structure.
So the phonological side of each form can be represented as a triple:

$$< \text{Prosodic Structure, Consonants, Vowels} >$$
E.g: nukwi 'sea otter' = < CVCV , (n kw), (u i) >

My main claim now is that an approach like this allows a uniform statement
of the operation which, taken together with certain assumptions about the
input items, predicts exactly the forms we get in the kinds of examples
given above.

Account III: the Prosodic Structure of the output is: CVCVC(C), the Vocalic
member of the input item is modified by addition of 'a'.

The assumptions that are needed for this to work are:

    i.   sonorants may appear as elements in the vocalic member of the triple,
    ii. items like (8) (√t's-) have empty vocalic members.

If we assume that association works uniformly right-to-left, then we get
the following derivations (I give just the consonants and vowel for the
input roots, more on this below):

3. < (k t) (u) >
   <CVCVC(C) (k t) (a u) >
   kakut'a'

4. <(c' kᵒ) (i) >
   <CVCVC(C), (c' kᵒ) (a i)>
   c'a'c'ikᵒ'a

5. <(k' xᵒ) (n) >
   <CVCVC(C) (k' xᵒ) (a n)>
   k'a'k'enw'a

7. <(t' s) ()>
   <CVCVC(C) (t' s) (a)>
   t'at'ac'a'

8. <(q p) (a)>
   <CVCVC(C) (q p) (a)>
   qa'qap'a

Note the formal similarity of (7) and (8), a desired result.

With the missing example (6), however, there is a problem, if we set it up
as follows the resulting form will be wrong:

6'. <(d) (n)>
   <CVCVC(C) (d) (a n))
   *dadənda

The correct result will be obtained if we assume that the sonorant /n/
plays out its double role by being part of both the consonantal and the
syllabic component of the item:

6. <(d n) (n)
   <CVCVC(C) (d n) (an)>
   dadən'a'

In a way, then, this step represents an expression of the insights about
the nature of the sonorants in the North Wakashan languages to be seen in
the other writers I have cited: Boas, Lincoln and Rath.

3. A further step.

There is one other wrinkle I would like to discuss. Complex words in
Haisla (and most words are complex) are built up by suffixing various
elements to a root or modified root. So the question arises: are these
derived words (stems we may call them) subject to the same operations as
the roots in the kinds of examples we've seen so far? This question
latches on to the indeterminacy in the first statements of possible
operations given earlier (...roots, stem, or words). It appears that for
the most part we have to assume that the operation specified above applies
to the root of a word, but in such a way that we have to think that the
operation has available the root of a derived word. So this makes it look
as if we might want to think of derived words also as given to the
operation not as fully built structures, but as ingredients and operations,
lying there like the pieces of an unassembled bicycle you are desparately
trying to put together the night before your kid's birthday. Here are some
examples:

9.   kwa'kwenq'a   mink   kwen'a'q
10. kwakwikw'a'   marmot   kwi'kwexd
11. k'a'k'enw'a   crab   √k'nx°-   k'ena'xw
12   qa'qac'ita sole LR √qc'- qec'i't sole

4. Conclusions: intensional phonology?

The exercise we have conducted here is strongly reminiscent of discussions
in semantics about hard questions of intensionality. If `2 + 3' and `1 +
4' are just different designations for the same object that is designated
by `5' how is it possible that little Johnnie might think that 2 + 3 and
1 + 4 are different. Mountains of ink have been expended on such problems.
The view I have suggested here as possibly a fruitful way to look at some
phonological problems is much like that represented by a number of writers,
perhaps for examples most closely related to the ones discussed here by

Cresswell (1985).

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Prosodic Licensing in Yanggu

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Diminutive affixation in Yanggu, a Mandarin Chinese dialect, has interesting phonological behavior which bears on issues of prosodic licensing and the structure of laterals. In this article I examine the data and show that the syllable in Yanggu licenses one articulator each for the onset and the rime, and the feature 'lateral' must not be placed below the coronal node.

1   The Data

The surface consonants in Yanggu are given in (1) (all data on Yanggu are taken from Dong 1985.[4]

(1)   Surface Segments of Yanggu

	Labial	Alveolar	Retroflex	Palato Alveolar	Velar
Stops:	p, pʰ	t, tʰ			k, kʰ
Affricates:		ts, tsʰ	tʂ, tʂʰ	tɕ, tɕʰ	
Fricatives:	f	s	ʂ, ʐ	ɕ	x, ɣ
Nasals:	m	n		ɲ	ŋ
Lateral:		l			

Rhymes:	ɿ, ʅ	y	ɛ	u	ʌ	ə	a		
	ia	ua			ao	iao			
	iɛ	uɛ			ou	iou			
	ie	uʌ	yʌ		ʌi		uʌi		
	ãn	iãn	yãn	uãn	ʌ̃n		uʌ̃n	ĩn	ỹn
	ãŋ	iãŋ		uãŋ	ʌ̃ŋ	iʌ̃ŋ		ỹŋ	ũŋ

In addition to the rhymes listed above, Yanggu has the syllabic retroflex lateral *l* and the syllabic nasal *m̩*, bringing the total of rhymes to thirty-nine. ɿ and ʅ are apical vowels, with the latter being retroflexed. Note that the symbol 'ɣ' is used to denote both the back mid vowel and the voiced velar fricative. As usual, a tilde denotes nasality. All vowels are nasalised

before nasals, except *ı*, which is not nasalised before the velar nasal ŋ. It is nonetheless nasalised before the alveolar nasal *n*. Dong 1985 does not explain the peculiar behavior of this vowel.

The canonical form of the diminutive affix in Yanggu is *l*, which is a syllabic, retroflexed lateral. The distribution of this lateral is rather restricted. It is syllabic, does not occur in the onset position, and appears to be used in the diminutive affix, but nowhere else. Diminutive affixation in Yanggu has several surface manifestations, depending on the segmental makeup of the syllable to which it is affixed. Dong 1985 lists four types.

The first type, Type I, involves syllables whose nucleus is the front, high vowel *i* or *ü*. In such cases, the monosyllabic stem surfaces as bisyllabic (throughout the paper I will cite monosyllabic data only):

(2) a. i > il̩   'clothes'
     b. pʰi > pʰil̩   'skin'
     c. tʰi > tʰl̩   'flute'
     d. hi > il̩   'seal'
     e. tɕʰi > tɕʰil̩   'strength'
     f. y > yl̩   'fish'
     g. tɕy > tɕyl̩   'saw'
     h. tɕʰyn > tɕʰyl̩ 'group'

Note that the nasal coda in (2d,e,h) disappears as a result of diminutive affixation. We will see more of this phenomenon later.

Diminutive affixation also generates a bisyllabic word from a monosyllabic stem if the stem contains a pre-vocalic glide *i* or *y*. This is Type II:

(3) a. ia > ilar   'duck'   cia > cilar   'box'
     b. tɕia > tɕilar   'street'   ciɛ > cilɛr   'shoe'
     c. ie > iler   'leaf'   tie > tiler   'plate'
     d. piao > pilaor   'mark'   iao > ilaor   'waist'
     e. iou > ilour   'oil'   tɕʰiou > tɕʰilour 'ball'
     f. piân > pilɛr   'piggytail'   iân > ilɛr   'cigarette'
     g. iäŋ > ilar   'manner'   tɕʰiäŋ > tɕʰilar 'voice'
     h. pʰiŋ > pʰiler   'bottle'   iŋ > iler   'shadow'
     i. yɛ > ylɛr   'medicine'   tɕyɛ > tɕylɛr   'leg'
     j. yän > yiɛr   'garden'   tɕyän > tɕylɛr   'roll'
     k. cyŋ > cylɛr   'bear'

In the data, *Vr* denotes a retroflexed vowel. Type II is more phono-

logically active than Type I, despite the fact that both generate bisyllabic
results, with the first syllable being of the form Ci/y. In Type II affixation,
a few phonological changes take place in the rhyme. The nasal endings are
deleted, along with the nasality on the nuclear vowel (3f,g,h,j,k); *a* raises
and fronts to *e* (3f,j), and *ʌ* to *ɛ* (3h). (2h) and (3k) are peculiar, since
they are similar in all relevant aspects, yet they belong to different types. I
will have nothing further to say about the segmental changes observed here.
A principled analysis of such changes requires more data than Dong 1985
provides. The important property to observe here is that nuclear vowels
are retroflexed, and the coda nasals are deleted, along with nasality on the
nuclear vowel.

The onset of the second syllable is invariably the alveolar lateral *l*, which
is not retroflexed, although Dong is not explicit about it. This contrasts with
Type I, where the lateral is syllabic and retroflexed. The intuition is that
both laterals derive from the same source, and a lateral is retroflexed only
when it is syllabic.

Our main interest is in the phonological behavior of Types III and IV.
Whereas the major factor in Types I and II is the front high vocoids *i* and
y, in Types III and IV, it is the onset. If a stem (monosyllabic, or the last
syllable if polysyllabic) begins with an alveolar consonant *t, tʰ, n, ts, tsʰ, s*,
it belongs to Type III, except those stems which belong to Types I or II (cf.
tiɛr 'plate' in (3c) of Type II). Therefore, Type III rhymes are of the type
(u)Vr, with an optional pre-vocalic glide *u*. Sample data are given in (4):

(4) a. na > nlar 'endure'
    b. tsa > tslar 'what?' tsou > tslour 'walk'
    c. tsʰɛ > tsʰlɛr 'dish' tsʰu > tsʰlur 'thick'
    d. tao > tlaor 'knife' tuãn > tluɛr *a kind of pastry*
    e. tʰãŋ > tʰlar 'soup' tʰu > tʰlur 'rabbit'
    f. sãn > slɛr 'three' sãŋ > slar 'voice'

The most interesting property of Type III is the onset homorganic clus-
ters of the form *Cl*, where *C* is alveolar, and *l* is not retroflexed. As in
Types I and II, the nuclear segments are retroflexed; and the coda nasals
are deleted along with the nasality on the vowels (4e,f).

Type IV, which Dong 1985 calls the common type, includes all syllables
which belong to neither Type I, Type II, nor Type III. As the data in (5)
show, Type IV stems do not have *i* or *y* as a nuclear vowel or as a pre-vocalic
glide; nor do they have alveolar consonants in syllable-onset position. In this
type, the monosyllabic stem remains monosyllabic, as in Type III.

5. a. pa > par   'handle'
   b. kɛ > kɛr   'cover'
   c. sɔ > sər   'tongue'
   d. k-i > k-r   'pigeon'[3]
   e. xou > xour   'monkey'
   f. p-n > p-r   'book'
   g. f-ŋ > f-r   'crack'
   h. tş'-ʒ > tş'ər   'hammer'

Type IV stems are not only monosyllabic, they do not contain any consonant cluster either. The lack of consonant clusters contrasts with the presence of (homorganic) consonant clusters in Type III stems. This contrast is the key to the analysis to be developed shortly.

To summarise, the major phonological properties of diminutive affixation in Yanggu are as follows, where · · · indicates any tautosyllabic materials.

6. Diminutive affixation in Yanggu

   Type I: (C)i/y· · · surfaces as (C)i/y-l
   Type II: (C)i, aV· · · surfaces as (C)i/y-lVr
   Type III: C· · · · · ·, where C is alveolar, surfaces as
              Cl · · uVr
   Type IV: all other stems surface as · · ·Vr

From (6) we obtain the two generalizations stated in (7):

7. a. If the stem surfaces as bisyllabic, the nuclear segment
      of the second syllable is retroflexed;

      if the stem surfaces as monosyllabic, the nuclear segment is retroflexed.

   b. Consonant clusters are homorganic. ·

There is a gap in our exposition of the data, which, unfortunately, we are not able to close. Dong (1985) does not contain data which show the interaction between the diminutive affix l and stems which begin with the alveolar liquid l, and nothing is mentioned of the syllabic nasal $m̩$. For lack of positive evidence, I shall remain silent on the issue.

2   The Analysis

How do we characterize the morphology of diminutive affixation? It appears to be suffixed in Types I and IV, and infixed in Types II and III. We certainly

don't want to say that the morpheme is a suffix for Types I and IV and an infix for Types II and III. Such an approach fails to yield any insight into the phonology of diminutive affixation. The analysis to be developed here assumes that the diminutive affix in Yanggu is infixed between the onset and rime; and the intricate phonological behavior results from the interplay between rules and the prosodic licensing capabilities of the syllable in Yanggu.

The syllable structure we will assume for Yanggu is pretty standard in the literature (Cheng 1973, Lin 1989, Bao 1990, 1991). It is given in (8):

(8)   σ

        O   R
             |
        N   Co

The first step in our analysis is to infix /l/ before the rime node. Since the glides /j/y and w have different behavior, with the former belonging to Types I and II and the latter to Types III and IV, I assume that the front glides are in the onset (O), and the back glide in the rime (R). The asymmetry between the front and back glides has other manifestations, see Bao 1990. The front glides, in the absence of a vowel, 'vocalise' to become the nucleus (Pulleyblank 1988).

The segment following the infixed lateral is retroflexed (7a). We derive this generalization with the rule below.

(9)   N
                             |
        R'   R'
         |_____ _____/
         |
        COR_i
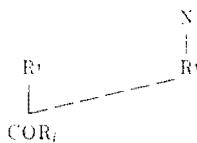
Rule (9) spreads the coronal node of the infixed lateral onto the following segment(s) dominated by the nucleus (N). It creates the structure in (10), which I take to be the representation of retroflexed vowels (Chomsky and Halle 1968):

(10)   R'
             /\
        COR_i DOR
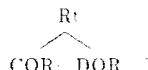
Thus, retroflexed vowels are complex segments involving both the coronal

and dorsal articulators. What remains to be accounted for is the deletion of
i, n, η in coda position, which will be dealt with shortly.

The rule in (11) derive the homorganic consonant clusters (7b):

(11)
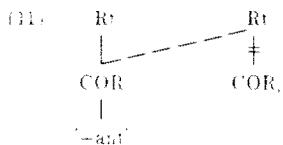
It is crucial that the coronal node be specified as [+anterior], since the
retroflexed coronals such as $t\!s$ do not surface as the first member of a Cl clus-
ter. The coronal node of the target Rt delinks to satisfy the well-formedness
constraint on trees (Sagey 1986, 50). The rule accounts for the homorganic-
ity of onset clusters in Type III. As a result of delinking the retroflex lateral
loses its retroflexivity.

Another piece of machinery we need is the prosodic licensing capability
of syllabic constituents, which accounts for the lack of onset clusters in Type
IV and the deletion of coda segments in all types. In Yanggu, as in many
other Mandarin dialects, there is no consonant cluster in uninfixed words in
any position. This suggests the following two prosodic licensing conditions
in Yanggu (Fujimura 1976, Ito 1986, Goldsmith 1990):

(12) a. The onset (O) licenses one articulator.

b. The rime (R) licenses one articulator.

By 'articulator' I mean the articulator nodes which immediately dom-
inate articulatory features, such as COR and DOR. For the conditions to
work properly, we must differentiate between vocalic articulators and conso-
nantal articulators, and the conditions license the latter. The two conditions
regulate the syllable structure of Yanggu. The syllable $t'\ddot{a}\eta$ is licensed be-
cause the onset licenses t' and the rime licenses η. Diminutive affixation
breaks up the syllable structure of the stem, which triggers resyllabification
on the string with the infixed retroflex lateral. Since both the onset and
rime can license only one articulator, non-homorganic clusters in the onset
position are ruled out. Recall that the retroflexed vowels have COR as a
result of spreading (9), the rime is therefore unable to license an extra ar-
ticulator in the coda position, hence the lack of coda segments i, n, η in
infixed stems.

As an illustration, consider the structures in (13).

(13) Type I structure:

```
                O                        N
                |                        |
        x       x       x.      x        x
        |       |        \___/           |
       (C)     i/y        R₁            (C)
                                |         |
                              COR,      ⎰ COR ⎱
                                        ⎱ VEL ⎰
```

Type II structure:

```
                O                        N
                ┊                        |
        x       x       x.      x        x
        |       |        |       \      |
       (C)     i/y       R₁       V     (C)
                                |         |
                              COR,      ⎰ COR ⎱
                                        ⎱ VEL ⎰
```

Type III structure:

```
                O                        N
                |                        |
        x              x_i       x        x
        |               |        ┊        |
        C               R₁       V       (C)
         \             /         |         |
           COR               COR,      ⎰ COR ⎱
            |                           ⎱ VEL ⎰
          (–ant)
```

Type IV structure:

```
                O                        N
                |                        |
        x              x_i       x        x
        |               |        |        |
       (C)             R₁        V       (C)
        |               \       /         |
     ⎰ LAB ⎱             COR,           ⎰ COR ⎱
     ⎱ COR ⎰                             ⎱ VEL ⎰
     ⎱ VEL ⎰
```
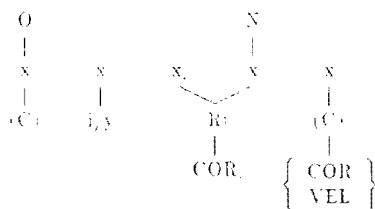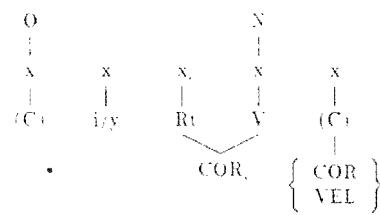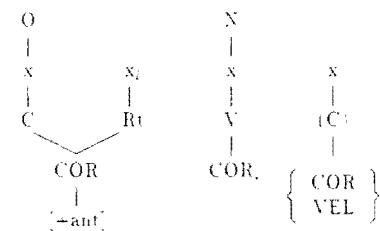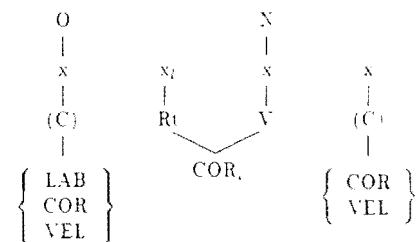
The optional segments are in parentheses, and the infixed lateral is denoted by 'x.'. In the Type I structure, COR_i spreads to the following empty

nucleus – recall that the high vowels in Chinese are assumed to be derived from their corresponding glides. This creates the structure below:

(14)   Rt   Rt

                COR
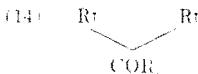
In this case the two root nodes dominate exactly the same features, and by the Shared Feature Convention of Steriade (1982) they are merged as in (13a). This situation does not arise in the other structures, since the nucleus is not empty (indicated by V). In the Type III structure, COR spreads to the infixed lateral, delinking COR$_i$, which explains why the lateral is not retroflexed. In Type IV stems coronals are either retroflex or palato-alveolar; COR therefore does not spread.

Now we are in a position to explain why coda segments, and the lateral in Type IV, do not surface. This is due to the prosodic licensing conditions spelled out in (12). In all structures, if a coda segment is present, it would have one articulator: COR for e, i and VEL for ŋ. Since the retroflexed vowel acquires an additional articulator, namely COR$_i$, the rime node R would have two articulators, which it can not license simultaneously due to (12b). Coda segments are therefore not licensed, and stray-erase (Ito 1986, Goldsmith 1990). The same is true of the onset position. For Type III structures, (12a) allows the infixed lateral to syllabify as part of the onset with the preceding coronal, since they share the same articulator. In Type IV structures, if the lateral were to syllabify as part of the onset, the onset would have two articulators: COR or LAB or VEL on the one hand, and COR$_i$ on the other. This is ruled out by (12a). The inserted lateral is not licensed, and stray-erases.

Types I and II surface as bisyllabic due to resyllabification. The glides i/u vocalise to be the nucleus of the first syllable. The second syllable of a Type I stem is the syllabic retroflex lateral l, which occupies both the onset and nucleus positions (Yip 1982, Bao 1990). Note that the lateral of the second syllable of Type II stems is alveolar, rather than retroflex. The rule below accomplishes this.

(15) $\begin{bmatrix} +lat \\ -ant \end{bmatrix}$ ⟶   [+ant]   /   [$_{onset}$ —

This rule renders the structure in conformity with a general phonotactic condition in Yanggu which prohibits the retroflex lateral in onset position.

Having accounted for the phenomenon of Yanggu diminutive affixation,[4] let's now consider the placement of the feature [lateral], which has generated

its share of controversy in recent literature on feature geometry. [Lateral] is placed above the coronal node in Sagey 1986, Halle 1989, Avery and Rice 1989, Paradis and Prunet 1989, 1990, Hegarty 1990, Rice and Avery 1991, and Shaw 1991: it is placed below the coronal node in Schein and Steriade 1980, Blevins 1988, McCarthy 1988, Archangeli and Pulleyblank 1989, Sproat and Fujimura 1991, among others. The controversial structures are given below:

(16) a.   Rt   b.   Rt
             ⌒ |
             |]lat]   COR
           COR |
                                         [lat]
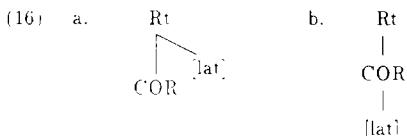
The crucial evidence against the model in (16a) is the onset cluster of Type III. The relevant structure is given below:

(17) Rt   Rt   as in *nlar* 'endure'
           ⌣
         COR
          |
        [−ant]

In the cluster the first segment is not lateral. Since they share the same coronal articulator, it follows that [+lateral] must not be dominated by COR, as below:

(18) Rt   Rt
           ⌣
         COR
          ⌒
      [+ant]   [+lat]
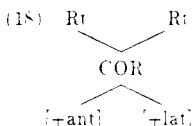
This structure would lateralise both segments in the cluster. This, however, is contrary to the facts of Yanggu diminutive affixation. Hence, the Yanggu data can not be handled in a model like (16b). Although laterals are coronals, the feature [lateral] is geometrically independent of COR, as in (16b). The data is compatible with any model of feature geometry in which [lateral] is docked on a node above COR, of which (16a) is one.

Notes

[1] Yanggu diminutive affixation has been the subject of several recent studies, see Lin 1989, Duanmu 1990, Chen 1991, all of which draw data from Dong 1985. For a review of the analyses, see Chen 1991.

[2] Three finals, *in*, *uən*, *uən* belong to Type I when they follow avleolar segments except *l*: *tʰi* > *tʰil* 'thigh'; *tsuŋi* > *tsuŋl* 'pile'; *tuŋn* > *tuŋl* 'stool'.

[3] Stems which end in *i*, *n* and *ən* all surface as *ər* which, according to Dong (1985, footnote 6), is retroflexed more backward and upward. This phonomenon does not happen when the coda segment is the velar nasal *ŋ*, and the coda glide *u/o* does not even delete (cf. (4d) and (5e). The extra retroflexion in these rhymes may be due to the properties of the coda segments which are deleted, i.e. *i*, *n*.

[4] There are still four rhymes whose behavior defies analysis. In addition to the three rhymes mention in footnote 2, the behavior of the apical vowels is a bit odd:

(i) *tsɿ* > *tsl̩* 'characters'; *sɿ* > *sl̩* 'silk'
(ii) *tʂʅ* > *tʂʰr* 'twig'; *tʂʅ* > *tʂʰr* 'wing'

The apical vowels occur in restricted environment: *ɿ* occurs only after alveolar fricative and affricates; *ʅ* after retroflex fricatives and affricates, and they never occur before a vowel. If the apical vowels are derived from *i*, as is the common assumption in Mandarin, they ought to belong to Type I.

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Dative Subjects and Retreat in UG

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0.   Introduction

Although the properties of Dative Subjects in psych
constructions are compatible with either the **Advancement** analysis
(Belletti & Rizzi 1988; Hoekstra 1984; Cowper 1988; Hermon 1984;
Kachru et al. 1976; Mohanan 1983; Davison 1985) **or** the **Retreat** analysis
(Sridhar 1979; Perlmutter 1983; Hubbard 1985; Davies 1986; Klaiman
1988), recently Rosen & Wali (1989) have provided arguments to claim
1 to 3 retreat as the proper analysis of psych constructions in Marathi.
In this paper we (a) bring more evidence to show that the evidence for
Retreat is scant in Marathi and that in fact the Inversion nominal IS an
initial 3 and a *final* 1--an argument **against** Rosen & Wali's claim, and
(b) discuss psych constructions in Kashmiri, another Indo-Aryan
language, in which there is clear evidence that the Inversion nominal
is a final 1, NOT a final 3. We take this evidence to **claim**
Advancement as the proper analysis of psych constructions in
Kashmiri and Marathi. This paper complements the earlier work on
psych constructions in Korean by Gerdts & Youn (1990) which also
reached similar conclusion, casting doubt on the existence of Retreats
in Universal Grammar.

The paper is organized in the following manner: In section 1 we
discuss the phenomena of Psych (also known in the literature as
Inversion, Dative or non-nominative subject) constructions in
different languages with reference to the properties associated with the
dative nominal. In section 2 we provide more data from Marathi as
evidence against Rosen & Wali's (1989) claim that Retreat is the proper
analysis of the Inversion phenomenon. In section 3 we provide
evidence from Kashmiri to claim Advancement as the only possible
analysis for the Inversion phenomenon. In the last section we
summarize the main arguments and conclude that psych constructions
in Kashmiri and Marathi are best analyzed as Advancement--not
Retreat.

1.0   The Phenomena

In a wide variety of languages there is a marked construction in
which a thematically prominent NP associated with an Experiencer
theta role and marked with a Case generally associated with the
indirect object, shows "subject" properties. The (highlighted) dative

nominal in the psych constructions (1) - (6) below, has properties normally associated with "subjects" except that it does not control verb agreement and its Case is "quirky" (=non-nominative).

Imbabura Quechua (from Hermon 1984)
(1)   (**nuka-ta**)   aycha-ta   miku-naya-wa-n-mi
       me(A)   meat(A)   eat-desid-1 OM-pr 3-val
       I desire to eat meat.
Georgian[1] (from Harris 1984)
(2)   Turme   **Rezo-s**   ucukebia   samajuri sen-tvis
       apparently Rezo(D)   gave-3s-it-evid   bracelet you(Ben)
       Apparently Rezo gave a bracelet to you
Icelandic (from Zaenen et al. 1985)
(3)   **Henni**   hefur alltaf   þott   Olafur leiðinlegur
       her(D)   has   always   thought   Olaf(N)boring(N)
       She has always thought Olaf boring.
Hindi
(4)   **laRke-ko**   apnaa ghar   yaad   aa-yaa
       boy(D)   self's home(m,sg) memory(f)   come-Perf(m,sg)
       The boy remembered his home.
Kannada (from Sridhar 1979)
(5)   **avarige**   siTTu bantu
       he(D)   anger came
       He got angry.
Kashmiri
(6)   **laRk-as**   baas-yav   panun boy   paagal
       boy(D)   appear-Perf self's brother stupid
       The boy felt his brother (to be) stupid.

The dative nominal in these constructions is known to be associated with, by and large, the following "subject" properties:
(a)   they can **antecede subject-oriented reflexives** as shown below in the Icelandic example[2]:

(7a)   **Sigga**   barði mig   með dukkuni **sinni/*hennar**
       Sigga(N)   hit   me(A)   with doll(D) her (*[-REFL])
       Sigga hit me with her doll
(7b)   Eg   barði **Siggu** með dukkuni **hennar/*sinni**
       I   hit   Siggu with doll   her (*[+REFL])
       I hit Sigga with her doll.
(7c)   **Henni**   þykir broðir   **sinn/*hennar**   leiðinlegur
       her(D)   thinks brother(N) her (*[-REFL])   boring
       She thinks her brother boring.

(b)   they **raise in ECM contexts** as shown in the Icelandic example below:

(8) Eg tel **Henni**   hafta alltaf þott   Olafur leiðinlegur
     I believe her(D)   to-have always thought   Olaf(N) boring(N)
     I believe she has always thought Olaf boring.

(c)   they can **become PRO** in appropriate contexts as shown in the
Quechua example below (from Hermon 1985):

(9) Nuka-ta$_i$ [PRO$_i$ puNa-naya-y]-ta   kati-ju-rka-ni
     I(A)   [sleep-desid-inf](A)   continue-prog-past-1
     I continue to want to sleep.

Given the facts so far we face the following questions:
(i) Is the dative nominal in constructions (1) - (9) a "subject" or an
"indirect object"?
(ii) If the dative nominal is taken to be the "subject" then how do we
account for its quirky Case and its inability to control verb agreement?
(iii) If it is taken to be the indirect object, then how do we account for
the facts in (7)-(9)?
The remainder of the paper addreesses the questions raised above.

2.0   Retreat: Rosen & Wali 1989

The properties of Dative Subjects in psych constructions are
compatible with either the Advancement analysis or with the Retreat
analysis, recently however, drawing evidence from Marathi, Rosen &
Wali (1989) provide arguments to claim 1 to 3 **retreat** as the proper
analysis of Inversion in Marathi. In this section then, we critically
examine the claims made in Rosen &Wali and show, by bringing more
data from Marathi, where their analysis falls short in accounting the
data.
Rosen &Wali claim that the reflexive aapaN picks out only
initial 1s. Thus (10) (their 22b) and (11) (their 56a) below are shown to
claim that it is always the logical subject (initial 1) and NOT the surface
subject (final 1) that binds the reflexive aaplaa.

(10) Mini-ni$_i$ Ravi-laaj   aapli$_{i/*j}$ pustaka   dilit
      Mini(E)   Ravi(D)   selfs books   gave
      Mini$_i$ gave to Ravi$_j$ selfs$_{i,*j}$ house.
(11) Mini-kaDun$_i$ Ravi-laaj   aaplyaa$_{i/*j}$ gharii   paaThavla gela
      Mini-by   Ravi(D)   selfs house-to   send-PTCP PASS
      Ravi$_j$ was sent by Mini$_i$ to selfs$_{i,*j}$ house.

DAT nominal binds aaplaa in (12) (their 23a), but in a Passive
construction like (13) (their 55) the dative nominal fails to do so. They
take this as evidence for initial 1-hood of the dative nominal.

(12) Ravi-laa_i   aapli_i pustaka aavDaat
      Ravi(D)   self's books   likes
      Ravi likes his (own) books).
(13) *Ravi-laa   aaplyaa kholiit   Daamb-la gela
      Ravi(D)   self's room in   dump-PTCP PASS
      Ravi was dumped in self's room.

However, Pandharipande (1990:165) claims that reflexivization does
not provide any conclusive evidence for subjecthood of an NP in
Marathi. In fact, for most Marathi speakers (11) gives an ambiguous
reading (either <u>Mini-kaDun</u> or <u>Ravi-laa</u> as potential binders of the
reflexive <u>aaplyaa</u>) and (13) is considered a perfectly **grammatical**
sentence. We provide below in (14) the data from Pandharipande (1990)
[her example (23)] to support the claim that reflexive in Marathi do not
selectively pick clausal subjects as their antecedents. In (14) the
reflexive <u>aaplyaa</u> is bound both by a nominal which heads a 1-arc (the
subject) as well as by a nominal which heads a 2-arc (the direct object).

(14) mii_i   tyaalaa_j   aaplyaa_{i/j} gharii   paaThavto
      I   he(A)   self's house   send
      I send him to my/his house.

Also the data in **(15) and (16)** [from Pandharipande (1981:54, ex.#47)]
yields further counterarguments to Rosen and Wali's (1989) claim that
the reflexive <u>aapaN</u> can be anteceded ONLY by an initial 1. In (15) the
reflexive is indeed anteceded only by the nominal heading a 1-arc of a
monostratal clause but in (16) the reflexive is anteceded by both the
nominal that heads an initial 1-arc AND the nominal that heads a final
1-arc.

(15) ma-laa_i   aaplyaa_{i/?*j} gharaat   to_j   dislaa
      I(D)   self's   house-in   he   saw
      I saw him in my/*his house.
(16) majhaa-kaDuun_i tyaa-laa_j   aaplyaa_{i/j} zagi   paThavle gele
      I-by   he(A)   self's place   sent   went
      He was sent to my/his place by me.

     Rosen & Wali's most important evidence for 1 to 3 retreat comes
from their claim that only **final 1s can be Equi controllees** and that the
Inversion nominal is ineligible to be an Equi controllee. On closer
inspection, however, we do not find EQUI TEST to be quite foolproof
either since it has been shown (Pandharipande 1981) that in Marathi,
the Regular Passive advancee is unable to undergo EQUI. The
controversy notwithstanding, the **data in (17) below** [Pandharipande,
p.c.] is presented to show that the <u>Inversion nominal is indeed eligible
to be EQUI controllee</u>. [The small superscripted question mark on (17)

indicates that the sentence though grammatical is not stylistically preferred/desired]

(17) ⁷ram-laa [Ø   shilaa-ci aaThvaN punhaa punhaa yeNa]   avaDlaa naahii]
      Ram(D)   Sheila(G) memory again again to-come   likes   not
      Ram does not like remembering Sheila all the time.

The most uncontroversial final-1 hood test in Marathi is the **Subject-to-Object Raising** (strangely missing from Rosen & Wali's (1989) dicussion) as argued in Pandharipande (1981:55-59). The data in (18)-(21) (taken from Pandharipande 1981) show that only final 1s can raise to object in ECM constructions.

(18)   mii   tyaa-laa   phaLa viktaanaa   paahila
        I   he(A)   fruit selling   saw
        I saw him selling the fruit
(19)   *mii   (to)   phaLa   viktaanaa   paahilaa
        I   (he)   fruit   selling   saw
        I saw the fruit being sold.
(20)   *mii   tyaalaa   phaLa viklii   zaataannaa   paahila
        I   he(A)   fruit sold   going   saw
        I saw him being able to sell the fruit.
(21)   mii tya mulaannaa laDhaaiivar   paaThavla   zaat astaannaa paahila
        I   those boys(A)   war-on   sent   go   aux   saw
        I saw the boys being sent to war.

Inversion nominal can raise to object as example (22) shows.

(22)   aayii   aaplyaa   mulaalaj [tᵢ raag aalela]   paahuu shakat nahii
        mother(N)   self   child(A) anger come-PERF-PRTCP see can   not
        The mother cannot see her child getting angry.

To sum up the discussion in this section, we provided data that falsified Rosen &Wali's claim that Inversion nominals in Marathi are final 3s. We provided some more data to show that the Inversion nominal does not fail the EQUI TEST and, that in fact, the Inversion nominal CAN be Equi controllee. We also showed that the reflexive aapaN can be anteceded by a nominal that does not necessarily haed an initial 1-arc. Further, we provided incontrovertible evidence (**raising in ECM context**) to argue that the Inversion nominal MUST in fact head a **final** 1-arc.

3.0   Advancement: Evidence from Kashmiri

While evidence for retreat is scant in Marathi, other languages such as Kashmiri provide further support for the advancement

analysis. In the follwing sections we provide evidence from Kashmiri to show that the ONLY possible analysis of **Inversion IS Advancement**.

3.1 Dative NP as "Derived Subject"

In what follows we will show that in Kashmiri the Inversion nominal MUST head a final 1-arc. The following sets of arguments forms the basis of our claim:
(i) only final 1s can **float quantifiers** (23)--Inversion nominals can float quantifiers (24); (ii) only final 1s **can be equi victims** (25)--Inversion nominals can be equi victims(26); (iii) only final 1s **raise in subject-to-subject environments**(27)--Inversion nominals raise to subject (28); (iv) only final 1s undergo **raising to object** in ECM constructions(29)--Inversion nominals appear as "objects" in ECM contexts(30).

3.1.1 Quantifier Floating

In Kashmiri ONLY final 1s float quantifiers. The grammaticality of (23a) suggests that 1s (subjects) can float quantifiers while the ungrammaticality of (23b &c) suggests that 3s (indirect objects) and 2s (direct objects) canNOT float quantifiers, respectively. (23d), a Passive construction, shows that a final 1 can float a quantifier whereas (23e) shows that an <u>initial 1</u> is unable to float quantifier.

(23a) **koory-av** vuch **saaryivi** raath laRk
girls(E) saw all yesterday boy
All the girls saw a boy yesterday
(23b) *tem suuzyl **maasTran** khat **saaryini**
he(E) sent teachers letter all
He sent letters to all teachers.
(23c) *tem loy **shuranyi** raath **saaryini**
he(E) hit kids yesterday all
He hit all the kids yesterday.
(23d) **laRkan** aav **saaryini** lay-ni
boys came all hit-PASS
All the boys were hit.
(23e) *maasTar aav laay-ni **laRk saaryini** hind zeryi
teacher came hit-PASS boy all of by
The teacher was hit by all the students

The grammaticality of the Psych construction (24) below shows conclusively that the dative (inversion) nominals can float quantifiers suggesting, rather unequivocally, that these nominals are not initial 1s, in fact they are final 1s.

(24) laRk-an   baasyav   saaryini   raamesh   paagal
     boys(D)   felt   all   Ramesh   stupid
     All boys felt Ramesh stupid. (Lit. To all boys, Ramesh appeared stupid)

3.1.2 Equi-NP deletion

The second argument of final 1-hood of dative nominals comes
from the Equi-NP deletion facts. In Kashmiri only final 1s can be equi
victims, i.e., can become controlled PRO, as the data in (25) shows. The
ungrammaticality of (25a) indicates the inability of initial 1 to be an
Equi victim [Controlee]. On the other hand, there is evidence that final
1s can act as controlled PRO as shown by the grammaticality of (25b).

(25a) *raam-an   yotsh   [Ø   kitaab par-ni   yin]
       Ram(E)   wanted   book   read-PASS   aux
       Ram wanted the book to be read (by him)
(25b) raam   chu-na   yatshaan   [Ø   jeel   soz-ni   yun]
      Ram   aux-not   wants   jail   sent-PASS aux
      Ram does not want to be sent to jail.

In (26) below we show as evidence that dative nominals CAN be Equi
victims (adapted from Syeed 1984).

(26) laRk   chu-na   [Ø sabak   mashith   gatsun]   yetsaan
     boy   aux-not   lesson   forget   to-go   wants
     The boy (student) does not want to forget the lesson.

3.1.3 Conjunction Reduction

As our third argument, we present evidence from the facts of
Conjunction Reduction in Kashmiri. In Kashmiri only final 1s can
control PROs or become PROs in such clauses as shown by our data in
(27).

(27a) [PRO$_i$/*$_j$ kitaab parith]   dits maastaran$_i$ aasyi$_j$ kaam
                book   read-PRTCP gave teacher(E) us(D) work
      After the teacher read the book, he gave us work (to do).
(27b) [PRO$_i$/*$_j$ kitaab parith]   aayi aasyi$_j$ kaam dini   maastar$_j$ sin zaryi
                book   read-PRTCP came us(D) work give-PASS teacher of by
      After we read the book, work was given to us by the teacher.

In (28) we show that the dative nominal both controls PRO and
becomes PRO. In (28a) the Inversion nominal CONTROLS PRO and in
(28b) the Inversion nominal is the CONTROLLEE (becomes PRO).

(28a) [PRO$_i$/*$_j$ yi kath buuzith]   aayi laRkas$_i$ maaj$_j$ yaad
                this story hear-PTCP   came boy(D) mother memory
      After the boy heard this story, he remembered (his) mother.

(28b) [PRO_i tsakh khasith]   tul laRkan_j shor [from Syeed 1984]
       anger climb-PTCP lifted boy(E) noise
   After the boy got angry he raised hell.

3.1.4 Subject-to-Subject Raising

The fourth argument is based on the facts of Subject-to-Subject Raising. In Kashmiri we show that only final 1s can be raised as shown in (29).

(29a) kuur   cha   basaan   vuch-ni   aame-ts
     girl   aux   seems   saw-PASS   come-PERF
   The girl seems to have been seen.
(29b) *mastaras   chu   basaan   kuur   aayi   vuch-ni (tem sin zeryi)
     teacher   aux   seems girl   came   saw-PASS   (by him)
   The teacher seems the girl was seen.

Dative nominals also raise to subject as the data in (30) shows:

(30) **laRk-as_i**   cha   basaan   [t_i   boch   laj-mets]
     boy-D   aux   seems   hunger   feel-PTCP
   The boy seems to be hungry.

3.1.5 ECM constructions

Finally, we show that in Kashmiri there is conclusive evidence to claim that in Kashmiri only final 1s undergo raising to object in ECM constructions (see 31) below:

(31a) *asyi   vuch   raam   tsuuNTh   na   kini-ni   yivaan
     we   saw   Ram   apples   not   sell-PASS   comes
   We saw Ram not being able to sell apples.
(31b) asyi   vuch-na   kitaab   kini-ni   yivaan
     we   saw-not   books   sell-PASS   comes
   We did not see the books being sold.

Dative nominals appear as "objects" in ECM contexts as shown in (32).

(32a) tem   vuch-na   dod-as_i   [t_i   grakh   yivaan]
     he   saw-not   milk(D)   boil   come-Prst-PTCP
   He did not see the milk boiling/coming to a boil.
(32b) me   vuch-na   temis_i   [t_i   shalakh   pyavaan]
     I(E)   saw-Neg   he(D)   beat   fall-Prst-PTCP
   I did not see him being beaten.

3.2 The Advancement analysis

The properties of dative subject in Kashmiri can be accounted for in the following advancement analysis: The initial structure is unaccusative--the Experiencer/dative nominal is an initial 3 which

advances to 1 placing the Theme, an initial 2, en chomage. This proposal of advancement is represented in (33).

33.
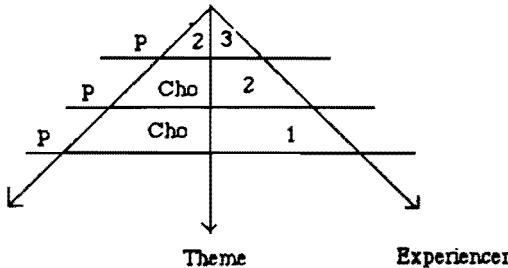
Theme   Experiencer

Under the proposal outlined above all the behavioral properties of dative subjects in Kashmiri, such as Quantifier floating, Control PRO, S-S-R and ECM can be stated in terms of its final 1-hood. The quirky "dative" on the Experiencer subject can be accounted for by following the proposals in Gerdts & Youn (1989). They make the distinction between I-Case [=inherent Case in GB theory] which is selected on the basis of semantic role of the nominal and licensed in initial structure, and S-Case [=structural Case in GB] which is the grammatical Case and licensed in the final structure.

In Kashmiri then, Nominative and Accusative are S-Cases licensed by final 1s and 2s, respectively. Dative, on the other hand, is an I-Case licensed by an Experiencer (or a Goal). In the advancement analysis, therefore, the dative Case is properly licensed by the experiencer, which is an initial 3.

In Kashmiri, it is not unusual for a final 1 to appear with an I-Case. In "Indirect Passives" for example, a 3 to 1 advancement as in (34) shows the final 1 appearing with a (I-Case) dative Case.

(34)   laRk-as   aay-ii   kitaab   din-i
       boy(D)   came(f,sg)   book(f)   give-PASS
       The boy was given a book.

Similar constructions in other languages (like Hindi and Icelandic), known as quirky constructions in which a nominal that bears a final 1 relation is nevertheless marked by an I-Case, support Gerdts & Youn's proposal of Case.

4.0   Conclusions

In this paper we argued, based on the facts of Marathi and Kashmiri, that Advancement is the proper analysis of the dative

subject constructions.We presented evidence from both Marathi and Kashmiri to claim that the dative-Experiencer (Inversion) nominal MUST head a final 1-arc, NOT a final 3-arc. The claim was based on, among other things, the ability of dative subjects to float quantifiers, control or become PRO and raise in ECM contexts.

Our account of Psych constructions finds support in the work of Gerdts and Youn (1989). They examine constructions like (35), especially (35c), and claim that Korean psych constructions are best analyzed as Advancement.

(35a) Haksaeng-t+l-eykey ton-i   philyoha-ta
       student-pl-(D)   money(N)   need-ind
       The students need money.
(35b) Haksaeng-t+l-i   ton-i   philyoha-ta
       student-pl-(N)   money(N)   need-ind
       The students need money.
(35c) Haksaeng-t+l-eykey-ka   ton-i   philyoha-ta
       student-pl-(D)-(N)   money(N)   need-ind
       The students need money.

Gerdts & Youn justify their analysis based on the following arguments:
(a)   Case assignment under an Advancement analysis[3] but not under Retreat follows from previous accounts of Korean Case;
(b)   there is evidence for the chomage of the Theme[4], a fact that is consistent with the Advancement analysis but not with the Retreat analysis; and finally
(c)   Korean has non-psych constructions which must be analysed as OBL-2-1 advancement; thus an Advancement analysis of psych constructions is available with no cost to the grammar.

The results of our proposal and Gerdts &Youn's investigation have, among others, one important theoretical claim: Psych constructions in Universal Grammar are initially unaccusatives and involves advancement of either the Theme to 1 or the Experiencer to 1 or both. These conclusions of course cast doubt about the existence of Retreats in Universal Grammar.

Notes
1. The Inversion construction in Georgian occurs in many verbs in the evidential (evid) mode, when the intention is to indicate that speakers lack evidence of the truth of their statement (see Harris 1984 for details).
2. Unless mentioned otherwise, the Icelandic data is taken from Zaenen, Maling and Thrainsson (1985), Kannada data is taken from Sridhar (1979), Quechua data is taken from Hermon (1984).

3. If we accept Gerdts' (1988) "Satellite Principle" [= if an element A is licensed in an earlier stratum than an element B, then A must appear inside B], which is also implicit in Baker's (1988) "Mirror Principle", to hold cross linguistically (see especially, example (35c)) then we MUST abondon Retreat as the analysis of Inversion.

4. Theme in Korean psych constructions CANNOT be a final 1 since it neither determines Subject Honorification nor does it control a myense construction (see Gerdts and Youn, examples 61, 62)

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Performance Constraints and Linguistic Explanation

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1   Introduction

In this paper we consider how constraints on parsing can remove some of the burden from the theory of syntax. By making a minimal set of assumptions both with respect to syntax and parsing, it seems that certain languages should be unparsable. As a solution, we propose that long-range LF movement in general, and long-range LF *wh*-movement in particular, is rightward. This overcomes the apparent unparsability of certain languages, and makes certain syntactic and computational predictions, which will be discussed below.

2   Motivation & Background

Most work done in linguistics is concerned with defining what Chomsky has termed linguistic competence, whereas relatively little work concerns linguistic performance. This paper will investigate some aspects of the relationship between competence and performance. The interactions between syntactic constraints and parsing constraints with respect to *wh*-movement will be of particular interest.

We assume that the syntax and the parser are distinct and well-defined entities, that the syntax can be parameterized to account for cross-linguistic variation, but that the parser is fixed, and not parameterized. We thus predict that any parsing constraint will apply without change cross-linguistically. In other words, parsing constraints are universal.

Given this framework, our aim is to "divide and conquer" – by casting some syntactic phenomena in terms of parsing constraints, some of the burden is moved from the competence to the performance. In doing so we hope to achieve three things. First of all, we hope that viewed as the result of parsing constraints certain syntactic phenomena will be seen to have more satisfying explanations, which are less stipulatory in nature. Second, by removing some of the burden from the syntax, the syntactic theory should become simpler

and more elegant. Finally, we hope that the interaction of universal parsing constraints and parameterized syntactic constraints will yield more accurate predictions as to what can and cannot happen cross-linguistically than a fully parameterized (and thus more powerful and less restrictive) system could.

It is as important to know what we are *not* attempting to do as what we *are* hoping to accomplish. In this section we will briefly outline some of the things with which we will not be concerned.

A study such as this touches three main areas, namely linguistics, computer science, and psychology. There has been much work done both in the intersection of linguistics and computer science ([2, 13] , and others) and in the intersection of linguistics and psychology ([7, 12], and others) which is directly relevant to the work described here. However, there has been relatively little work done in the intersection of all three ([5, 9], and others). This area can be described as the study of psycholinguistically plausible models of parsing. This study is in a sense a stab at formulating a theory of performance, at defining where the boundary between competence and performance lies, and how the two can interact.

As we are at this time primarily interested in linear asymmetry (with respect to *wh*-movement in particular) as a function of the interaction of certain syntactic and parsing constraints, the implementation is skeletal. We assume, for the purposes of parsing, that there is a natural grouping of principles of government-binding (GB) theory into two categories – those which are involved with the construction of phrase structure, and those which are dependent on phrase structure. Thus, the implementation deals mostly with Case theory, theta theory, and functional selection, as these guide the parser in its construction of phrase structure. At this time, binding theory, for example, is ignored completely.

Consequently, at this stage, the implementation is not a complete implementation of any version of GB theory. Furthermore, we have not been concerned with implementing the various principles "transparently" ([6]). For the present study it is enough for us to be concerned with the *effects* of the principles, rather than with the precise formulation of them.

3 Syntactic Assumptions

We make a small number of relatively uncontroversial syntactic assumptions.

- We assume that there is a level of logical form (LF) which reflects the quantificational structure of sentences.

- Closely tied to the above is the assumption that the scope of a *wh*-quantifier is represented structurally at LF.

- The final assumption is that *wh*-movement is possible either in the syntax or at LF.

What is some of the evidence supporting these assumptions? First there are the parallels between moved and unmoved *wh*-phrases, as noted in [10, 11, 14, 15]), among others. In languages with overt *wh*-movement, taken as an instance of move-α, various constraints on movement are obeyed. In English, for example, the contrast in (1) is evident:

1.   (a)   ? What$_i$ do you believe the claim [that [John bought t_i]]?
     (b)   * Why$_i$ do you believe the claim [that [John bought the book] t_i]?

Given the above assumptions, it is expected that we see the same pattern in languages without overt *wh*-movement. In Chinese, for example, the same contrast holds:

2.   (a)   ? Ni xiangxin Lisi mai le shenme de shuofa?
             you believe Lisi buy ASP what COMP claim
             "What do you believe the claim that Lisi bought?"
     (b)   * Ni xiangxin Lisi weishenme likai de shuofa?
             you believe Lisi why leave COMP claim
             "Why do you believe the claim that Lisi left?"

Further support comes from arguments concerning selectional restrictions. If we accept that verbs subcategorize for specific types of complements (not only in terms of their syntactic category but also in terms of some of the features that they bear), then one would expect that this be true cross-linguistically. However, with respect to a verb's complement being $\pm wh$, Chinese would seem to be a counterexample:

3.   (a)   Zhangsan wen wo shei mai le shu.
             Zhangsan ask I who buy ASP book
             "Zhangsan asked me who bought books."
     (b)   Zhangsan xiangxin shei mai le shu
             Zhangsan believe who buy ASP book
             "Who does Zhangsan believe bought books?"
     (c)   Zhangsan zhidao shei mai le shu
             Zhangsan know who buy ASP book
             "Who does Zhangsan know bought books?"
             or "Zhangsan knows who bought books."

Assuming that a verb's subcategorization requirements need not be fulfilled until LF, then assuming LF *wh*-movement for languages like Chinese allows this generalization to be made cross-linguistically.

4 Parsing Assumptions

We also make a small set of relatively uncontroversial parsing assumptions. The first two are necessitated by our parsing model being psycholinguistically plausible, while the last one is a general assumption concerning the organization and operation of the parser.

- The parser is *bounded* in the amount of look-ahead or backtracking it can do. Although this might change, the parser currently has a maximum look-ahead of two elements. This means that while the parser is considering what to do with the current element from the input stream, it can look ahead at the next two elements and identify what they are before deciding what to do with the current element. Also currently, the parser does not backtrack at all unless it encounters a garden path situation.

- The parser operates from *left to right*, meaning that it will process words in the same way that people hear them. This must obviously be so if we are to claim psycholinguistic plausibility.

- In order to better handle both left-branching and right-branching languages with one parser, it carries out the parse in a partial bottom-up fashion. That it is bottom-up implies that the parser is driven by the input, and that structure is projected from the lexical items. However, it is only partially bottom-up – the parser uses subcategorization information as well as functional selection to help guide it. Both of these strategies are top-down.

The parser is *principle based* (rather than *rule-based*), and it utilizes a *filler-driven* (rather than a *gap-driven*) strategy in building movement chains[1]. This implies that it will not begin building a chain until it identifies an element as having been moved. Once a moved element has been identified, the parser begins to look for a suitable landing site for it. There are, however, two types of filler-driven chain construction – *gap-locating* and *gap-creating*. These will be discussed below.

5 Interactions and Implications

Although these assumptions seem innocuous enough, they have some rather nasty interactions. This section will investigate the problems produced, various "non-solutions", and finally the solution we believe to be reasonable.

5.1 The Problem

The main problem which arises is that given the standard analysis of *wh*-movement in languages like Chinese and Japanese, which do not have overt *wh*-movement but rather LF *wh*-movement, it seems that these languages should be unparsable. Under the standard analysis, the *wh*-phrase is left in-situ at S-Structure, and is moved to the left between S-Structure and LF to occupy an appropriate specifier of CP position at LF. Since the parser proceeds from left to right, and as it will not know about the presence of the *wh*-phrase until it reaches its in-situ position, it seems the parser must either have an infinite look-ahead or have the capability to backtrack arbitrarily far up the tree (see 4). Neither of these solutions is acceptable if we are to maintain psycholinguistic plausibility.

4. (a) Ni kanjian shenme?
        you see what
        "What did you see?"
   (b) Ni shuo ni kanjian le shenme?
        you say you see ASP what
        "What did you say you saw?"
   (c) Ni renwei ni shuo ni kanjian le shenme?
        you think you say you see ASP what
        "What did you think you said you saw?"

5.2 Pseudo-Solutions

What are some possible "solutions"? It might be claimed that LF is simply not psycholinguistically interpretable. This would get around the problem because the parser would simply not have to worry about what happens after S-Structure. However, this is an unsatisfying explanation, for if the level of LF is to have any force in the theory at all, then it *must* be psycholinguistically interpretable. Otherwise it may as well be dispensed with.

Another pseudo-solution would be to have the parser assume that *wh*-movement has taken place until it can be disproven (this is basically Stowe's ([16]) "all resorts" model in disguise). This would also solve the problem. If there is *wh*-movement happening at LF, then the appropriate movement chains would have been built by the time the in-situ *wh*-phrase is encountered. However, this "solution" introduces problems of its own. If there is no non-overt *wh*-movement taking place, then either these partially constructed movement chains will violate the constraint against vacuous quantification, or they must be removed – something which will again require unlimited backtracking, giving one a profound sense of déja vu.

A more sophisticated proposal might take the following form. There are two parameters which seem to be relevant to the issue at hand. One concerns the headedness of the VP and the use of subcategorization information. If the VP is head-initial the parser could use subcategorization information (particularly with respect to the value of the *wh* feature of the embedded clause) to determine the possible scope-domain of the *wh*-phrases in the clause. If it is head-final, then subcategorization information will come too late for it to be useful for the parser in avoiding a backtracking situation.

The second parameter concerns the location of scope markers (or Q-morphemes). These can be either clause-initial or clause-final. If they are clause-initial, then (just as with a head-initial VP) this would give the parser enough information to set up a proper scope-domain. If these markers occur clause-finally, then the parser cannot make use of this information. In [1], for example, it is suggested that *wh*-phrases in Chinese are not moved at LF, but remain in-situ. It is argued that the scope of *wh*-phrases is defined by the the Q-morpheme "ne".

Under this proposal, it is predicted that there is enough overt marking in the sentence to indicate the possible scope-domains, and that languages must have either (or both) head-initial VP's or (obligatory) clause-initial scope markers (or Q-morphemes). There are, unfortunately, at least two problems with this proposal.

The first problem is that scope markers / Q-morphemes are not always obligatory, even in languages without head-initial VP's. In Chinese, for example, "ne" is both clause-final and optional (in fact, for some speakers "ne" is in complementary distribution with *wh*-phrases), as shown below. Thus the first prediction is refuted.

5. (a)   Zhangsan zai nar kandao ni?
           Zhangsan at where saw you
           "Where did Zhansan see you?"

    (b)   Ni yao shenme ne
           You want what Q
           "What do you want?"

The second problem is that there are languages which have head-final VP's and clause-final scope markers, such as Japanese. Japanese has a Q-morpheme, "ka", which is obligatory, and which demarcates the scope of the *wh*-phrase. Thus 6(a) is grammatical while 6(b) is not. The latter is ungrammatical as the *wh*-phrase is not within the scope of "ka". Under this proposal, they should be unparsable, and so the second prediction is refuted as well. (Examples are from [15].)

6. (a)   [$_{IP}$ John-ga Mary-ni [$_{CP}$ [$_{IP}$ dari-ga kuru] ka] Osieta] koto
          John-nom Mary-to   who-nom come Q taught facts
          "the fact that John told Mary who is coming"

    (b) * [$_{IP}$ John-ga dari-ni [$_{CP}$ [$_{IP}$ Mary-ga kuru] ka] Osieta] koto
          John-nom who-to   Mary-nom come Q taught facts
          "the fact that John told who Mary is coming"

5.3   The Proposal

The solution we propose runs into none of these problems, and yields some interesting predictions. We propose that LF movement in general, and LF *wh*-movement in particular, is *rightward* in languages such as Chinese and Japanese.

6   Consequences

This section will investigate some of the linguistic and computational consequences of our proposal.

6.1   Syntactic Consequences

The following are some of the main syntactic consequences of our proposal.

- Since the rightward nature of LF *wh*-movement is due to a parsing constraint, there is no directional asymmetry in the theory of movement. Hence the competence theory need only specify that *wh*-quantifiers must move to a specifier of CP position by LF, parameterized according to whether this happens between D-Structure and S-Structure or between S-Structure and LF. A (universal) performance constraint specifies that overt movement be leftward, and covert movement be rightward[2].

- If LF *wh*-movement is rightward, then in languages with covert *wh*-movement, the specifier of CP position will have to be on the right. Thus we arrive at the following generalization of the $\overline{\text{X}}$ system for CP projections.

```
English:      CP            Japanese:    CP
            /  \                       /  \
         SPEC   C'                   C'   SPEC
               /  \                 /  \
              C   IP               IP   C
```

```
Vata:        CP              Farsi:      CP
           /  \                        /  \
        SPEC   C'                    C'   SPEC
             /  \                  /  \
           IP    C               C    IP
```
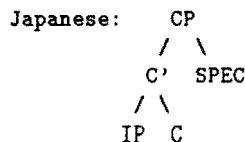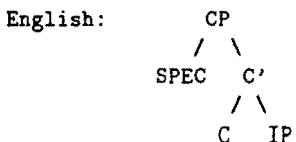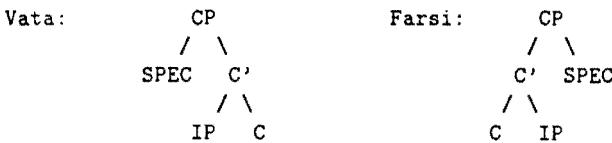
Given this generalization, there is no need to stipulate that the specifier of CP is on the left – all possible permutations of the CP projection are instantiated. Furthermore, the location of the specifier and the level at which *wh*-movement takes place are intimately tied together. Any language which has the specifier of CP position on the left will have overt *wh*-movement (and vice-versa), while any language in which the specifier is on the right will have LF *wh*-movement (and vice-versa). This then also accounts for the absence of overt specifiers on the right.

6.2 Parsing Consequences

As previously mentioned, the construction of movement chains by the parser is done according to a filler-gap paradigm. When the parser identifies a displaced constituent, it actively begins searching for the place from which this constituent was moved. This is a straightforward strategy to use when dealing with (overt) leftward movement, but it cannot be used with (covert) rightward movement, since in this case the traditional filler-gap structure is not exhibited.

Taken together with our assumptions, our proposal that (long-range) covert movement is rightward implies that the parser must be able to, simultaneously,

- build up phrase structure guided by the input stream and lexical information,

- undo the effects of D-Structure to S-Structure movements, and

- carry out the S-Structure to LF movements (the covert movements).

We propose that there must be two types of parsing strategies for long-range dependencies (both filler-driven) in order to satisfy these constraints. The first is a filler-driven *gap-locating* strategy, the other, a filler-driven *gap-creating* strategy.

6.2.1 Gap-locating and Gap-creating Movements

When the parser encounters an element which has been moved at S-Structure, it begins to actively look for the gap from whence it came. The process

of "undoing" S-Structure movement is thus gap-locating. In looking for a gap, the parser is helped by the syntax – the search is driven by Case and theta saturation, as well as by subcategorization satisfaction requirements. See Figure 1 for an example of this.

The case of LF movement contrasts with this. The parser must identify that an element is to move, "pick it up", leaving behind a co-indexed trace, and find a suitable landing site for the element. This process is thus gap-creating (see figure 2).

7   Other Considerations

This section will consider a construction which is potentially difficult to handle, and our proposed analysis of it.

7.1   Empty Operators

A potential difficulty arises with empty operator constructions. The difficulty comes not so much from our proposal, but rather from our assumptions that the parsing mechanism should pursue only one possible syntactic analysis at a time, and that it be psycholinguistically plausible.

7.   (a)   Mike is the man to watch.
      (b)   Mike is the man to tell the conservatives to watch.

8.   (a)   Mike is the man to do the job.
      (b)   Mike is the man to tell the conservatives where to go.

The problem is that the parser cannot know until it reaches the end of the sentence whether "the man" should be related to the subject or the object position. There seem to be two possible choices,

- postulate a gap as soon as possible, or

- postulate a gap as late as possible.

Under the first strategy, the parser will be wrong in the case of sentences such as those in 7 (infinitival relatives), and one would then expect to see garden path phenomena in these cases. Similarly, if the parser employs the second strategy, garden path effects should be present in the case of purpose clauses (as in 8). Although, as far as we know, no psycholinguistic studies have been done to investigate processing times in infinitival relatives, there does not seem to be any garden path effect.

Another possible analysis for these sentences is as follows. Assume that the parser employs the first strategy, but that it treats any further gaps as

```
[c [case=x],[theta=no],[wh=no],[qa=yes]
   Spec: [det [case=no],[thata=no],[wh=yes],[scope=1],[abar_index=2]
      Spec:
      Head: [ what ]
      Comp: ]
   Head: [ did ]
   Comp: [i [case=x],[theta=x],[wh=no],[qa=yes]
      Spec: [det [case=yes],[theta=no],[wh=no],[a_index=3]
         Spec:
         Head: [ the ]
         Comp: [n [case=x],[theta=x],[wh=no]
            Spec:
            Head: [ man ]
            Comp: ]]
      Head: [ infl ]
      Comp: [v [case=x],[theta=x],[wh=no],[qa=yes]
         Spec: [det [case=yes],[theta=yes],[wh=no],[a_index=3]
            Spec:
            Head: [ the ]
            Comp: [n [case=x],[theta=x],[wh=no]
               Spec:
               Head: [ man ]          •
               Comp: ]]
         Head: [ say ]
         Comp: [c [case=x],[theta=yes],[wh=no],[qa=yes]
            Spec: [det [case=no],[theta=no],[wh=yes],[scope=1],[abar_index=2]
               Spec:
               Head: [ what ]
               Comp: ]
            Head: [ wh ]
            Comp: [i [case=x],[theta=x],[wh=no],[qa=yes]
               Spec: [det [case=yes],[theta=no],[wh=no],[a_index=4]
                  Spec:
                  Head: [ the ]
                  Comp: [n [case=x],[theta=x],[wh=no]
                     Spec:
                     Head: [ woman ]
                     Comp: ]]
               Head: [ infl ]
               Comp: [v [case=x],[theta=x],[wh=no],[qa=yes]
                  Spec: [det [case=yes],[theta=yes],[wh=no],[a_index=4]
                     Spec:
                     Head: [ the ]
                     Comp: [n [case=x],[theta=x],[wh=no]
                        Spec:
                        Head: [ woman ]
                        Comp: ]]
                  Head: [ hit ]
                  Comp: [det [case=yes],[theta=yes],[wh=yes],[scope=1],[abar_index=2]
                     Spec:
                     Head: [ what ]
                     Comp: ]]]]]]]]
```

Figure 1: The output of the parser for the sentence "What did the man say the woman hit?": a *gap-locating* process.

```
[c [case=x],[theta=no],[wh=no]
    Head: [ wh ]
    Spec: [det [case=yes],[theta=yes],[wh=yes],[scope=3],[abar_index=4]
        Spec:
        Head: [ shenme ]
        Comp: ]
    Comp: [i [case=x],[theta=x],[wh=no]
        Spec: [det [case=yes],[theta=no],[wh=no],[a_index=1]
            Spec:
            Head: [ ni ]
            Comp: ]
        Head: [ infl ]
        Comp: [v [case=x],[theta=x],[wh=no],[qa=yes]
            Spec: [det [case=yes],[theta=yes],[wh=no],[a_index=1]
                Spec:
                Head: [ ni ]
                Comp: ]
            Head: [ shuo ]
            Comp: [c [case=x],[theta=yes],[wh=no]
                Head: [ wh ]
                Spec: [det [case=yes],[theta=yes],[wh=yes],[scope=3],[abar_index=4]
                    Spec:
                    Head: [ shenme ]
                    Comp: ]
                Comp: [i [case=x],[theta=x],[wh=no]
                    Spec: [det [case=yes],[theta=no],[wh=no],[a_index=2]
                        Spec:
                        Head: [ ni ]
                        Comp: ]
                    Head: [ infl ]
                    Comp: [v [case=x],[theta=x],[wh=no],[qa=yes]
                        Spec: [det [case=yes],[theta=yes],[wh=no],[a_index=2]
                            Spec:
                            Head: [ ni ]
                            Comp: ]
                        Head: [ kanjian_le ]
                        Comp: [det [case=yes],[theta=yes],[wh=yes],[scope=3],[abar_index=4]
                            Spec:
                            Head: [ shenme ]
                            Comp: ]]]]]]]
```

Figure 2: The output of the parser for the sentence "Ni shuo ni kanjian le shenme?": a *gap-creating* process.

parasitic on the first. In this case there is no garden path phenomena expected, and it is predicted that these will behave as (overt) parasitic gap constructions. In particular, it is predicted that these sorts of constructions cannot originate at LF (since movement traces at LF are incapable of licensing parasitic gaps)[3].

9.   (a)   Mike is the man $[Op_i\ t_i$ to watch $e_i]$.
      (b)   Mike is the man $[Op_i\ t_i$ to tell the conservatives to watch $e_i]$.

10.   (a)   Mike is the man $[Op_i\ t_i$ to do the job].
      (b)   Mike is the man $[Op_i\ t_i$ to tell the conservatives where to go].

8   Conclusions

This paper has investigated the interactions of some relatively uncontroversial syntactic and parsing assumptions. Given the standard analysis of *wh*-movement, a consequence of this interaction is that LF *wh*-movement should be unparsable. In order to resolve this difficulty, we propose that covert *wh*-movement is rightward.

This proposal not only solves this problem of apparent unparsability, but it also permits a generalization of the $\overline{X}$ system for CP projections, in which all possibilities are instantiated. The need for a stipulation concerning the branching direction of the specifier of CP position is thus obviated, simplifying the syntactic theory.

The proposal also predicts the need for two different kinds of parsing strategies for the construction of movement chains – gap-locating and gap-creating strategies. Gap-location is employed when the parser is undoing a (leftward) S-Structure movement, while gap-creation is used to carry out (rightward) LF movement. Note that both of these processes are left to right – the construction of the chain in both cases is triggered by an element which is (ultimately) to left of the end point of the chain. The parser thus operates in a completely left to right manner, regardless of the type of movement it is dealing with.

Notes

[1] It has been hypothesized ([8]) that all long-range dependencies are filler-driven. Gap-driven strategies have also been proposed ([16]).

[2] It is not quite as simple as this: *local* overt movement can be rightward, and *local* covert movement can be leftward. This is irrelevant with respect to long-range *wh*-movement, however.

[3] We leave open the question of how to account for parasitic gap constructions. See [3, 4] for an analysis based on chain composition.

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ECONOMY AND THE THAT-T EFFECT
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Although well known, the paradigm in (1) has not received a satisfactory explanation in recent theories of wh-movement (Chomsky 1986, Frampton 1990, Rizzi 1990):

(1)a. Who can you believe left
   b. *Who can you believe that left
   c.   the man that left
   d. *the man left
   e.   It is John that left
   f. *It is John left

Put succinctly, the problem is that English appears to have no uniform strategy for subject extractions. Complementizer deletion is required in (1a) and impossible in (1c&f). Standardly, the ungrammaticality of (1b), generally taken to be the core fact, is directly attributed to the ECP; (1d) and (1f), on the other hand, are either assumed to result from independent factors or left unaccounted for. While preserving the central insight of standard analysis, this paper proposes a solution to (1) which entails a shift of focus. The ungrammaticality of (1d) and (1f) will be argued to instantiate the core cases of ECP violations. (1b), on the other hand, will be taken to stem from the interaction of the ECP with more general principles of Economy (Chomsky 1989). The proposal affords a uniform strategy for subject extractions in English as well as in other languages such as French, in which no surface discrepancies are manifest.

(2) Qui crois-tu qui/*que est parti
     l'homme que je crois qui/*que est parti
     C'est l'homme qui/*que est parti

I will begin by reviewing three recent approaches to the *that-t* effect pointing out their shortcomings with respect to the paradigm in (1). The proposed analysis is developed in section 2. Section 3 develops further refinements.

1. Recent approaches to the *that-t* effect

In Chomsky (1986) and Frampton (1990), the ungrammaticality of (1b) is attributed to a failure of antecedent government. On these views, the complementizer *that*, when present, induces a Minimality barrier which blocks antecedent government between the trace in Spec-CP and the subject trace. The two analysis diverge slightly in their account of (1a). Assuming that empty complementizers are featureless, Chomsky suggests that they do not induce Minimality barriers so that antecedent government is possible when C is empty. Frampton, on the other hand, proposes that indexing through spec-head agreement with the trace in its specifier turns an empty complementizer into a relevant antecedent governor for the subject trace. Although it permits a better account of subject extractions in languages where complementizer are always overt, the latter proposal requires an added stipulation to prevent spec-head agreement from obtaining in English with the overt comp of (1b).[1]

Rizzi's (1990) proposal differs from the previous two in attributing the ungrammaticality of (1b) to a failure of head government. In Rizzi's view, complementizers are functional heads intrinsically inert for government. Accordingly, they generally fail to satisfy the head-government requirement of a conjunctively defined ECP. Thus, in (1b), the trace of the extracted subject fails the ECP because it is not head-governed. The grammaticality of (1a) is attributed to the effects of spec-head agreement. According to Rizzi, spec-head agreement turns an inert C^0 into a proper head-governor, so that the subject trace in (1a) is properly head-governed. Note that, here as well, the success of the account depends on the stipulation that the overt comp of (1b) is immune to spec-head agreement.

With respect to the paradigm in (1), these three accounts face a common problem: why should the overt and empty complementizers of (1 c-f) behave differently from those of (1a-b)? Seeking an answer to this question, Rizzi (1990) suggests that, in spite of their apparent similarity, the complementizers in (1) are lexically distinct. He proposes that complementizers are crosslinguistically subdivided on

the basis of the features [+/-wh] and [+/-pred(ication)] which, in English, distribute as in (4):

(4) +wh -pred   I wonder what C^o you saw
    +wh +pred   the thing which C^o you saw
    -wh +pred   the thing Op that you saw
    -wh -pred   I know that you saw it

Putting aside the [+wh] complementizers which are not directly relevant to a discussion of (1), note that (4) distinguishes two instances of *that*, one [+pred] and the other [-pred], each, presumably, with an empty counterpart. Rizzi further suggests that spec-head agreement is restrictied to empty [-pred] complementizers, and that [+pred] complementizers undergo a distinct type of agreement relation, i.e, predicative agreement, which obtains between the complementizer of a headed relative and the relative head. This second form of agreement has the same effect as spec-head agreement w.r.t the ECP; it too, can turn an inert complementizer into a proper head-governor. The consequences of Rizzi's proposal on (1) are as follows. In (1a), C^o is [-wh, -pred] and empty. Thus spec-head agreement obtains turning C^o into a proper head-governor for the subject trace. In (1b), C^o is also [-wh,-pred] but since it is overt, spec-head agreement does not obtain, and C is not a proper head-governor. In (1c), C^o is [-wh +pred] and overt; predicative agreement with the head of the relative obtains and C^o is a proper head-governor. In (1d), C^o is also [-wh,+pred]. Predicative agreement should then be able to obtain, but this would incorrectly predict that (1d) should be grammatical. To obtain the correct result, predicative agreement must be assumed to fail with empty [+pred] complementizers. In sum, Rizzi's proposed lexical distinctions do not remove the need for a stipulated difference w. r. t. agreement between overt and empty complementizers of the same kind. It must be assumed, on the one hand, that empty [-pred] C^o can agree but overt ones cannot and, on the other hand, that overt [+pred] C^o can agree but empty ones can not. Since this overt/empty distinction does not follow from the features listed in (4), Rizzi's proposal leaves the paradigm in (1) essentially unaccounted for.
        The consideration of somewhat more complex cases further suggests that the role which Rizzi

attributes to predicative agreement in regards to the
the ECP is misguided. Consider the example in (5):

(5) *the woman$_i$ I know the book$_j$ [$_{CP}$ that [t$_i$ wrote t$_j$]

In (5), the C^o immediately dominating the subject trace
has the feature [+pred] and is overt. Predicative
agreement with the head of the relative clause (a book)
can obtain and *that* should then qualify as a proper
head-governor for the subject trace. But this
incorrectly predicts that (5) should only violate
Subjacency, not the ECP. The correct account of the
severe ungrammaticality of (5) requires that the
effects of predicative agreement on the ECP be further
restricted to contexts in which the head of the
relative clause is also the antecedent of the locally
extracted subject. In Rizzi's system, this needed
restriction does not follows from any other
assumptions. In sum, it appears clearly that current
analysis of the *that-t* effect provide no satisfactory
account of the paradigm in (1).

2. The role of Economy

        As is well known, complementizer deletion in
English is not limited to contexts of subject
extractions. Apart from a few constructions, to which I
return in section 3, deletion is rather free. In this
respect, English is clearly distinct from other
languages, such as, for instance, French, in which
complementizer deletion is never possible:

(6)a.   John believes that Mary will hire Bill
   b.   John believe Mary will hire Bill
(7)a.   Jean croit que Marie va embaucher Bill
         *Jean croit Marie va embaucher Bill

        This distinction, I suggest, is at the heart of
the apparent diversity manifested in (1). Noting that
English complementizers are essentially meaningless,
Chomsky (1989) proposes to delete them at LF. [2] Under
this view, they are first projected at D-structure and
then removed at LF. A perhaps more economic way to
obtain the same result would be to assume that English
complementizer may simply fail to project so that

tensed clauses can be categorially realized at D-structure either as IPs or as CPs. Concretely, I will assume that:

(8) When C is lexically realized S = CP
    When C is absent and has no feature S = IP [3]

This option, I assume is parametrized. Thus, it clearly is not available in French where a tensed S is always categorially realized as CP.
    A second assumption central to the proposed account concerns the role of spec-head agreement in the grammar. I proposed in earlier work, (Deprez 89,90,91), that spec-head agreement affects the transparency of barriers, not the governing status of heads. Agreement is a symmetric and transitive feature sharing relation. As currently assumed, functional heads are bundles of syntactic features including phi-features, tense features etc. It seems then natural to assume that if two functional categories share phi-features with one another, they are in some sense non-distinct from one another and therefore transparent to government. Chomsky (1986) has proposed that inherent barriers can become transparent when they are governed by lexical heads. Putting these two notions of barrier transparency together, we obtain the following definition of L-marking:

(9) X^0 L-marks YP iff
(i) X^0 governs YP and
(ii) X^0 is lexical or
(iii) if X^0 is functional, then X^0 agrees with Y the head of YP (Deprez 1989)

    For some illustration of the consequences of (9iii), consider the two functional projections CP and IP. Assume that both are inherent barriers. In the normal case, C and I do not agree, so IP is a barrier. But when spec-head agreement occurs in CP with the trace of a locally extracted subject, C and I bear the same phi-features. As a result, IP is transparent and government from the immediately dominating CP can obtain. This proposal accounts for observed restrictions on overt complementizer agreement in various languages and has interesting consequences for other functional projections. The purpose of this paper

is to outline its consequences for English subject extractions and the paradigm in (1).

Let us begin by considering the relative and cleft constructions. If as proposed above, in the absence of lexical complementizers a clause is of category IP, the structure of (1d) will be as in (10):

(10) [[a man] [Op$_i$ [$_{IP}$ t$_i$ left]]]

Since empty operators do not bear wh-features, nothing forces them to occur in a CP specifier. Following Chomsky (1986), I will then assume that they can be adjoined to IP. If so, antecedent government of the subject trace in (10) cannot fail to obtain; the ungrammaticality of (1d) must therefore be due to a failure of head government. There are, in fact, no available head-governor for the subject trace in (10). Indeed, under standard assumptions, the relative head noun does not c-command its dependent clause. Consequently, N cannot qualify as a head-governor for the subject trace. Thus (1d) is excluded by the ECP, which following much recent work, I assume to be conjunctively defined, requiring both antecedent and head-government. Note that this account does not affect object extractions since head-government in this case can be satisfied by the V head. Thus structures such as (11) are correctly predicted to be grammatical:

(11) [[a man] [Op$_i$ [$_{IP}$ Mary saw t$_i$]]]

Consider by contrast (12), the structure of (1c):

(12) [[a man] [$_{CP}$ Op$_i$ that [$_{IP}$ t$_i$ left]]]

(12) as opposed to (10) contains a possible head-governor for the subject trace, namely the complementizer *that*. If, in contrast to Rizzi (1990), we assume that complementizers are head-governors which can freely undergo spec-head agreement, agreement with the operator in Spec-CP will transfer to *that* the phi-features of the extracted subject. If so, condition (9iii) is met and IP is transparent so that the subject trace can be head-governed by *that*. The same reasoning will apply to the examples (1e) and (1f). In sum, ECP is violated in (1d) and (1f) simply because there is no

available head-governor for the subject trace. (1c&d)
on the other hand can satisfy the ECP thanks to the
presence of the complementizer.

Let us now turn to the contrast in (1a) and
(1b). (1a) has the structure (13):

(13) Who$_i$ do you believe [$_{IP}$ t$_i$ left]

In (13) condition (9ii) is met. IP is L-marked by the
matrix verb and is thus not a barrier. Consequently,
the subject trace can be head-governed by the matrix
verb and ECP is satisfied. (1b) on the other hand, has
the structure given in (14):

(14) Who$_i$ do you believe [$_{CP}$ t'$_i$ that [t$_i$ left]]

After movement to Spec CP, spec-head agreement obtains
so that condition (9iii) is met. IP is not a barrier
and the trace in subject position is properly head-
governed. Here too, ECP is satisfied. Why then is (1b)
ungrammatical ? Note that in the approach developed
here, there is in fact an interesting difference
between the relative or cleft constructions in (1 c-f)
and the pair in (1a-b). In the former, the ECP can be
satisfied only when the complementizer is present.
Thus, there is only one possible structure made
available by the grammar. In the latter, however, both
the IP structure and the CP structure can satisfy the
ECP. Chomsky (1989) has proposed that it is only when
principles of UG are satisfied that general
considerations of Economy play a role in the grammar.
Since it is only in constructions like (1a&b) that two
strategies for the ECP are made available, it is there
only that principles of Economy will dictate a choice.
In other words, Economy is irrelevant to a choice of
structure in the relative and cleft constructions, but
it does play a role for the pair in (1a-b). The
derivation in (1b) is clearly more complex. First, it
involves an additional step, namely movement to the
Spec CP.   Second, it must resort to an additional
process, namely Spec-head agreement. It is thus natural
to assume that general considerations of Economy will
dictate the choice of (13) over (14). (14) being
generally more costly will be systematically excluded.

The proposed account has I believe, a number of advantages over Rizzi's proposal. First, no stipulation are required with respect to the governing capacity of overt or empty complementizers. Furthermore, there is no need to posit abstract lexical differences between instances of superficially identical complementizers nor to assume that different types of agreement processes are available in English. Finally, spec-head agreement in English can be assumed to function essentially as in French. Recall that French is a language which never permits complementizer deletion. Thus, clausal complements are always CPs and spec-head agreement in the C projection is the only available strategy to satisfy the ECP in all the constructions under consideration. It is then not surprising that French subject extractions manifest a complete uniformity. In these cases, considerations of Economy simply play no role.

The proposed account raises one important question. In English, complementizers are either necessary or impossible with subject extractions. They are, however, simply optional with all other types of extractions. If, as I argue, considerations of Economy regulate the presence of complementizers in the former cases why do they not in the latter ? To put it differently, why does the presence of a complementizer not entail a more complex derivation for non-subject extractions ? There are essentially two possible lines of answers to this question. First, one may assume that spec-head agreement itself, not the number of steps, is the costly process in the derivation (14). Since non-subject extractions do not require spec-head agreement to satisfy the head-government requirement of the ECP, the presence or absence of C may be negligible in the derivational cost. Note that this leaves the account of (1c-f) and French unchanged since, in these cases, Spec-head agreement is required by the ECP and thus considerations of Economy do not play a role. The second line would be to ensure that the number of steps in the derivation remains unaffected by the presence or the absence of the complementizer. Movement to the specifier of an embedded non-wh CP is forced in Chomsky's (1986) system because CP inherits barrierhood from IP. If we do not make this assumption, this intermediate step will not be required and the presence or absence of complementizer will leave the number of

steps unaffected.[4] In relative clauses and cleft sentences, the CP projections are not governed by a lexical head so (9) does not obtain. As we have noted, however, nothing forces the movement of an empty operator to Spec CP. Thus, we can assume that in all non-subject cases, the operator adjoins to IP so that the presence of the complementizer will not entail any additional step in the derivation.

3. Obligatory CPs

Despite the relative generality of complementizer deletion, there are well known contexts where CPs are obligatory. Such contexts include subject sentences, extraposed or dislocated sentential complements and complex NP contexts.

(16)　　a.*(That) John came is obvious
　　　　b.It is important *(that) John comes
　　　　c.I believe it, *(that) John will succeed
　　　　d.The fact *(that) John has succeeded

Clearly then, the assumption (8) is too general. Stowell (1981) has proposed to account for the impossibility of (16) in terms of government. In his view, complementizers can delete only in contexts in which they are governed by a matrix verb. Since in (16) no governor is available, the complementizers cannot delete. This proposal, however, says nothing about complementizer deletion in relative clauses and cleft constructions where government hardly seems to be at stake. In this section, I will briefly sketch a different solution to (16) based on a semantic analysis of sentential complements developed in Hegarty (1991). Hegarty proposes that sentential complements can denote either a set of events, actual or irrealis, or a single actual event, the second interpretation being associated with the standard notion of factivity. These two distinct denotations are formally represented as in (17):

(17) a. believe that Mary met Bill ---->
　　　　believe(ϕ): $\phi = \lambda$ e met(M,B,e)
　　　b. forget that Mary met Bill ---->
　　　　forget (x): x = ι e met(M,B,e)

As suggested by Hegarty, (17b) is analogous to a definite description:

(18) [$_{NP}$ the [N'$_{<x>}$ dog]] ι x:dog(x)

This suggests a parallel between types of sentential complements and types of NPs (or in some approaches DPs). [5] Let us further assume that while complements of the type (17a) can be syntactically realized either as IPs or CPs, complement of the type (17b) must be realized as CPs (or gerunds cf Hegarty). This assumption is compatible with the semantics given by Hegarty. Using the thematic theory developed in Higginbotham (1985), Hegarty proposes that the two interpretations of (17) are compositionally distinguished in the way the event position of the embedded predicate is discharged. In sentential complements which denote a single actual event, the event position is discharged internally to the sentential complement by the complementizer:

(19) forget [$_{CP<>}$that [$_{IP<e>}$Mary [$_{I'<e>}$I [$_{VP<e>}$meets Bill]]]]

In sentential complements which denote sets of events, the event position is discharged externally by the predicate which selects the complement:

(20) believe [$_{CP<e>}$that [$_{IP<e>}$Mary [$_{I'<e>}$I [$_{VP<e>}$meets Bill]]]]

External discharge also obtains when the sentential complement is syntactically an IP (see Hegarty):

(21) believe [$_{IP<e>}$Mary [$_{I'<e>}$I [$_{VP<e>}$meets Bill]]]

We can further assume that in cases of relative clauses which involve modification and not selection, external discharge can proceed, in parallel with adjectival modification (cf Higginbotham 1985), in terms of theta-identification of the event position with the internal position of the relative N head. [6]

(22) a. the dog$_{<1>}$ [$_{CP<e>}$that [Op [$_{IP <e>}$Mary saw t]]]

b. the dog$_{<1>}$ [Op [$_{IP<e>}$ Mary saw t]]

Returning to (16), observe that the parallel between
the interpretation in (17b) and definite descriptions
suggests a possible explanation for the obligatory
presence of the complementizer in sentences such as
(16c). It is a well known fact, that dislocated NPs
must generally be definite (and specific). What I would
like to suggest then, is that it is this requirement
which enforces the presence of the complementizer in
(16c). In parallel with the definiteness requirement on
dislocated NPs, dislocated sentential complements must
denote a single actual event, not a set of events. Thus
external discharge of the event position is excluded
and the presence of the complementizer is required.
Furthermore, if as suggested by Koster (1978), subject
sentences and extraposed sentences are base generated
in peripheral positions, the same reasoning extends
straightforwardly to these cases (16a&b). Finally, it
is also clear that in (16d) the sentential complement
must be interpreted as denoting a single actual event.
Here again, then, the necessary presence of that is not
surprising. In brief, the suggestion made here is that
the obligatory presence of the complementizer in
contexts such as (16) is not driven by syntactic
considerations but rather by constraints on semantic
interpretation. Although, clearly, this analysis
requires further refinement which cannot be discussed
here due to space limitations, it presents at least a
plausible alternative to standard accounts of the
complementizer deletion phenomenon. Standard accounts
assume that empty complementizers can occur only in
contexts in which they are syntactically licensed. The
account sketched here on the other hand, presupposes
that both CP and IP are possible syntactic realizations
of English sentential complements and that the
necessity of the former in some contexts is due to
semantic restrictions, selectional or other, on their
denotation.[7]

One final question must be addressed. If as I
suggest in section 2, the presence of the
complementizer can satisfy the head-government
requirement of the ECP, the question arises as to why
subject extractions are not possible from contexts such
as (16). Consider, for instance, a case of subject

extraction from a subject sentence, the structure of which is given in (23):

(23) Who does [$_{CP}$ t'$_i$ that [$_{IP}$ t$_i$ left]] bother you

In (23), the extracted subject moves to the CP spec of the subject sentence, so that spec-head agreement obtains and the subject trace t$_i$ can be properly head-governed by *that*. Why then, are such sentences excluded ? The problem, I suggest (Deprez 89,91), occurs not with the subject trace but with the trace t'$_i$ in Spec CP which fails to be head-governed by the higher C. Since this trace cannot delete without destroying the agreement relation necessary to the transparency of IP, ECP is violated and the sentence is excluded. Interesting confirmation for this analysis can be found in French, where complementizers are always present and agreement is overtly manifested. As shown in (24), the switch of *que* to ·*qui* has no effect on the ungrammaticality of structurally identical cases:

(24) *Qui est-ce que [que/qui t soit parti] t'ennuie.

This shows clearly that spec-head agreement does not suffice to avoid an ECP violation in these cases. Consequently, there is no need to restrict its application with respect to (16). Here again, the proposed account draws a parallel between English and French.

Conclusion:

This paper proposes that the standard *that-t* effect is not strictly speaking an ECP effect. Rather, it results from the interaction of the ECP with more general considerations of Economy. As I have shown, the proposed analysis permits a unified account of the paradigm in (1) and of subject extractions in English and in French.

-- Notes --

1. To quote Frampton:" It is an unsatisfactory feature of both analysis (i.e. Rizzi's and his) that they must stipulate that *that* does not enter into spec-head agreement. Otherwise, the account fails".fnt 35 pp 66

2. LF complementizer deletion is in fact crucial in the Barriers system to prevent ECP violations with adjunct extractions. Cf Lasnik and Saito (1984) for a discussion of the problem and the origin of the proposal.

3. Following Chomsky, I assume that [+wh] complementizers, being semantically significant cannot be missing. Consequently, although English does not have [-wh] empty complementizers, it has [+wh] empty complementizers. Like other complementizers, [+wh] can undergo spec-head agreement. Thus in structure such as (i), this empty C will be able to head govern the trace in subject position:

(i) I wonder [who C [t left]]

4. The successive cyclic character of wh-movement can be preserved if we assume instead that IP can inherit barrierhood from VP. This will not affect subject extractions, since they do not invoke VP, but it will force IP adjunction, even when IP is L-marked, for all other types of extractions (objects and VP adjuncts) if BCs are defined as in Deprez (1989) (i.e in terms of non-exclusion rather than domination) and inheritance is only induced by lexical categories. Recent analyses of the phenomenon of "cyclic" subject inversion in languages like Spanish, Romanian and Catalan (see Bonet (1990) among others) suggest that IP adjunction or movement to spec IP, not CP is at stake. If correct, this provides interesting support for the proposed reinterpretation of the cyclic character of wh-movement.

5. Such a parallel has been independently argued for on the basis of syntactic evidence. See for instance Lefebvre & Massam (1988) among others.

6. In Higginbotham (1985) the semantic interpretation corresponding to theta-identification is coordination. Applied to relative clauses, (22) entails

that " the dog Mary saw " is informallly interpreted as
: the x [which is a dog] and [which Mary saw].
   7. Similar constraints arise in French. However,
they are not syntactically manifested in the
complementizer system, but rather in the tense system
by the necessary use of subjunctive.

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NEGATION AS A FUNCTIONAL PROJECTION IN HINDI

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0.0 Introduction
    In this paper I show that the negative morpheme nahiiN in Hindi
is syntactically a head that projects its own phrase, Neg(ation)
P(hrase), (cf. Pollock 1989, Zanutinni 1989). I further argue that
despite its traditional classification as a "modifier" in the
notional sense, the syntactic behaviour of Negation is distinguished
from other modifiers in Hindi, namely Determiner, Adjective, Adverb
and Quantifier. Those modifiers are syntactically adjuncts, as they
adjoin to the phrase they modify. Negation, on the other hand, is
a head that takes a complement (or object) XP. I claim that nahiiN
is not a member of the category of "true modifiers", which are the
adjoined modifiers.

1.0 A Brief Sketch of Hindi

1.1 Word Order
Hindi is an SOV language that is consistently head final. The
default word order is schematically shown in (1) and
exemplified in (2)a.[2]:
(1) S X O V (Aux)
X= $PP_{loc/instr}$; $AdvP^3$
(2)a. Raam roTii khaataa   (thaa).
      R. bread(f) eat(imp.m) be(pst.)
      Ram used to eat bread.
The default sentence pattern is of interest because Hindi has a
relatively free word order. This pattern is the
version that is least marked stylistically, with "simple"
intonation.
Native speakers of Hindi generally have a clear idea of what
constitutes a default utterance, and what does not. Thus the
following sentence patterns are also grammatical, albeit marked
compared to (2)a.:
(2)b. O   S   t V   Aux
      roTii Raam khaataa thaa.

   c. V   S   O t Aux
      khaataa Raam roTii thaa, magar ab puRii khaataa
      hai.
                      but now fried bread eat(imp.m.)
      be(3p.sg.m.)
      ie, "Ram used to eat bread, but now he eats fried bread."
 Other patterns of scrambling (the list in (2) is not exhaustive)
will be described later in the text. (See Section 4.1).
    Derivationally, I assume that the default word order is
described by the simplest possible representation. If the default
pattern is the result of some movement, this movement must result
from a principle in the Grammar (e.g., Case Filter, etc.). This is
in contrast to "scrambled" versions, which have extra instances of
"Move-a" applied to them.

1.2 Facts about Negation

The negated version of the affirmative sentence (2)a. is shown below:

(3)   Raam roTii nahiiN khaataa thaa.

If (3) is uttered using an unmarked intonation, then the sentence means "Ram used not to eat bread." This is an example of sentential negation, the facts of which will be further examined in Section 4.0.

If roTii, "bread" bears the main pitch accent, (which is indicated in the example using capital letters) then the sentence is of a contrastive type, so that it must be followed by (or conjoined with) a relevant contrast phrase, as in (4)

(4) Raam ROTII nahiiN khaataa thaa, balki PURII khaataa thaa.
                                    but fried bread
    "Ram didn't used to eat ROTII, he used to eat PURII."

(4) would be perfectly appropriate in the following discourse setting. Suppose Ram's mother and his aunt are musing about Ram's eating habits as a child. The aunt remembers (2)a. His mother challenges the aunt's memory with (4). (3) would be inappropriate here, since it is merely an assertion so that nothing with the relevant focal structure is presupposed. In (4) Ram's eating something is presupposed or old information. The new pieces of information are that he did NOT eat roTii but purii. I call sentences like (4) examples of constituent negation (cf. Horn 1989), which invoke topic focus structures (cf. Jackendoff 1972, Selkirk 1984).

1.3 Summary

In this section we saw that Hindi is a language with free word order (we will see constraints on this freedom below). Constituent and sentential negation have the same morphological form, nahiiN. When the direct object is contrasted, to yield the surface string S DO neg V, the surface form of the sentence looks just like sentential negation. The difference is that the two different types of negation support different intonational patterns.

In the following sections I show that constituent and sentential negation may be analysed using a uniform syntactic configuration, NegP, so that the sister of the negative morpheme is syntactically selected. Crucially, I argue, negation does not adjoin to its sister, as do say, adjective phrases and adverb phrases.

2.0 Constituent Negation

In this section I make the preliminary hypothesis that since constituent Neg unambiguously takes its sister to the left in this head final language, it should be analysed as an X^0. It contrasts with the other modifiers in Hindi, which modify to the right. Before we look at the relevant negation facts it would be instructive to look at how other modifiers work.

2.1 The "True" Modifiers: MOD

The examples below show the position of Adjective, Determiner and Quantifier with respect to their complements, (see Section 1.1 for Adverb). First let us examine (5).

(5)   Bacce ne [[kai] ciriyaoN ko] cawal khilaaye.
      Children erg. many birds dat. rice fed.
      The children fed many birds rice.

In the above sentence, <u>kai</u>, "many" unambiguously modifies "birds," such that the sentence CANNOT be read, *"Many children fed the birds rice." Quantifiers and Determiners modify in the same way:

(6) [$_{NP}$[$_Q$Har] bacca ko] khelnaa caahiyee.
     every child dat. play(nom.) should.
     Every child should play.

(7) Vidhyaarthi ne   [[har] kitaab ko] paDaa.
     student(m.) erg. every book acc. read(pf.m.)
     The student read every book.
     *Every student read a book.

(8) [[Us] laDkii] ke paas [[ek] ciriya] hai.
     That girl gen.   one bird is.
     That girl has a bird.

(9) LaDke   ne   [[us]   kalam   ko] khariidaa.
    boy(m. obl.) erg. that pen(f.) acc. buy(pf.m.)
    The boy bought that pen.
    *That boy bought the pen.

I assume that the above modifiers are adjuncts that are Chomsky-adjoined to the YPs they modify. As a result, NP is the maximal projection that dominates the "Mod(ifier)P(hrase)" in the above sentences.   An exemplary configuration would look like the following:

(10)   NP
         /   \
      AdjP   NP
       | |
      Adj^0 N^0
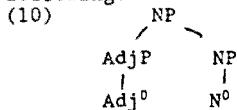
The head of Modifier Phrase^YP is always Y^0, as in (10) where Y^0 —N^0.

2.1 Focus Facts
2.1.1 Direction of Sister

As noted in Section 1.2, the constituent that is contrasted in Hindi is left adjacent to <u>nahiiN</u>. It also always receives the main pitch accent in the sentence.   The schematic representation of contrasting a constituent X to Y is shown in (11), with examples to follow:

(11) X$_{focus}$ Neg but Y.
(12)a.   S$_F$ neg   IO-ko   DO   V
     RAAM NE nahiiN Sita ko kitaabe diyaa, Shyaam ne.
     R. erg. neg S. dat. books(f.) give(pf.0) Sh. erg.
     Ram didn't give the books to Sita, Shyaam did.

    b.   S   IO-ko$_F$ neg   DO   V
     Raam ne SITA KO nahiiN kitaabe diyaa, balki Sudha ko
     R. erg. S. dat. neg. books(f.) give(pf.0) but Su. dat.
     diyaa.
     gave.
     Ram didn't give the books to Sita, but to Sudha.

```
c. S        IO-ko    DO_F   neg      V
   Raam ne Sita ko KITAABE nahiiN diyaa, balki noTbuk diyaa.
   R. erg. S. dat. BOOKS neg. gave, but notebook gave.
   Ram didn't give books to Sita, he gave her a notebook.
```

The sentence <u>S IO-ko DO V</u> is altered in (12) by systematically positioning Neg in different slots between the words. We see that there is unambiguous evidence that Neg is modifying to the left. Thus in (12)a., it is the subject that is contrasted, not the indirect object. Further the direct object is contrasted in (c), not (b), where Neg precedes it. Notice that (12)c. is not the default negative sentence pattern discussed in Section 1.2. Because the DO is focussed, the sentence does not mean, "Ram didn't give the books to Sita;" instead it means, "It's not BOOKS that Ram gave Sita, it's notebooks."

Neg modifies other complements, too, as shown below:

```
(13) AP^Neg
     Sushma   [bevkuf]_F nahiiN hai, samajdar hai.
     S.(f)   ·FOOLISH    neg   is, intelligent is.
     Sushma's not STUPID, she's smart!
```

```
(14) PP^Neg
     GuDiyaa [skul me]_F nahiiN hai, park me hai.
     G.(f)   SCHOOL IN   neg   is, park in is.
     GuDiyaa's not in SCHOOL, she's in the park.
```

(13) and (14) are of the same contrastive type observed in (12). If the relevant negated YP did not bear the main pitch accent (and thus was not focussed), the sentences would mean, "Sushma is not stupid," and "GuDiyaa's not in school," respectively. No contrastive interpretation would follow.

As a preliminary hypothesis, I propose that Neg be analysed as a head since it patterns like an X^0 in this head final language; its sister is to the left. The element that is contrasted is selected by Neg.[4] The following syntactic configuration is assumed for the DO case:

(12)c.'[5]

```
                       \
                    ,VP.
              spec    V'
              NP_SU/t  /‾‾‾
                   IOko   V'
                         /‾‾‾
                     NegP    V
                    /‾‾
                  DO    Neg
```
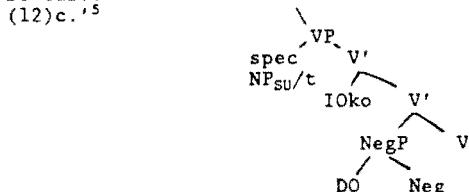
This suggestion is based purely on the fact that Neg modifies to the left, and to capture this syntactically in this head final language, I have posited a head final NegP.

Thus I have claimed that <u>nahiiN</u> is an X^0 that takes a complement sister. There is another grammatical fact that this analysis captures: the sister of Neg tends to bear the main pitch accent in the sentence. If Neg were adjoined to NP, such that there was no relation of argumenthood (see Footnote 4), then it would be an

accident that this intonation pattern were the case. This is because according to Selkirk 1984 (Ch. 5) intonational structure is only sensitive to argument relations, not adjunct relations. In the present analysis, I account for the intonation facts by positing a Focus Algorithm which assigns the feature +F[ocus] (cf. Jackendoff 1972) to the sister of Neg. Given Selkirk's assumptions no such algorithm could apply to an adjunct relation, shown in (15):

(15)

```
            NP
         /
   NP  ╱   NegP
```
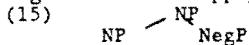
If (15) were the syntactic configuration, then we would assume that the pitch accent could occur anywhere in the sentence, but it doesn't: it only occurs on the sister to Neg.

2.2 Summary

In this section I used direction of complementation facts to claim that Neg is a head. This is because it consistently modifies to the left, true to the head final characteristic of this language. Neg is contrasted to all other modifiers, which modify to the right. This head relation also captures intonation facts: the sister to constituent Neg bears the main pitch accent in a sentence. If Neg were adjoined to NP, then this would be a syntactic accident, since according to Selkirk 1984 adjuncts do not affect intonation assignment. In the next section we see further differences between Neg and the other NP modifiers.

3.0 Long Distance Scrambling facts

An interesting example to look at is (16). The word order in this sentence is S-ne DO IO-ko t V. The DO has scrambled out of its original position. Let us assume that the subject has scrambled, too, so that the Goal marks the periphery of the VP. This would entail that the direct object is external to VP. If this sentence is negated such that Neg immediately precedes V, the word order may support three different intonation patterns, with each its own interpretation:

(16) Ram ne kitaab Supriya ko nahiiN dii, ...
      R. erg. book(f) S.   dat. Neg give(pf.f)
      Ram didn't give Supriya the book,...
      (i) he gave it to Sita, (IO negation, accented IO)
      (ii) he gave her an apple instead, (DO negation, accented
           DO).
      (iii) he kept it. (VP negation)[6]

Contrasting the IO, (i), yields a structure where NegP dominates IO and Neg. This would be an example of constituent negation, discussed in 2.0. We are concerned with the reading in (ii). This is an example of DO negation, the structure for which is shown in (12)c'. Apparently, even though the DO is not in its original position, as sister to Neg, it is still being interpreted that way. In other words, the YP left adjacent to Neg may move out of its position and still yield a grammatical sentence. This is not the case for other modifiers of NP, (I mark constituenthood below by boldfacing):

(17)a. BaDe bacce kitaabeN paDte haiN.
       big(pl.) children book(pl.f.) read(imp.pl.) be(3p.pl.)
       Big children read books.

   b. **bacce baDe t kitaabeN paDte haiN.**
      *Big children read books.
   ok: Children read big books.

(18)a. Zamindaar ne **us aadmi** ko maDaa.
     Landlord erg.that man KO hit(pf.m.)
     The landlord hit that man.

   b. **Us** zamindaar ne **aadmi** ko maDaa.
    *The landlord hit the man.
   ok: That landlord hit the man.

(19)a. ilaa ne raam se   **annu ki puraanii kitaab** khariidii.
     Ila erg. R. inst. Anu gen old(f.) book(f.) buy(pf.f.)
     Ila bought Anu's old book from Ram.

   b. *ilaa ne annu ki raam se **puraanii kitaab** khariidii.

   c. *raam se **annu ki** puraanii ilaa ne **kitaab** khariidii.
(taken from T. Mohanan 1990, ex. 17, p. 18)

There are two points to be made here. The data in (16) might suggest
that Neg simply associates itself with the stressed item in the
sentence to yield a contrastive reading. However, this is not true.
In the string <u>Sne DO IOko neg V</u>, Neg may only associate with the
direct object and the indirect object to yield the contrastive
reading. If there is a main pitch accent on the Subject, Neg does
not associate with it to yield a contrastive reading. The sentence
remains an example of topicalisation rather than one which must be
followed by a contrasting item. This is consistent with the fact
that Neg is not in a position that S could have moved out of to
yield the contrastive reading.
    In order to account for the difference in scrambling
possibilities between NPs that are modified by Neg versus NPs that
are modified by "true" modifiers, I posit that Neg is a head that
projects to its own phrase, NegP.
   What does this buy us?
   First, it accounts for the long distance relationship that a
sister to Neg may have with it. This is due to the fact there is
the relation of head government between Neg and its sister, so that
the scrambled NP can still be related to its former position, given
that its trace is governed.[7]
   Second, we don't need to say that Hindi only sometimes honours
the Complex NP Constraint. It always does. The reason why an NP
can scramble away from its Neg modifier is that it bears the
syntactic relationship in a. to it and not b. below:
(20)a.   NegP   b.   NP
           NP   Neg   NP   Neg

4.0 Sentential Negation: Evidence of Incorporation
   In this section I investigate data from an Eastern dialect of
Hindi, spoken largely in Uttar Pradesh. First, I examine the
fronting possibilities of different elements of the VP in an

affirmative sentence. Once negative sentences are introduced, I show that if negation, nahiiN, is present, then it must always front with the verb. If it is stranded, an ungrammatical sentence results.[8] While the exact nature of this fronted position is not relevant to our concern, it is important to mention my assumption that only one such position exists. As such, whatever fronts will front as a constituent, so that successive frontings of two constituents is not permissible.

4.1 Fronting Possibilities

Section 1.1 on Word Order alluded to the fact that Hindi has relatively free word order. Here we examine more examples of this freedom. These examples are clearly not default sentence types; some informants described them as somewhat literary. However, the judgements on grammaticality were clear. Below, the (a) sentences depict the basic sentence type. Verb fronting is shown in the (b) sentences.

(21)a. S-ne   O·   V
    raam ne saikal calaayii.
    R. erg. bicycle(f.) drive(pf.f.)
    Ram rode a bicycle.

   b. V   S-ne   O   t
    calaayii raam ne saikal,   aur uskii saikal nali me
    drive(pf.f.) R. erg. bike(f.) and his(f.) bike gutter in
                                                    girii.
                                                    fell.
    Ram rode his bike and it fell in the gutter!

(22)a. Krishna ne Rukmuni ko dekhaa.
    K.   erg. R.   dat. see(pf.0)
    Krishna saw Rukmuni.

   b. dekhaa krishna ne rukmuni ko, lekin yaad   usse
    see (pf.0) K.(m.)   R. (dat.) , but memory him(dat.)
    raadhaa ki   aayii
    Radha   genitive marker come(pf.f.).
    Krishna saw Rukmuni, but thought of Radha.

(23)a. mai ne   abhii   film   dekhii   hai.
    I(nom.) erg. now   film(f.) see(pf.f.) be(1stp.sg.pres)
    I just saw a movie.

   b. V   *(Aux)   S-ne Adv O
    dekhii *(hai) mai ne abhii film.

   c. O   V   *(Aux) S-ne Adv
    film dekhii hai mai ne abhii.

Example (23) shows that when an Aux is present, it must front along with the verb, indicating that there is V-Aux incorporation occurring. In (23)c. we see that O^V may front as a unit, too.[9]
    The negative sentences of (21), (22) and (23) are shown below:

(24) Raam ne saikal nahiiN calaayii.
     R. erg. bike(f.) neg drive(pf.f.)
     Ram didn't drive the bicycle.

(25) Krishna ne Rukmuni ko nahiiN dekhaa.
     K.   erg. R.   dat. neg   see(pf.0)
     Krishna didn't see Rukmuni.

(26) mai ne film abhii nahiiN dekhii hai.
     I erg. movie yet neg. see(pf.f.) be (3p.sg.)
     I haven't seen the film yet.

When one examines the fronting possibilities in negated sentences,
then it is apparent that sentential Neg may not be stranded.[10]
This is shown below. The (a). sentences show Neg-V fronting as
grammatical; the (b). sentences show that V fronting without Neg is
ungrammatical.

(24)'a. Neg   V   S-ne   O
     nahiiN calaayii raam ne saikal,...
     Neg   drive(pf.f.) R. erg. bike(f.)

     b. * V   S-ne O   Neg
         *calayii raam ne saikal nahiiN,...

(25)'a. nahiiN dekhaa krishna ne rukmuni ko,...
        Neg   see(pf.0) K. erg. R. dat.

     b. *dekhaa krishna ne rukmuni ko nahiiN,...

(26)'a. Neg   V   *(Aux)
        nahiiN dekhii *(hai) mai ne film, lekin sunaa hai...

     b. *dekhii hai mai ne film nahiiN,...

     c. O   Neg   V   (Aux) S-ne
        film nahiiN dekhii (hai) mai ne, lekin sunaa hai ki
                                        but hear(pf.0) is that..
        I haven't seen the film, but I heard that...

     d. * O   V   (Aux) S-ne   Neg
        *film dekhii (hai) mai ne nahiiN, lekin...

    Example (26)'c. and d. further show that when the VP does front,
it cannot strand Neg.[11]

4.2 Neg Incorporation
    These data may be accounted for if we assume that sentential Neg
is a head and that there is verb movement in Hindi.
4.2.1 Phrase Structure in Hindi
    I adopt a tree in which the aspectual and tense morphemes
project to separate phrases, since they can each be words (cf. Speas
1990).   I propose the tree in (28) which represents (2), repeated

here as (27):
(27)   Raam roTii khaataa   (thaa).
       R. bread(f) eat(imp.m) be(pst.)
       Ram used to eat bread.
(28)

```
                      TP
              spec  ⟍  T'
                      AspP  ⟍ T
                       ╱⟍    thaa
                    VP   Asp
              spec ⟍ V'  +t+aa
              Raam   ╱⟍
                   NP   V
                 roTii khaa
```
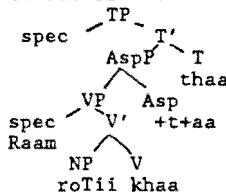
Note that the domination relations of the tree reflect the order of
the verbal morphemes. When aspect is a suffix, it subcategorises
for V_{root}. The verb moves to Asp to satisfy the subcategorisation
frame of the affix, (Roberts, 1985).[12] This movement is restricted
by the Empty Category Principle: all traces must be properly
governed. If an X^0 moves too far so that it crosses a barrier to
movement, or if it skips over another head, then the trace will not
be governed. [13]

    The phrase structure for sentential negation is such that NegP
forms part of the inflectional complex and is a sister to VP. I
account for the fronting facts above by assuming the following: in
a negated sentence the verb, which must move to satisfy the affixal
requirements of aspect, must incorporate into Neg. This is because
if it does not, then by the Head Movement Constraint (and/or the
Minimality Condition of Chomsky 1986 and Rizzi 1990) the trace of
the verb will not be governed. Thus the ungrammaticality of the
fronted sentences above that strand Neg is accounted for if we
assume that Neg's head status means that it counts as a closer
governor for the trace of V^0, such that V must incorporate into it
to avoid this syntactic configuration (but see Pollock 1989). Thus
the phrase structure I am assuming to support these claims is shown
below:
(29) [14]

```
                       TP
               spec  ╱⟍  T'
                    AspP  ⟍ T
                     ╱⟍    Neg-[V+asp]-Aux
                 NegP   Asp
                 ╱⟍     t_{Neg-[V+asp]}
               VP   Neg
               ╱⟍    t_{Neg-V}
            spec  V'
             NP ⟍ V
                  t_V
```
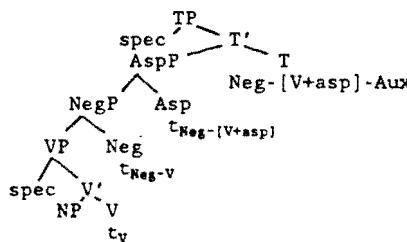
    The Eastern dialect[15] then provides us with the relevant data
that show that Neg does have the ability to incorporate with another
X^0, clearly demarcating it as a head.
4.2 Predictions
Having established that Neg is syntactically not adverbial (or
adjoined to VP), we expect that the fronting facts for real adverbs

should differ from those for Neg. As an example, let's look at the
closely related adverb kabhi nahiiN, "never" and another VP adverb
jaldi se, "quickly."
(30)a. Raam saikal [kabhi nahiiN] calaataa hai.
      R. bike(f.) sometimes neg drive(pf.m.) be (preslsg.)
      Ram never drives a bike.

   b. ? calaayi Ram ne kabhi nahiiN saikal is liye woh moTor
                                         this reason he motor
                                         kaar se darte hai.
                                         car abl. be afraid is.
      ... which is why he's afraid of cars.

   c. * kabhi nahiiN calaayi Ram ne saikal
(31)a. Shyaam saikal jaldi se calaataa hai.
       S.   bike   quickly drive(pf.m.) be(preslsg)
       Shyaam drives his bike really fast.

   b. ?calaate Shyaam saikal jaldi se is liye woh skul
                                       this reason he school
                                       taym se pahuNcte hai.
                                       time abl. arrive is.
      ... which is why he arrives to school on time.

   c. *jaldi se calaate Shyaam saikal

Apparently, there is a strong acceptability difference between V^0
fronting and Adv^V fronting. The latter type of fronting is
unacceptable. We see a clear dichotomy in the data; whereas verb
fronting in negated sentences did not permit nahiiN stranding, verb
fronting in adverbial sentences must strand an adverb. Under my
account the reason for this is that there is only one topic position
that constituents can move to, and since an Adverb is adjoined to
VP, it cannot move to the front of the sentence with V. Neg on the
other hand can, precisely because it is a head and has taken part in
the head fusion. Being a head allows for the incorporation
possibility.
4.3 Summary
    In this section I relied on recent assumptions about phrasal
syntax to show that the reason why fronting verbs in negated
sentences necessitates the negative morpheme fronting too is because
the negative morpheme is a head that the verb incorporates with. If
nahiiN is stranded such that the incorporation does not happen, then
given the Head Movement Constraint, the sentence is rendered
ungrammatical.
    In the end, although I advocate a similar syntactic configuration
for constituent negation and sentential negation using NegP,
sentential negation usually ends up as, in effect, a prefix to the
verb.

5.0 Conclusion
    In this paper I argued that nahiiN projects to its own phrase and
selects its sister. I used three tests to show this. First I
relied on the superficial fact that the modifiee of Neg in

constituent negation is left adjacent to it. This is in contrast to
all other modifiers in the language, but completely consistent with
the heads. Since only arguments (crucially not adjuncts) can affect
intonation assignment, this account captured the fact that the
sister to Neg tends to receive the main pitch accent in the
sentence. Second, the sister to Neg may scramble and still be
associated with its initial position. No other instances of
scrambling NP modifiers are found in this language. I suggest that
Hindi does indeed honour the Complex NP Constraint. The reason why
NPs scramble when sister to Neg is because they are daughters to
NegP, so that scrambling is possible. Finally, I show that in
negated sentences, when there is verb fronting, the negative
morpheme may not strand. I assume an incorporation strategy to
account for this, again showing that we need to assume that nahiiN
is an X^0.

An implication for further research is the following: in
instances of constituent negation where an NP is dominated by NegP,
one has to address the following issue-- why does NegP not block
subcategorisation restrictions by verbs? NegP is an interesting
category in that it seems to be transparent so that the syntactic
restriction that a verb take an object NP is not violated if the NP
is dominated by NegP. Here is another area where the differences
between functional categories and lexical categories must be
investigated.[16]

Endnotes
1. This is a revised version of my Generals paper. I would like to
thank the members of my committee: Lyn Frazier, Roger Higgins and
Peggy Speas for their advice. I'd also like to thank Hagit Borer,
Paul Portner and Hotze Rullmann for discussion.
2. Some of the abbreviations used in glossing the Hindi examples
are: m.-masculine; f.-feminine; 0-default agreement (m.sg.);
sg.-singular; pl.-plural; 1/2/3p-first/second/third person; perf.or
pf.-perfective aspect; imp.-imperfective aspect; pst.-past;
inf.-infinitive; nom.-nominative; erg.-ergative; dat.-dative;
acc.-accusative; emph.-emphatic particle; gen.-genitive marker; N
indicates nasalisation on the preceding vowel; T-retroflex /t/,
D-retroflex /d/ or a flap.
3. Informant judgements are more certain about the default pattern
with PPs than the pattern with Adverbs. The judgement is that (i)
S PP O V is the default pattern vs. (i)' S O PP V. However, for
Adverb Phrases, the intuitions are less certain regarding which of
the possible orders (ii) S Adv O V vs. (ii)' S O Adv V, is more
basic. Here I assume that structural position may be correlated
with function. Since both PPs and manner Adverbs perform similar
functions, (modifying VP), I assume that Adverbs take the same basic
position as PPs, (ii). Further, when both do occur, the order is
(iii) S Adv PP O V.
4. I hesitate to use the term argument of Neg, since this term
could imply that Neg theta marks its sister. The nature of
'arguments' of functional projections is vague at best, (for some
discussion, see Speas 1990, Section 2.4 and Baker 1988 p. 61).
Baker suggests that the functional projections C^0 and I^0 enter a
relation of "selection" with their sisters and not theta assignment.
This term does not necessarily imply that Neg subcategorises for any
particular category; as will become obvious, any phrasal category

can be sister to Neg. I use this phrase in accordance with the current literature to indicate a tighter relationship than adjunction in syntax without theta assignment.

5. I am adopting a VP internal subject configuration. The optional trace in [spec, VP] indicates that the NP_{su} which is case marked as ergative, may scramble. Also, the implications of having NegP as an argument of V will be discussed in the conclusion of this paper.

6. For a discussion of VP negation, see Dwivedi 1990.

7. Although this is not a conclusive argument, since even if NegP was adjoined to NP, the scrambled NP could still antecedent govern its trace. This is because I assume that scrambled objects adjoin to VP. As a result, VP does not "exclude" (in the sense of Chomsky 1986) the direct object NP, and so is not a barrier for government.

8. Note that this ungrammaticality is particular to this dialect in Hindi. A "Western" dialect, spoken in Bombay, shows exactly opposite effects. Neg in this dialect always strands, and may not front with the verb.

9. Although one might argue that O^V fronting is really a case of the subject moving rightward, (23)c. shows that one could maintain the initial claim. In order to account for (23)c., either one assumes that the complex O^V^Aux fronts, OR that S postposes, and then Adv does, too, (these two XPs cannot postpose together since they do not form a constituent). Given that either option logically exists, I propose that the Grammar chooses the least complex derivation, which is the verbal complex fronting.

10. We see that sentential Neg may not strand due to the incorporation process invoked below. This is in contrast to cases of constituent Neg, where we saw the DO scramble and leave Neg behind. Thus while both sentential and constituent Neg are analysed with the same syntactic configuration of head final NegP, we see that this same configuration can support different syntactic analyses which account for the differences between sentential and constituent negation.

11. The exact details of this fronting process will not be pursued.

12. For more data concerning Verb Movement in Hindi, see Dwivedi 1990.

13. Essentially, Chomsky 1986 and Rizzi 1990 argue that an X^0 trace may not be governed by its antecedent if another Y^0 intervenes, since the closer head will end up governing the trace of X^0, effectively blocking government from the trace's antecedent. As noted in the literature (Baker 1988) this restriction is also expressed by the Head Movement Constraint of Travis 1984, "An X^0 may only move into the Y^0 which properly governs it."

14. An obvious remark here is that nahiiN, a two syllable word, is too big/heavy to be considered prefixal. I have two things to say about this. First, in non-subjunctive/conditional contexts and non-imperative contexts, nahiiN freely alternates with na. In addition, the subjunctive/conditional and imperative moods employ the single syllable na and mat, respectively. So potentially much of the time, the negative morpheme in Hindi is the "right size." Second, two syllable prefixes are not a null class, anyway. In English we refer to counter- as a prefix, in "counterexample" and "counteract."

15. We see that this Eastern dialect has Neg-V incorporation, and possibly, when Aux is present, Neg-V-Aux incorporation. This is in contrast to the Western dialect, which differs exactly along these lines: it does allow for Neg and Aux stranding. It seems, therefore, that the dialects differ at the level to which incorporation is allowed for; the Eastern dialect requires (or opts

for) incorporation at every possible instance, where the Western dialect simply does not allow for incorporation. I have no explanation for this difference at this time.

16.   See Dwivedi 1990 where I modify Abney 1987 and give a first account of the subcategorisation facts.

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Economy of Representation: the Realizations of X, +___YP
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1. Problems and Possibilities for Subcategorization.
Since being introduced in Chomsky (1965), contextual
"subcategorization features" of the form +___YP have been
the central lexical formalism for indicating differences
in how classes of verbs (subsequently, of other lexical
heads) select complements. Thus, three verbs like <u>seem</u>,
<u>describe</u>, and <u>glance</u> are lexically listed for different
complements as in (1), thereby expressing the obligatory
co-occurrence shown in (2). For more details on this
notation, such as the decision to lexically stipulate
only plus values for these features, see Chomsky (1965).

(1)   describe,V, +___NP; glance,V, +___PP; seem,V, +___AP
(2) a. Mary {described/ *glanced/ *seemed} the task.
    b. Mary {*described/ glanced/ *seemed} toward the room.
    c. Mary {*described/ *glanced/ seemed} thristy.
    d. *Mary {described/ glanced/ seemed} at last.

Many verbs can take, usually optionally, a second
complement, most simply represented in trees as their
second phrasal sister. Such "oblique" complements are
represented as in (3); parentheses indicate optionality.
Thus, the above verbs, but not <u>undertake</u> or <u>remain</u>, may
take indirect objects with <u>to</u>, as in (4). Chomsky (1965)
stipulates the introductory P, a practice I modify below.

(3)   describe, V, +___NP (to^NP); undertake, V, +___NP;
      seem, V, +___AP (to^NP); remain, V, +___(AP, NP, PP)
(4)   Mary {described/ *undertook} the task to the boss.
      Mary {seemed/ *remained} thirsty to the boss.

In recent years much if not all of what is
language-particular is ascribed to lexical variation, a
working hypothesis to which I subscribe. If indeed the
subcategorization mechanism is to carry the weight of
lexical specificity, it is then an urgent task to
carefully formulate and refine it. For it is easily
appreciated that subcategorization as originally
formulated is inadequate, as authors have noted since at
least Bresnan (1970). And if the theory of grammar
cannot actually specify what expresses the language-
particular in scientific rather than purely expository
terms, then we really don't have a science of language.
    To see inadequacies of classical subcategorization,
consider a verb like <u>reside</u> which like <u>glance</u> also
requires a PP complement; consequently, the simple
feature +___PP fails to predict the following contrasts.

(5)   Mary {resided/glanced} {near/by/*of/*with} the hall.
       Mary {resided/seemed}{in the hall/*toward the room}.

Or, if we replace a direct object NP licensed by +____NP
with an NP gerund, we find differences among verbs as to
whether an NP object with an "event-like interpretation"
containing an overt possessive phrase subject is allowed:

(6)   Mary described my friend's preparing a fish.
       Mary described Sam's distribution of my paper.
       Mary undertook (*my friend's) preparing a fish.
       Mary undertook (*Sam's) distribution of my paper.

Thus, "different kinds" of XPs must be selected, since
simple statements like +____NP and +____PP fail to describe
the actual arrays of surface distributional facts.
    Given the apparent inadequacy of subcategorization
features, many researchers have concluded that surface
co-occurrence relations between various X head and YP
complements are to be captured through lexical expression
of deeper semantic regularities ("s-selection").   Thus,
Grimshaw (1979) argues that some co-occurrence patterns
involving sentential complements are best expressed by
means of non-syntactic "semantic" selectional features.
Pesetsky (1982) further proposes that if such semantic
selection is supplemented by lexical specifications of
how and when a verb assigns "abstract case" to its NP
objects, then subcategorization may even be eliminated.
I have responded to these proposals in Emonds (1991,
1992), arguing that the advantages of item-particular
semantic or "s-selection" are illusory, and that many
distributional and even semantic generalizations are
thereby obscured and left unexpressed.   Here, I start
from these conclusions, i.e. that the best mechanisms for
capturing distributional regularities of lexical items
are subcategorization frames, expressed syntactically.

    2. The Range of Subcategorizataion Features. To fix
ideas, we consider in turn verbs subcategorized for the
five major types of phrases headed by N, A, P, V, and I;
these phrases appear as deep structure sisters to such
verbs. We have already seen examples of transitive verbs
(+____NP) and "linking verbs" (+____AP) in (1)-(4).
    The X_0 heads of phrasal complements can be further
restricted to membership in marked subclasses; e.g., NPs
may be required to be +ANIMATE, or +PLURAL, as with the
objects of "psychological" or "distributive" predicates.
Since features "percolate" from heads to phrases, placing
this associated feature with the phrase in the
subcategorization frame itself is an appropriate notation
for these restrictions. If the restriction concerns a
feature which plays a role in syntax, with Chomsky (1965)

I call the feature syntactic; moreover, I refer to such restricted frames as subcategorization, reserving the term "semantic selection" for features which play no role in regular syntactic and morphological processes.

(7)   amuse, V, +___[NP, ANIMATE]   (*amuse the storm)
      disperse, V, +___[NP, PLURAL] (*disperse the leader)

The feature PLURAL suffices to represent the restriction on distributive predicates if we lexically list "collective nouns" such as <u>crowd</u> and <u>family</u> as PLURAL, but assume that this feature does not get transferred, in for example Standad American usage, to the co-occurring DET position, the position in which PLURAL brings about plural agreement on a verb (*<u>The crowd are rushing out</u>).
     A little reflection shows that the subclassification features in frames as in (7) are less restrictions on lexical selection than conditions on felicitous interpretation; e.g., an object of a psychological predicate is interpreted as animate, of a distributive predicate as collective, etc. (<u>That didn't amuse my cold;</u> <u>Can't they disperse this wall of traffic?</u> etc.). In this light, we can treat the v̇erb <u>get</u> as +___[AP, -INHERENT], while its competitor <u>become</u> is +___[AP, +INHERENT]. These frames thus capture contrasts in interpretations that certain lexical choices render quite anamolous:

(8)   Mary got {thirsty/ warm/ ?penniless/ ?European}.
      Mary became {?thirsty/ ?warm/ penniless/ European}.

(In other terminology, +INHERENT = "individual-level" or "characterizing" while -INHERENT = "stage-level" or "state-descriptive"; I don't venture here to determine which value is marked.) This contrast between inchoative linking verbs in English entirely parallels the better-known contrast between the Spanish copulas <u>ser</u>, V, +___[AP, +INHERENT] and <u>estar</u>, V, +___[AP, -INHERENT].
     Still other subcategorization frames must be further specified according to syntactic features on their heads. As established in Jackendoff (1983, ch. 9), there are two kinds of spatial PPs, one whose head indicates a path (<u>to</u>, <u>toward</u>, <u>into</u>, <u>onto</u>, <u>from</u>, etc.) and one whose head indicates a static location. Since the latter class of "place" is distributed more freely, in various adverbial adjuncts and also as complements for certain verbs, I take it to be the unmarked realization of the category P.

(9)   The caliph {{resides/ located a monument}}
      {near/ at/ above/ *toward/ *onto/ *from} the oasis.

Verbs such as <u>reside</u> and <u>locate</u> are thus represented, respectively, +___[PP, PLACE] and +___NP ([PP, PLACE]).

While the feature PATH of directional Ps like <u>toward</u>
and <u>onto</u> is incompatible with lexical insertion in
complements licensed by PLACE, verbs whose complements
indicate "motion or direction to or from" are listed as
in (10) and hence accept such Ps as heads. (To simplify
exposition, I abstract away from temporal and causal P.)

(10) dash, V, +___[PP, PATH]; push, V, +___NP([PP, PATH])

Most English Ps of spatial location (PLACE) double as Ps
of direction (PATH), although, in my speech at least,
some "compound" P cannot serve this function (?<u>Sam {put
flowers/ dashed} {within/ throughout} the cabin.</u>)
 Next, we must account for the fact that non-
locational Ps such as <u>of</u>, <u>since</u>, <u>without</u>, <u>despite</u>, etc.
satisfy neither type of deep structure PP frame (with
PLACE or with PATH). Some of these Ps have marked
lexical features that conflict with feature values either
specified in subcategorizations or perhaps unspecified
but supplied by markedness conventions. Nonetheless,
prepositions such as <u>of</u> or its "copula-like" counterpart
<u>as</u> (Emonds, 1985, ch. 6) may lack such marked features,
making it impossible for their insertion to conflict with
features imposed by lexical subcategorization.
 To solve this puzzle, i.e., to account for contrasts
as in (5), I suggest that grammatical prepositions which
are fully characterized by syntactic features are
inserted under P only after s-structure, that is, at
phonological form. Thus, a surface PP of the form <u>of</u>-NP
(idioms and uses of <u>of</u> as non-physical "source" aside)
derives from a syntactic structure [$_{PP}$ [$_P$ $\emptyset$] NP]; such
a PP whose head is empty can't satisfy a deep structure
frame +___PP. (I specify in the next section restrictive
conditions under which such a structure satisfies rather
an NP frame.) For the same reason, an empty expletive <u>it</u>
without an antecedent cannot, outside of idioms, satsify
an otherwise unrestricted frame +___NP.
 There are also frames of the form +___[VP,+ACTIVITY]
and +___[S, MOOD], where with Chomsky (1986), S = IP:
 (i) Emonds (1985, ch. 2) provides several arguments
that certain clausal types are not exhaustively dominated
by S, namely English participles and their Spanish
counterparts. In that treatment, participial complements
are selected by a lexical feature +___VP and, if non-
infinitival, are realized as deep structure VP sisters to
certain classes of V (namely, temporal aspect verbs and
perception verbs); cf. also the next section. In
(Emonds, 1990), such complements are still selected by
the lexical feature +___VP, and are realized in deep
structure as minimally projected phrases of selectionally
dominant V. (This latter treatment is a more complex use
of devices described in the next section for selecting

PPs with empty Ps.) Some of these "VP complements" are necessarily headed by activity rather than stative verbs, as pointed out by Lakoff and Ross (1966). Interestingly, exactly as the notation here predicts, this restriction, expressed by the frame +___[VP, +ACTIVITY], never arises with finite S complements whose head is I rather than V.

(ii) I argue in Emonds (1985, ch. 7) that the subordinating conjunction category P takes S complements (via the feature +___S) without the presence of an intervening COMP (=C), and quite plausibly this same feature for "COMP-less" S complements can appear with V as well. Candidates for such "bare S" complements to V include English "raising-to-object" infinitives that lack overt C and select non-tensed I, and French subjunctive clauses, which are similarly analyzed in Rochette (1988), whose I must be of specified (subjunctive) form.

In conclusion, this section has argued that the syntactic frames available in the lexicon are of the form (11), where Y = N, V, A, P, I.

(11) +___[YP,+F], where F is a feature of the category Y.

3. The Satisfaction of Subcategorization Features.
In section 2, I proposed that purely grammatical prepositions such as <u>of</u> and <u>as</u> are lexically inserted only at phonological form--that the syntactic form of the phrases which they head contains an empty P through s-structure. Under certain circumstances, such PPs satisfy an NP complement subcategorization feature. Take for example the verb <u>elect</u>, which is +___NP NP (<u>elect Ann the treasurer of the club</u>). Assuming a similar frame for the derived nominal <u>election</u>, we nonetheless find grammatical Ps in the resulting nominalizations: <u>the election of Ann as the treasurer of the club</u>. More generally, I argue in Emonds (1985, ch. 1) that phrasal arguments are subject to a licensing condition that can be formulated as (12):

(12) Any subject or complement argument phrase must be a sister to a potential case-assigner: V, P, I, or D.

It follows from (12) that an argument of a lexical N or A cannot be a direct sister of that item, but must satisfy the subcategorization for that item somewhat differently, along the following lines:

(13) Definition. C constitutes D iff all lexical material under D is under C. (Clearly, C constitutes itself.)
(14) Frame Satisfaction. A YP in a tree satisfies a frame X, +___YP iff YP constitutes a sister of X.

Using these concepts, we see that the structure in (15) satisfies the frame +___NP NP.

(15)

```
                        N¹
         N            PP              PP
      election     P      NP       P      NP
                   ∅     Ann      ∅    treasurer
```
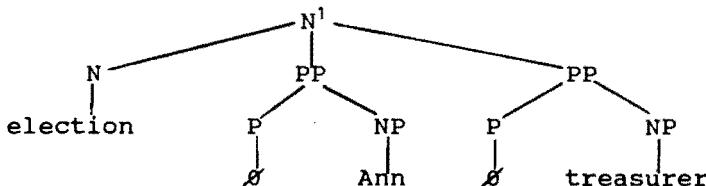
The following principle of economy of representation
insures that superfluous structure is not introduced when
sister constituents are available for Frame Satisfaction.

(16) Minimal Structure.   Satsify lexical frames with as
     little structure as possible.

By virtue of (16), the extra structure in (15) for Frame
Satisfaction allowed by (13) and (14) comes into play
only when some principle of grammar such as (12) makes
sisterhood of head and complement impossible.
     Problematic co-occurrence restrictions in structures
other than nominalizations can be handled similarly. For
example, these principles predict the choice between
English infinitives and participles of obligatory
control.   In Emonds (1985, ch. 2), I argue that the
minimal realization of the lexical frame +___VP is a
present participle (V+<u>ing</u>), corresponding to Spanish
V+<u>ndo</u>. The Theta Criterion then allows structures as in
(17), where arrows indicate theta-relations.

(17)a.   S   b.   V¹
       NP ←   VP   V   NP   VP
      John   V → VP   hear   N   V
             resumed lighting up   oxygen exploding
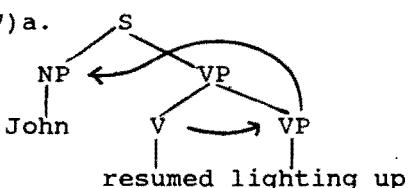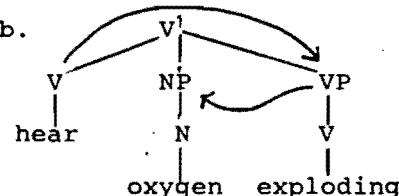
In (17a), the subject NP fails to receive a theta role
from the aspectual verb and so may receive one from the
lower VP; in (17b), the object NP fails to receive a role
from the perception verb and so may receive a theta role
as the subject of the following VP.   (A generalized
definition of subject, a revised Theta Criterion, and
their implications are discussed in the study cited.)
     However, if verbs of these classes are replaced by
ones which assign theta roles to all arguments, then VP
complement structures violate the prohibition against one
NP receiving theta roles from two verbs.   In this case,
the +___VP frames must be alternatively satisfied via
(14) by deep structure VP that constitute infinitival S
sisters to the verbs. (As justified in Lobeck (1986),
infinitival <u>to</u>, like the grammatical P under study here,

is not inserted until PF.) Then, the Theta Criterion is
no longer violated, as the arrows in (18) show.

(18)a.
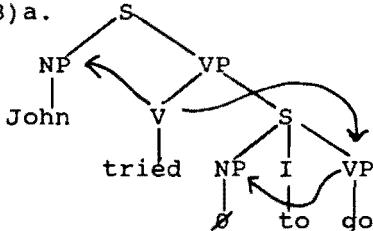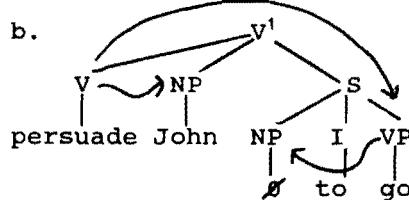
A third problem solved by extending "satisfying
subcategorization" to nodes that constitute sisters is
the distribution of obligatory control. The subject NPs
induced within Ss in (18) are, by Minimal Structure (16),
minimally specified and hence empty. (Their antecedents
must of course be independently determined, just as in
competing accounts.) We will see further instances below
of empty infinitival subjects being introduced this way;
a more complete treatment is found in Emonds (1990).
    Let us now return to a "loose end" of section 1, the
issue of how to list an indirect object frame containing
an introductory P, as in (3). The P to appears too often
in these frames to be considered idiomatic; cf.(4). More
likely, an indirect object with such a prototypical PATH
preposition represents a widespread universal frame
+___PATH^NP. But this latter notation would suggest that
such frames allow any P of PATH, again incorrect.
    Conclusion (11) of section 2, that lexical frames
have the form X, +___[YP, F], stipulated that F be a
feature of Y. Let's drop this restriction, and use a
frame of the form +___[NP, PATH] for indirect objects;
now F is not necessarily a feature on Y; rather, Y may be
a feature on any phrase constituting a sister to X.
    Suppose further that the P to, like of and as
treated earlier, is a grammatical element fully
characterized by a lexical entry which operates at PF:

(19) to, P, PATH, +___{NP$_{oblique case}$, PP}

According to (19), the deep structure of an NP introduced
by to can be [$_{PP}$ [$_{P,PATH}$ $\emptyset$] NP].
    But now, such a PP satisfies the indirect object
frame X, +___[NP, PATH] by (14), because the NP dominates
the only lexical material under a (PP) sister of X.
Furthermore, such a representation of indirect objects
satisfies the requirement on arguments (12), even when X
= N or A. And since PATH is a feature on the PP sister
to X constituted by the indirect object NP, this PP
satisfies the indirect object frame minimally (16). That

is, no structure outside of NP is used to satisfy the frame, except the feature appearing in the frame itself and a head which hosts this feature, P. Thus, indirect objects are generated by a subcategorization frame X, +___[YP, F] of exactly the same form as the more familiar subcategorizations discussed in the first sections.

This device can now solve other problems in stating lexical co-occurrence restrictions, for instance, the syntactic selection of indirect question complements. Emonds (1985, ch. 7) argues that introductory C with features such as WH are nothing but empty syntactic Ps filled at PF. These empty Ps provide landing sites for movement, explain gaps in the distribution of [P + S], eliminate cross-linguistic syncretisms (e.g., French and Spanish _si_ have the same "COMP / P" dichotomy as English _if_). Thus, indirect questions have the deep form (20):

(20) finite: [$_{PP}$[$_{P,WH}$ $\emptyset$] S]; infinitival: [$_{PP}$[$_{P,WH}$ $\emptyset$] VP]

These structures, according to principles (14) and (16), now satisfy the minimally specified frames in (21):

(21) finite: +___[IP, WH]; infinitival: +___[VP, WH],
     where WH is a feature on C (or P, provided C = P).

All the advantages of representing C as an empty P are expressed, indeed predicted, by Minimal Structure (16).
     In addition, since WH can only be a sister to S, the +___VP frame necessarily generates a deep structure (22):

(22)
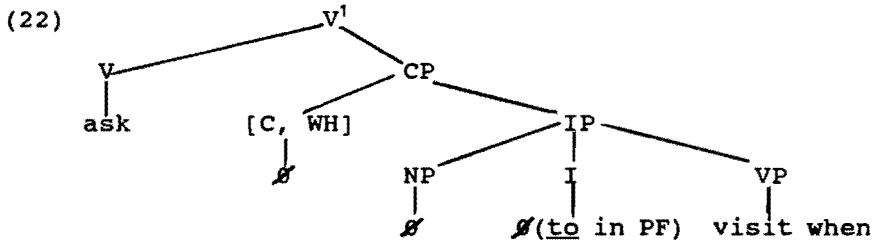
Since the subject NP in (22) must be empty by (16), the well-known fact that infinitival indirect questions require obligatory control follows with no stipulation.
     Another positive effect of relaxing the requirement on [YP,F] that Y be a feature on F concerns the selection effected by V, +___[PP, PATH]. Besides the usual interpretation, whereby PATH is a feature on the lexical head of the PP satisfying the subcategorization, (14) permits an alternative structural interpretation (23).

(23)

$$V^1$$

```
        V                    [PP, PATH]
        |
      dash            [P, PATH]            PP
                          ↓                 |
                          ∅          behind the barn
```
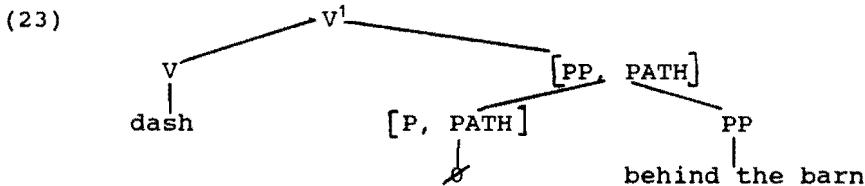
As observed in Jackendoff (1983), the Ps <u>to</u> and <u>from</u> can
be followed by PP as well as by NP (<u>She dashed {to/ from/</u>
<u>*into/ *toward} behind the barn</u>). These P are among
those inserted here at PF by frames like (19), and hence
can realize s-structures like (23). But, by (14), (23)
also satisfies the deep structure frame <u>dash</u> +___[PP,
PATH] with no stipulation; further, if the lower PP has
the feature PLACE rather than PATH, (23) is the minimal
structure to satisfy it. On the other hand, if the lower
PP itself has the value PATH, then (23) is <u>not</u> minimal,
and (16) correctly rules out the structure: <u>I dashed {to/</u>
<u>from} ({*toward/ *into/ *onto}) the barn.</u>
     Finally, how might the lexicon distinguish (24a-b)?

(24)a.I {regarded/ classified} Mary *(as) {happy/ ill}.
    b.I {considered/ declared} Mary (*as) {happy/ ill}.

In a study of non-comparative <u>as</u> (Emonds, 1985, ch. 6),
I conclude that <u>as</u> is a P with properties of a copula,
i.e., it fails to assign abstract case to an obligatory
NP or AP complement. (The "comparative preposition" <u>like</u>
has the same property.) Like the copula, <u>as</u> is a
syntactic element that can be inserted at PF. If we use
the lexical frame +___NP [AP, P] for predicates as in
(24a), appropriately generalized to attributes of both NP
and AP form, this gives rise to the structure (25):

(25)

$$V^1$$

```
        V          NP              PP
        |          |             /    \
     regard      Mary           P      AP
                               |       |
                               ∅     happy
```
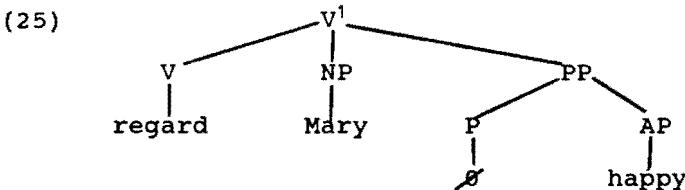
The PP in (25) is the minimal constituent which, as the
frame for <u>regard</u> requires, is both constituted by an AP
<u>and</u> is itself a phrase with a feature P.
     This section has introduced the use of a lexical
frame X, +___[YP, F], where F is a feature on some ZP
constituting a sister of X. We have seen how such frames
permit many recalcitrant co-occurrence restrictions to be
elegantly expressed in a format that is exactly that of
classically recognized frames such as +___[NP, ANIMATE].

4. A Two-sided Case Filter. The preceding section has shown that, even abstracting away from distinctions among syntactic subclasses of YP such as [NP, ANIMATE] or [PP,PATH], there are still essentially ten different phrasal subcategorizations for complements. A phrasal complement may be selected from among the five "bare" YP, for Y = N, A, P (of PLACE), V (participles), and I (for sentences not in a CP), and in addition, from these five types further specified for "introductory" syntactic features on empty P, like [NP, PATH] (indirect objects), [VP, WH] or [S, WH] (indirect questions), [PP, PATH] (e.g. to/ from (behind) the barn), and [AP, P] (an as-phrase). Additionally, a single head X sometimes has two phrasal complement sisters. But these two options yield one hundred different two-phrase complement combinations, assuming the two positions can be chosen independently.

This evidently provides too much choice among frames available for lexical entries. For example, in English at least, an NP complement of a VP-initial verb cannot be separated from the V by another full phrase, except when optional reordering of "heavy" direct objects at the end of the VP takes place. (For a transformational analysis of double object constructions with prepositionless NPs, see Emonds, 1976.) That is, no complement combinations are licensed by features such as +___YP-NP which are distinct from +___NP-YP. Provided we allow +___NP-NP, this eliminates nine (of one hundred) choices.

To formally express this kind of limitation, we can call on abstract case theory. If we say that NP sisters to a V must receive an abstract case only if no maximal ZP intervenes between the case-assigning element and the NP assigned case, this eliminates the ten possible frames +___[YP (+F)] NP, where F is a feature on P. In Emonds (1985, ch. 1), I argue for this (underlined) formulation of an "Adjacency Condition" on case assignment, which modifies Stowell's (1981) more stringent and I think incorrect proposal that requires absolute adjacency.

However, this proposal has now wrongly eliminated the double NP frame +___NP NP exemplified in (26), traditionally referred to as "secondary predication".

(26) Some call the major parties allomorphic variants.
Many voters considered the system no system at all.
The florid judge declared the pregnant woman's addiction a capital crime.

We return to how to express a double NP frame below. But first note that neither the theory of case assignment itself nor competing proposals for lexical listing exclude other double YP frames of the following sort:

(27) +___AP AP:*They consider less expensive very chic.
　　　+___VP VP:*I prefer to visit N.Y. going out locally.
　　　+___VP [S,WH]:*We preferred to visit N.Y. how often
　　　　　　　　　　you go to Paris.
　　　+___[S,WH] S: *We judged how often John came here
　　　　　　　　　　that he was homesick.
　　　+___[PP,PLACE] [PP,PATH]: *John put within the desk
　　　　　　　　　　　　　　　　　into the hallway.
　　　+___AP [PP,PATH]: *Mary felt proud onto the stage.

　　　With respect to examples as in (27), I stress that
the issue is not whether particular predicates appear
with the frames listed. Rather, such frames are simply
not available for any verbs, in spite of their semantic
plausibility. (This semantic plausibility is illustrated
by the fact, itself irrelevant for formal grammar, that
some of the frames can be paraphrased with slight changes
effected by using grammatical prepositions such as to or
by and/or nominalizations of verbs and adjectives.)
　　　It might be thought that imposing an abstract
restriction to binary branching excludes complement
combinations such as (27). But such a restriction must
still allow the occurring combinations. However one
sanctions these good combinations (e.g., look sick to me,
suggest to him how Mary did it, persuade Sam to leave),
say by free binary combinations inside a special category
called "small clause", the issue of how to account for
the discrepancy between these and the excluded
combinations in (27) simply arises in another guise.
　　　So a general question can be posed: how can we
generalize the mechanisms of abstract case to exclude
frames of the type in (27), as well as many other such
double frames? Under usual assumptions, which are
justified by observing morphological realizations of
abstract case in various languages, the phrasal types
that appear in (27) are arguably "caseless". That is,
abstracting away for a moment from predicate nominals,
arguments of verbs seem to fall into four classes:
external or subject arguments, direct object NPs, oblique
object NPs of lexical or grammatical prepositions
(including NP gerunds and indirect questions), and non-NP
arguments. (In some languages, finite clauses receive
case and appear in NP positions.) But of the non-NP
types, any given verb seems to take at most one internal
argument. If we say that an argument, including a PP
with an empty s-structure P, is "positively specified for
case" if it either exhaustively dominates or constitutes
an NP with abstract case, and that otherwise an argument
is "negatively specified for case", we can propose the
following extension of the usual Case Filter of Rouveret
and Vergnaud (1979):

(28) Two-sided Case Filter:
    (i) At Phonological Form, any phonologically
    specified NP and AP must have Abstract Case.
    (ii)At Logical Form, internal arguments YP of a head
    X are each specified differently for Abstract Case.

Actually, (28ii) must hold at s-structure, since there is
no case assignment between s-structure and logical form.
    It can be easily verified that the frames in (27),
and indeed many others, are now excluded by the "LF side"
of the Case Filter. In fact, the apparently correct
consequence of (28ii) is that internal arguments of an X
may consist of a single direct object abstractly marked
accsuative, a single "indirect object" introduced with a
grammatical or lexical P and abstractly marked oblique,
and a single VP, PP, AP, or S unspecified for case. In
addition, if some process assigns case to NPs and APs
between s-structure and phonological form, then such YPs
count as "unspecified for case" for the "LF side" of the
Case Filter (28ii), while at the same time they fully
comply with the "PF side" (28i); we return in the next
section to the unique universal process of this sort.
    Two final remarks: (i) There is never a difference
between the frames +___C D and +___D C (although factors
such as the Adjacency Condition can determine surface
order); that is, subcategorization frames do not specify
linear order. (ii) Phrasal ternary branching doesn't seem
to occur in English, i.e., three fully phrasal syntactic
complements are excluded (N. Chomsky, pers. comm.):

(29) *He made the guests the special sauce sweet.
    *We judged Sam the task a big bother.
    *She knocked John the book from the hand.
    *I found Mary her thesis lying beneath some papers.

    Although space precludes a full discussion, all the
possibilities allowed by the Two-sided Case Filter seem
realized somewhere in the space of lexical predicates.
Besides predicates with single YP complements, others
exist with YP plus an additional indirect object, and
still others exist where direct object NPs accompany the
various choices for YP. Thus, the range of predictions
made by (28) is nicely verified empirically. In this
way, a significant step is taken toward a goal of any
theory of lexical representation, that each possibility
provided by the formalism expressing lexical distinctions
is either realized, or is excluded on principled grounds.

    5. The Case of Predicate Attributes. So far I have
glossed over the fact that, if Indo-European languages
with productive morphological case-marking are taken as
indicative, predicate nominals modifying objects as in

(26) and subjects as in (30) also receive case. In most
of these languages (e.g., Classical Greek, Latin, Slavic
but not German), (underlined) predicate adjectives as in
(31) and (32) also receive morphological case.

(30) Mary became a chiropractor.
     Sam has always been a brother to me.
     John left the party my friend.
(31) Some call the economic reforms catastrophic.
     Many voters considered the system undemocratic.
     The florid judge declared the future mother guilty.
(32) Mary became obsessed.
     Sam has always seemed angry to me.
     John left the party thirsty.

     Predicate attributes of both sorts, NPs and APs,
typically receive the morphological case of the NP they
modify. Thus, predicate attributes modifying a direct
object as in (26) and (31) receive accusative case not
from the governing verb, but from the object itself; as
evidence, traditional grammar cites the fact that when
this object is passivized, the post-verbal attribute
surfaces with the same nominative case as the deep
object. Or, in non-finite counterparts to constructions
like (30) and (32) whose subject is in some oblique case,
a predicate nominative modifying that subject will appear
with that same case. (Nonetheless, in some languages in
some configurations, an attribute may receive some non-
agreeing oblique case from what I take to be an empty P.)
     From this I conclude, exactly as traditional grammar
states, that predicate attribute NPs and APs receive case
via agreement with the NP they modify. In this way, the
double frame +___NP NP exemplified in (26) is licensed
because the second NP receives its case from the first.
I propose that this agreement, which is a "second way" of
receiving case, occurs after s-structure before PF, but
that otherwise it is subject to the same conditions as
syntactic case assignment under government.

(33) (i) Abstract Agreement in Case, Number, Gender is
     assigned to $[+N]P_i$ (NP or AP) by a Case-assigner NP_i.
     (ii) Adjacency: a Case-assigner must c-command the
     phrase assigned Case and not be separated from it by
     a phonologically specified maximal projection.

Abstract Agreement as formulated in (33i) is based on the
syntactic co-indexing present at s-structure,, though the
co-indexed case-assignee is still caseless at this level.
     A number of interesting predictions now follow from
this formulation of predicate attribute agreement.
     (a) Being caseless at s-structure, predicate
attribute NPs and APs satsify the "LF side" of the Case

Filter (28ii) as arguments which are "unspecified for case". Thus, a predicate attribute inside a VP (i.e., one that is not an adjunct) can co-occur with either a direct object or an indirect object, but not with a full phrasal PP, AP, or clausal complement.

(b) When a predicate attribute argument occurs with a direct object, this object is next to a VP-initial V, so as to be accessible to the V under general conditions for receiving case (33ii). Therefore, it is correctly predicted that a predicate attribute must follow a direct object and further that this object NP blocks agreement with the subject; consequently, the attribute can only agree with (= receive case from) a preceding co-indexed direct object. This agreement and the correlated semantic interpretation based on the co-indexation explicates the traditional notion of "secondary predication" in (26).

(c) When a predicate attribute occurs with an indirect object, it cannot be c-commanded by or agree with this object, due to the PP structure over the latter. Therefore, the attribute can agree with and modify (via co-indexation) only the subject NP. But then, the Adjacency Condition on case assignment as formulated in (33ii) prohibits the indirect object from intervening between the verb and the attribute. Thus, the system here correctly predicts observed orders:

(34) John became {a brother to us/ *to us a brother}.
     Mary appears {unstable to Sam/ *to Sam unstable}.

(d) With respect to the theta-roles of attributes, it appears that these phrases are never construed as the central "theme" involved in the state or activity expressed by the verb. Since the predicate attribute has no abstract case at deep structure, s-structure, or LF, I incorporate this important limitation in the general principle for interpreting the theme in Emonds (1991).

(35) Assign the Theme (= Figure) role to any NP argument case-marked ("visible") at s-structure (i.e. at LF).

(e) The Principles of Disjoint Reference (B and C of the Chomsky's Binding Theory) should apply only to NPs which are case-marked at logical form, that is, to NPs with case at s-structure and not to predicate attributes. This explains why, if predication and coreference indices are parsimoniously assimilated, predicate attribute XPs are exactly those violating disjoint reference.

A final confirmation that Agreement (33i) applies "at PF" and not at s-structure involves languages which morphologically mark case but not agreement, such as, to use a well-known example, Japanese. Suppose morphological agreement is related to abstract agreement much as overt

morphological case is related to abstract case. <u>All</u> <u>languages then have abstract agreement</u>, which is realized phonologically only in "agreement languages". In "non-agreeing languages" where (33i) has no morphological effects, predicate nominals should exhibit either no case-markers (these being limited to NPs marked for case under government), or some non-agreeing oblique case, as sometimes occurs even in languages with morphological agreement. Exactly these options occur with Japanese predicate nominals; the copula takes a "caseless" NP and other linking verbs take obliquely marked attributes.

The predictions (a)-(e), and the one for Japanese predicate nominals, all confirm that the Two-sided Case Filter (28) and the PF Agreement Principle (33) are, taken together, the appropriate way to flesh out abstract case theory. With such theoretical tools, the system of lexical subcategorization in sections 1-3 provides a range of formal features for contextual selection that are all either realized with interesting sub-classes of predicates, or excluded on principled grounds.

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The Syntax and Semantics of Null Objects in Basque Spanish
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1. <u>Introduction</u>. Most of the literature on null objects in Romance languages, such as Rizzi (1986), Authier (1988) and related work, has focused on determining the categorial status of these empty constituents. There are two competing analyses in this regard which read as follows: (a) null objects are variables bound by abstract operators; (b) null objects are instances of *pros*. Thus, Raposo (1986), Campos (1986) and Authier (1988) subscribe to the former in regard to European Portuguese, Spanish and French respectively, whereas Rizzi (1986) for Italian and Farrell (1990) and Maia (1991) for Brazilian Portuguese subscribe to the second one. This paper shows that the two hypotheses are not mutually exclusive, if we consider, unlike the investigations above, that the possibility of having both types of empty categories in a single language depends on the existence in that language of the two basic kinds of semantic interpretation that null objects may have, i.e. arbitrary and referential interpretation. Interestingly Basque Spanish (the variety of Spanish spoken in the Basque Country) provides evidence for the need of a distinction of null categories based on their interpretation since this variety makes a syntactically and semantically defined cut between arbitrary and referential null objects, as far as their possibilities of occurrence are concerned. This point is partially illustrated by (1), (2) and (3), which show how the verb tense only affects the grammaticality of sentences with arbitrary null objects:

(1) La diabetes deja e_{arb} ciego. (Basque Spanish)
    Diabetes leaves e_{arb} blind.
(2) *La diabetes dejó e_{arb} ciego.
    Diabetes left-Pret e_{arb} blind.
(3) El domingo limpié el coche$_i$, pero ayer Juan
    Last Sunday I-cleaned the car$_i$, but yesterday Juan
    dejó e_i sucio otra vez.
    left-Pret e_i dirty again.

In this paper, we first demonstrate that the asymmetries in syntactic behavior between arbitrary null objects and referential ones are due to their different status as empty categories. Specifically, we claim that, in Basque Spanish, arbitrary null objects behave like variables bound by an abstract operator, whereas referential null objects behave like *pros*. Second, we provide an analysis that accounts for the licensing and semantic identification of these empty categories, which are the two necessary conditions to fulfill the Theta Criterion and the Projection Principle.

2. <u>**A foreword on the data**</u>. In regard to our examples containing arbitrary null objects, we have avoided imperatives, middle

constructions, and above all, instances in which the object theta-role of the verb could be lexically saturated since the semantic content of the null object is implied in the semantics of the verb. We stick to constructions in which the structural presence of the null object category -- specifically, control structures and small clauses selected by causative verbs for arbitrary null objects -- has been attested in previous works, such as that of Rizzi (1986) for Italian and Authier (1988) for French. Both authors devote a great part of these works to discriminate true null arguments from implicit ones. In this sense, our work benefits from these two authors.

The data on referential null objects on the other hand are totally novel as far as Peninsular and most Latin American dialects of Spanish are concerned[1]. The latter data were first attested in Landa (1990).

Finally, from a descriptive point of view, null objects of arbitrary interpretation cannot occur with verbs in the Preterite and, in Spanish, are restricted to [+human, +singular, +generic] entities. Referential objects do not have any tense constraint on the verb, however, their antecedent must generally be [-human] in Basque Spanish. In this paper, we will account for these facts.

3. Variable null objects and pro null objects. The Principles and Parameters framework has a number of tests to verify whether an empty category is a variable or a pronominal. Here, we are going to employ mainly two tests that capture syntactic phenomena that seem to be at work in Spanish, that is, Weak Crossover and Principle C of the Binding Theory.

The Weak Crossover Constraint states roughly that variables may not be coindexed with a non c-commanding pronominal element to their left. This effect is illustrated in Basque Spanish by (4):

(4) *¿A quién$_i$ vio su$_i$ madre e$_i$?
    whom$_i$ saw his/her$_i$ mother e$_i$?
    Whom did his/her mother see?

Thus, if null objects of arbitrary interpretation are variables bound by an abstract operator, we should expect them to be subject to the Weak Crossover Constraint, as it is the case in (5):

(5) OP$_{arb}$Su$_{i/*arb}$ guisado deja e$_{arb}$ con ardor de estómago.
    His/her$_i$ stew leaves e$_{arb}$ with heartburn.

Notice, moreover, that if the arbitrary null object is coindexed with a pronominal to its right, we destroy the input for the application of the Weak Crossover Constraint, as in (6):

(6) Este motor BMW de 24 válvulas incita e$_{arb}$ a admirar
    this motor BMW of 24 valves incites e$_{arb}$ to admire
    su$_{i/arb}$ motor como nunca.
    his/her$_{i/arb}$ motor as never-before.

The second part of our claim, that is, null objects of referential interpretation are *pros* in Basque Spanish, is also substantiated by the absence of Weak Crossover effects in these sentences, as illustrated in (7):

(7) A: ¿Qué hace   ese coche$_i$ tanto tiempo   aquí?
       What is-doing that car$_i$ such-a-long-time here?
    B: No sé.   Su$_i$ dueño trajo   e$_i$ para arreglar
       I don't know. Its$_i$ owner brought e$_i$ to   fix
       y   no hemos sabido más   de él.
       and we haven't heard any-more from him.

The same asymmetries between arbitrary null objects and referential ones are found with respect to Principle C of the Binding Theory, as shown in (8) and (9):

(8)   El libro$_i$ te   fue mandado para que pro$_k$ leas
       The book$_i$ to-you was sent   so   that pro you-read
       e$_i$ y   nos des   tu opinión.
       e$_i$ and to-us you-give your opinion.
(9)   En esa fábrica es   necesario PRO$_k$ hablar de PRO
       In that factory it-is necessary PRO$_k$ to-talk of PRO
       obligar   e$_{i/*k}$ a PRO trabajar más duro.
       to-oblige e$_{i/*k}$ to PRO work   harder.

Due to Principle C, when the arbitrary null object in (9) is bound from an A-position (PRO$_k$), the sentence becomes ungrammatical, since variables must be A-free everywhere according to the Binding Theory. Contrastively, sentence (8) is not subject to Principle C, since the referential null object is a pronominal and the disjointness effect is only required in the governing category of the pronoun.

4. On the nature of the abstract operator. With respect to the relation between the abstract operator and the arbitrary null object, we are going to adopt Authier's (1988) analysis for French, according to which arbitrary null objects are identified by an abstract operator but are not a trace of such an operator. Therefore, since the relation between the null object and its identifier is not the result of movement, sentences with arbitrary null objects are immune to constraints on syntactic movement at the level of Logical Form, as shown in (10):

(10) OP$_i$ [Que esta medicina deje e$_i$ atontado] me sorprende.
     OP$_i$ [That this medicine makes e$_i$ groggy] me surprises.

Sentence (10) illustrates the inoperativity of the Sentential Subject Constraint with null objects. This lack of subjacency effects -- which is parallel in French according to Authier -- is due to the fact that the operator is generated directly in the A'-position.

The quantificational properties of arbitrary null objects have also drawn the attention of Authier and Rizzi, since null objects and quantified objects exhibit opposite scope relations in interaction with negation, as shown in (11) and (12):

(11) El dinero no hace e_{arb} feliz.
    Money   not makes e_{arb} happy.
(12) El dinero no hace a todo el mundo feliz.
    Money   not makes everybody   happy.

Thus, in (11), the negation does not have scope over the null object, and this sentence means "for all x, money does not make x happy". In (12), on the contrary, the negation has scope over the quantified object, and the meaning of the sentence is "not for all x, money makes x happy". Even though the facts illustrated by (11) and (12) may look like counterevidence for any analysis that considers null objects as variables, Authier (1989) shows that the French counterparts of (11) and (12) actually support this type of analysis if one adopts Safir's (1985) treatment of negation. Along the lines of Safir (1985), the minimal scope of negation is fixed by the assignment of a +N feature to every element c-commanded by negation at s-structure. In this way, the LF representation of (11) and (12) would be (13) and (14) respectively:

(13) Null OP_i [$_{IP}$ El dinero no hace e_i feliz]
                             +N   +N
(14) A todo el $mundo_i$ [$_{IP}$ el dinero no hace e_i feliz]
         +N

Thus, under this view, since the null operator in (13), unlike the quantified NP in (14), is generated in situ, it can never receive the abstract +N feature at s-structure, thus escaping the scope of negation over it. Furthermore, Authier observes that if we modify the arbitrary null object with a generic adverb, as in (15) below, the interpretation of a quantified NP object is obtained, that is, that of (12):

(15) El dinero no hace siempre e_{arb} feliz.

Example (15) can only be interpreted as "not for all x, money always makes x happy". The contrast between (11), (12) and (15) can be explained, according to Authier's analysis for French null objects, by claiming that arbitrary null objects do not have a quantificational force of their own, but take the quantificational force of whatever is available in the sentence, that is, generic adverbs or generic tense. The latter claim brings us back to the question of what is the nature of this abstract operator and, most importantly, why this operator is selected. It is a well-known fact that adverbs of generic meaning, such as <u>frecuentemente</u> 'frequently', <u>siempre</u> 'always', <u>generalmente</u> 'generally', etc., accompany constructions with null objects, as in (15) above.

Hence, Authier equates the semantics of the null operator with that of these adverbs and characterizes the former as "null adverbial operators". However, it seems that the co-occurrence of null objects with these generic adverbs is a side-effect caused by a tense restriction on arbitrary null objects by which these empty categories can only occur in sentences which have a generic time reference. The generic interpretation of a sentence is reinforced by these adverbs, but does not depend on them at all, since these adverbs might not be realized phonologically as in (16) or, in some cases, they may appear with tenses of specific time reference as in (17):

(16) Los dulces ponen e_{arb} gordo.
     Sweets   make e_{arb} fat.
(17) Los dulces siempre le pusieron gordo.
     Sweets   always him made-Pret fat.

At this point, we depart from Authier's work, since we claim that it is not the values of Tense that entail generic interpretation (as he suggests for French), but the values of Aspect. If we are to articulate a descriptive correlation between generic interpretation and arbitrary null objects, there is no way to find the adequate feature values in the matrix of the head Tense that indicate generic interpretation. First, notice that Tense takes primarily the features [+/-finite, +/-past], so if we posit that Tense is marked with the negative value for the feature [past] in order to obtain a generic interpretation that would ultimately allow the verb to license the empty category, we account for the ungrammaticality of (18), but not for the grammaticality of (19):

(18) *Los dulces engordaron e_{arb}.
     Sweets   made-fat-Pret e_{arb}.
(19) Aquellas anfetas   de los sesenta dejaban e_{arb}
     Those   anphetamines of the sixties left-Imperf e_{arb}
     majara.
     nutty.

In (19), the verb is in the Past Imperfect and still the arbitrary null object can occur. Thus, the evidence in (19) compels us to look beyond the features of the head Tense. Furthermore, if we assume along the lines of Ouhalla (1990) and others, the existence of an aspect node within the IP node as in (20), it could be proposed that the feature [-perfective] would be responsible for the generic interpretation of the sentence. It is arresting to note that the Preterite not only clashes semantically with arbitrary null objects but is also the only tense that has the aspectual feature [+perfective] grammaticalized in Spanish (King 1991). Be that as it may, under our analysis, (16) and (19) are uniformly accounted for despite the tense difference, since the feature [-perfective] in the Aspect head licenses the variable

null object in a structure such as (20) below, and Quantificational Theory triggers the occurrence of the abstract operator to bind the variable:

```
(20)  TP
     / \
        T'
       / \
      T  ASPP
        / \
          ASP'
         / \
        ASP   AGRPo
       [-perf]  / \
              NP_arb AGR'
                   / \
                  AGRo  VP
                      / \
                        V'
                       / \
                      V    e
                      .    o
```
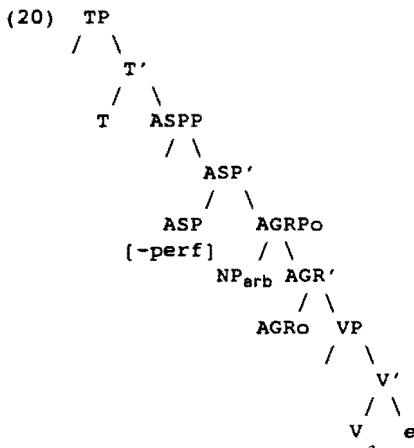
The phrase marker in (20) can be read as follows: [-perf] Aspect selects an object AGRP whose head has no features but does have a default generic interpretation. Then, the null object raises to the specifier of AGRPo, where it picks up the non-referentiality of the AGR head. At this point, even though the empty category is now formally licensed by the aspectual head under government (ECP), its lack of referentiality as a variable requires to have an abstract operator that would recover its semantic content, i.e. [+singular, +human, +generic], like in any other operator-variable A'-chain.

5. An analysis of referential null objects in Basque Spanish. As we have seen before, referential null objects in Basque Spanish do not exhibit the properties of a variable bound by an abstract operator, but those of *pro*. Moreover, they do not have any restriction on the verbal aspect either, as arbitrary null objects do. This is illustrated once more in (21):

(21) No tenemos el ordenador¡ aquí porque María no
     not we-have the computer¡ here because Maria not
     devolvió   e¡ a tiempo como prometió.
     returned-Pret e¡ on time as she-promised.

Now, if there is no operator binding these referential null objects, nor an identifying overt morphology, there must be a disguised mechanism that is able to recover the semantic content of these empty categories -- *pros* -- in order to make them linkable to the object theta-role of a verb such as <u>traer</u> 'to bring' in (21), for instance. Even though the referent of the null

object can be picked from the previous clause, as in (21), or from
the immediate extralinguistic context, the null object has to be
identified independently of the location of its antecedent. In
this regard, due to the fact that null objects are limited to
third persons, Farrell (1990) proposes for Brazilian Portuguese
that *pro* is intrinsically specified as [+3rd person]. We cannot
adopt Farrell's proposal for Basque Spanish, since it will
erroneously predict that all [+human] referential null objects are
possible in Basque Spanish without an identifier clitic. Still,
Farrell's proposal for Brazilian Portuguese could capture a fact
about Basque Spanish object pronominals, that is, as long as the
value of the feature [person] is identified (normally by a
clitic), null objects are permitted.

There is some language internal and cross-dialectal evidence
that supports the view that [person] is the relevant feature for
the object clitic paradigm. For instance, in some Caribbean
dialects third person object clitics, lo 'him', la 'her', los
'them (masc.)', las 'them (fem.)', le 'to him/her' and les 'to
them', have been subsumed under the form le. Also in colloquial
Chilean Spanish, the singular le and plural les have merged into
the single form le. In standard Spanish, the number distinction
between le and les is neutralized in the form se when followed by
an accusative clitic. So, it seems that the feature [number] is
factored out at some point (let alone the feature [gender] in
leísta dialects).[2]

Bearing this in mind and assuming that, first, clitics are
generated in situ and identify an object *pro* along the lines of
Jaeggli (1982, 1986) and, second, that the clitic paradigm
constitutes the inflectional system for the objective conjugation
of the verb in Spanish, as claimed by Borer (1984), Suñer (1988)
and Franco (1991) in the generative framework, the non-realization
in Basque Spanish of an overt identifier, i.e., a clitic for
inanimate referential null objects, can be accounted for by
positing the existence of a zero morpheme/clitic that co-occurs
with an overt clitic for third person objects. In other words,
this zero morpheme would only be specified as [−animate, +3rd
person]. These two default abstract specifications should be
enough to identify all referential null objects in Basque Spanish.
In this way, the proposed clitic paradigm in this paper for Basque
Spanish would be as in (22):

(22)

	singular	plural
1st p.	me	nos
2nd p.	te	os
3rd p. [+anim]	le	les
3rd p. [−anim]	ϕ/lo/la	ϕ/los/las

Notice that independently of the phenomenon of null objects, the
split between third person clitics with an animate referent and
third person clitics with an inanimate one, already exists in the
language since Basque Spanish is a partially *leísta* dialect.[3]

6. Theoretical considerations about the zero-morpheme and evidence of its existence. The label zero clitic or zero object verbal agreement morpheme can only be understood here as a cover term that stands for the non-phonological realization of syntactic features on the member of the clitic paradigm that corresponds to inanimate objects. How is this absence of phonological features possible? It is legitimate to claim that object agreement in Spanish is strong or rich, in the sense that gender, person, number and, sometimes, animate distinctions, are established in the paradigm. These distinctions also happen to follow a hierarchy of preference depending on the Spanish variety we may be dealing with, as shown in the dialects above mentioned and additionally by the phenomena of *loísmo* and *laísmo* (see note 2). In regard to Basque Spanish, our position is that due to the strong nature of Spanish object-verb agreement and the special arrangement of oppositions among the classes of features in this dialect, clitic forms with inanimate reference are allowed to have meaningful null phonological realizations.[4] That is to say, the composition of this zero morpheme consists of a syntactic set of features lacking a phonological matrix at PF. In the spirit of Chomsky (1982) and Pollock (1989), we also claim that languages with weak agreement like English are unlikely to have the option of a 'zero morpheme'.

In the rest of this section, we will see, in the light of two phenomena, to what extent it is worth positing a 'zero morpheme' in the DO clitic paradigm instead of having no morpheme at all. For instance, it is a well-known fact that Romance clitics do not license parasitic gaps (cf. Kayne 1975) which, at first sight, seems to be the case in Basque Spanish, as (23) shows:

(23) */???María quería invitarle$_i$ e$_i$ sin   conocer e$_i$.
      Maria wanted to-invite-him$_i$ e$_i$ without knowing e$_i$.

However, Kayne's generalization would not hold for Basque Spanish clitics with inanimate reference as illustrated in (24), unless of course we posit the existence of an abstract realization of the feature [3rd person] for the object on the verb <u>probar</u> 'to try':

(24)   María quería comprar(lo$_i$) e$_i$ sin   probarϕ_i e$_i$.
        Maria wanted to-buy-it$_i$ e$_i$ without tryingϕ_i e$_i$.

In other words, if we took the (alternative) position that there is no morpheme at all, the grammar of Basque Spanish would need to have a supplementary clause addressing the issue of animate/ inanimate distinctions in the clitic licensing of parasitic gaps.

The second phenomenon that may shed some light on the existence of a zero clitic/verbal morpheme for inanimate DOs is that of clitic doubling. Clitic doubling with objects as illustrated in (25) is quite common in Basque Spanish. However, it just fails to apply in those cases where the doubled NP object is an inanimate entity, as shown in (26), that is to say, in the same cases in which the object can have a null realization:

(25) Le$_i$ he   visto a Pedro$_i$.
     him$_i$ I-have seen   Pedro$_i$.
(26) (*La$_i$) he   visto la casa$_i$.
     it$_i$ I-have seen the house$_i$.

Again, if we assume that inanimate DO-NPs take a zero clitic, the phenomenon of clitic doubling could naturally be deemed as an exceptionless fulfillment of object-verb agreement relations by means of the object clitic paradigm. In this way, Basque Spanish object *pros* that take inanimate referents may concord with a 'zero-morpheme' specified as third person, whereas object *pros* with animate reference concord with the clitic le.

In sum, our positing of a 'zero morpheme' gives us some explanatory advantages for Basque Spanish in the sense that we do not have to elaborate a dialect specific analysis for inanimate direct object NPs.

Suffice it to say, null objects are not categorical and there is variation within the language, this being a typical feature of agreement relations. Despite the possibility of not having a sheer uniformity as far as the morphophonological realization of the identifying head for object *pros* is concerned, there seem to be two contexts which particularly favor the occurrence of the zero clitic/verbal morpheme, or what we have been calling referential null objects. The two contexts pointed out in Landa (1990) are direct objects of ditransitive verbs and direct objects whose referent is a clause, as (27) and (28) illustrate:

(27) No tengo aquí el libro$_i$ pero te   prometo que
     Not I-have here the book$_i$ but to-you I-promise that
     la próxima semana te   traigo e$_i$.
     the next   week to-you I-bring e$_i$.
(28) Tengo que [comprar un taladro]$_i$ pero no hay
     I-have to [buy   a drill]$_i$ but not there-is
     prisa, si no puedo hacer e$_i$ hoy no importa.
     hurry, if not I-can do   e$_i$ today not it-matter.

The lack of variation or, most relevantly, the generalization in the use of the zero verbal morpheme in these contexts in Basque Spanish follows straightforwardly from the specification of the morpheme, since clauses and, with a few exceptions, direct objects of ditransitive verbs are always [-animate, +3rd person].

7. The recovery of features and the parametrization of licensing heads. Rizzi (1986:546) proposes that "*pro* is formally licensed through Case assignment by a designated head. The membership of the set of licensing heads defines a parameter whose values range from the empty set (...) to the set including all the Case assigning heads". English, for instance, would have no licensing heads, whereas Italian would have Infl and V as possible licensing heads of *pro*. As for the identification of the phi features, Rizzi claims that it "is done through (non-standard) binding from the

licensing head (p. 547)". In this way, the arbitrary interpretation of object *pro* in Italian would be sanctioned through an *arb* slot in the theta-grid of the verb which is, according to Rizzi, the licensing head of object *pros* in that language. Rizzi also argues that Theta Theory and ultimately the nature of the theta-grid of the verb are crucial for the semantic recovery of *arb* null objects in Italian. In broad lines, Rizzi distinguishes two types of themes and shows that Theme-roles that are unaffected by the verb action cannot function as arbitrary null objects in Italian. This phenomenon, known as the Affectedness Constraint, is illustrated by the contrast between (29) and (30) ((79) and (80) in Rizzi (1986)):

(29) Gianni fotografa e_{arb} nudi.
     Gianni photographs e_{arb} nude.
(30) *Gianni vede e_{arb} arrabiati.
     Gianni sees e_{arb} angry.

Interestingly, Maia (1991) has also observed some Affectedness Constraint effects for referential null objects in Brazilian Portuguese. In this regard, he states in relation to the contrast exemplified by (31) and (32), that only "sentences in which affected theta-roles are assigned allow null objects to be anteceded by an element in A-position":

(31) Maria$_i$ não quer que você fotografe e_i nua.
     Maria$_i$ not want that you photograph e_i naked.
(32) *João$_i$ disse que Maria viu e_i.
     João$_i$ said that Maria saw e_i.

Basque Spanish, on the other hand, does not exhibit any effects of this Affectedness Constraint for constructions with referential null objects, as (33) illustrates, which suggests that this variety utilizes a recovery procedure for object *pro* features independently from theta-roles:

(33) Juan trajo el coche$_i$ para que María viera e_i
     Juan brought the car$_i$ so that Maria saw e_i
     antes de irse.
     before leaving.

The strategy of feature recovery, outlined in section six, consists of having the members of the object clitic paradigm including the 'zero morpheme', as the agreement heads (AGRo) of the object-agreement phrase (AGRPo), in the flavor of Franco (1991). This approach would make object agreement (Infl) be the licensing head and the identifier for the null object at the same time. Consequently, in parametric terms, Basque Spanish only needs one licensing head for *pro*, that is, Infl and, under our analysis, the occurrence of *pro* can be restricted to an agreement relation.

8. Summary. In this study, we have given two different categorizations for arbitrary null objects and referential null objects in Basque Spanish. Thus, arbitrary null objects are variables licensed by a grammaticalized aspect and identified by an abstract operator, whereas referential inanimate null objects are instances of *pro* identified and licensed by a zero clitic/object-verbal agreement morpheme. Evidence for this formal distinction is illustrated by their differences in behavior which are summarized in (34):

(34)

	arb null objects	ref. null objects
Weak Crossover	yes	no
Principle C	yes	no
Aspectual Constraints	yes	no

Also, within the null hypothesis, the analysis proposed here keeps the licensing of object empty categories to a strict government relation from a head which can be either Aspect or AGR depending on the referential status of the null element. Most likely, this government relation, on the one hand, and the nature of object agreement, on the other, are what makes the null object parameter in Basque Spanish so different from the null subject parameter.

Notes

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1. To our knowledge, there is only one other variety of Spanish that allows referential null objects in its grammar, that is, Quiteño Spanish. The phenomenon of null objects in Quiteño has been attested in Suñer and Yépez (1988).

2. *Leísmo* is the replacement of DO-CL forms (*lo(s)* 'it/him/them (masc)', *la(s)* 'it, her, them (fem)') by the etymological IO-CL forms (*le/s*). *Laísmo*, on the contrary, is the replacement of IO-CL forms (*le/s*) with feminine value by the etymological DO-CL forms (*la/s*), and *loísmo* is the replacement of IO-CL forms (*le/s*) with masculine value by the etymological DO-CL forms (*lo/s*).

3. Basque Spanish is a partially *leísta* dialect in the sense that the etymological IO-CLs (*le(s)*) replace the DO-CLs that refer to animate DOs, and only very rarely the ones that refer to inanimate DOs for which the zero phonological option or the overt DO-CLs are available:

(i) Mi hermano compró un coche; y   al cabo de 6 meses
    my brother bought a   car;   and after   6 months
    (lo) /*le;   vendió.
    DO-CL/*IO-CL; he sold.

4. Similarly, it could be suggested that the same kind of feature oppositions for object agreement that hold for Basque Spanish take place in Quiteño Spanish, since not only do null objects occur in both dialects, but also the *leísmo* and clitic-doubling phenomena are shared by these two geographically far-apart Spanish varieties.

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Weak Crossover in Shuswap Salish

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0. Introduction

In a series of papers Kenneth Hale (1982, 1983, 1985) presented a set of facts from the central Aus-
tralian language Warlpiri, suggesting that there was a type of language called a non-configurational
language. In a non-configurational language the grammatical relations of subject (the external argu-
ment) and object (the internal argument) are not hierarchically distinguished. Hale also proposed a
cluster of properties of non-configurational languages that could serve as diagnostics.

Recent work on diverse languages has focused on the syntactic properties of binding, weak cross-
over (see Saito and Hoji (1983) and Farmer, Hale and Tsujimura (1986) for Japanese) and long dis-
tance extraction[1]. These syntactic properties can be used as tests of configurationality. In this paper
I would like to present the results of research on Shuswap Salish[2] regarding weak crossover effects.
They are, to my knowledge the first published results of this type of research for Salish. Native
speaker judgements indicate that there are weak crossover effects in Shuswap which provides evi-
dence that the language has a degree of configurationality. These results are important given the fact
that Shuswap, a language with relatively free word order, lacks standard VP constituency tests, and
that the binding facts are obscured by other principles of the grammar.

1.0 Properties of Non-configurational Languages

Hale (1983) proposes the following cluster of properties as common to non-configurational languag-
es[3]:

(1)   (a) free word order
        (b) syntactically discontinuous expressions
        (c) null anaphora

The properties of non-configurationality are demonstrated in the following Warlpiri sentences.

(2)   ngarrka-ngku ka   wawirri   panti-rni
            man-erg   aux   kangaroo spear-non-past[4]
            The man is spearing the kangaroo.

In sentence (2) the constituents can occur in any order, with the exception of the auxiliary which
must occur in second position. This is shown in (3).

(3)   ngarrka-ngku ka panti-rni wawirri
            wawirri ka ngarrka-ngku panti-rni
            wawirri ka panti-rni ngarrka-ngku
            panti-rni ka wawirri ngarrka-ngku
            panti-rni ka ngarrka-ngku wawirri

Thus, Warlpiri is argued to have free word order. Discontinuous constituency is shown in (4)-(5).

(4)   wawirri   yalumpu kapi-rna panti-rni
            kangaroo   that   aux   spear-non-past
            I will spear that kangaroo.

(5)   wawirri   kapi-rna panti-rni   yalumpu

              kangaroo   aux   spear-non-past that

              I will spear that kangaroo.

In sentence (4) the forms /wawirri/ and /yalumpu/ constitute a single constituent in that the AUX is in second position. The forms /wawirri/ and /yalumpu/ in sentence (5) demonstrate a discontinuous constituent.

Sentences (6)-(8) demonstrate null anaphora, or missing arguments in various positions.

(6)   ngarrka-ngku ka   panti-rni

              man-erg   aux   spear-non-past

              The man is spearing it.

(7)   wawirri ka   panti-rni

              kangaroo aux   spear-non-past

              He/she is spearing the kangaroo.

(8)   panti-rni   ka

              spear-non-past aux

              He/she is spearing him/her/it.

In (6) the object is dropped, in (7) the subject, and in (8) both the subject and the object are missing.

Shuswap is similar to Warlpiri regarding the properties of word order and null anaphora. There is considerable freedom of word order due to an elaborate focussing device in which arguments scramble out of their underlying positions. (9)-(12) can all mean 'Mary likes her father'. As this paper is concerned with binding and ultimately variable binding the constructions which follow are judged for co-referential interpretations.[5]

(9)   x̣ʷi-st-∅-és   ɤ-Mary   ɤ-qéʔčə-s

              like-caus-3abs-3erg det-Mary det-father-3poss

              Mary likes her father.

              *Her father likes Mary.

(10)   ɤ-Mary   x̣ʷi-st-∅-és   ɤ-qéʔčə-s

              det-Mary like-caus-3abs-3erg   det-father-3poss

              Mary likes her father.

              *Her father likes M.

(9) reflects the surface VSO word order but of near equal frequency in direct elicitation is SVO order in (10) where the subject occurs in pre-verbal position. There is a strong tendency to interpret the proper noun as the experiencer rather than the possessive in these constructions. (11)-(12) indicate surface VOS and OSV orders respectively.

(11)   x̣ʷi-st-∅-és   ɤ-qéʔčə-s   ɤ-Mary

              like-caus-3abs-3erg det-father-3poss det-Mary

              Mary likes her father.

              *Her father likes Mary.

(12)   ɤ-qéʔčə-s   x̣ʷi-st-∅-és   ɤ-Mary

              det-father-3poss like-caus-3abs-3erg det-Mary

              Mary likes her father.

              *Her father likes Mary.

A co-referential interpretation for 'Her father likes Mary' in (12) is expressed by a passive shown in (13).

(13)   x ʷi-st-∅-ém   tə-qéʔčə-s   ɤ-Mary
                  like-caus-3abs-pass obl-father-3poss det-Mary
                  Mary is liked by her father.

Wh-question constructions exhibit the same freedom of word order in Shuswap. The wh-word moves into sentence initial position and one of the arguments may scramble into pre-verbal position.

(14)   swéty̓   k-x ʷi-st-∅-és   ɤ-qéʔčə-s
                  who   irr-like-caus-3abs-3erg det-father-3poss
                  Who likes her father?

(15)   swéty̓   ɤ-qéʔčə-s   k-x ʷi-st-∅-és
                  who   det-father-3poss   irr-like-caus-3abs-3erg
                  Who likes her father?
                  *Who does her father like?

Hale has also noted that free word order is not criterial of non-configurationality given that possible non-configurational languages such as Navaho lack free word order. It should also be noted that in current theory linear precedence relations are treated as distinct from dominance relations. There is evidence however that precedence relations as well as dominance may be involved in binding in Japanese (Saito and Hoji (1983), Farmer, Hale and Tsujimura (1986)) and in Palauan (Georgopoulos (1991)). Precedence does not appear to involved in binding in Shuswap. I now turn to the distribution of empty pronominals in Shuswap.

Shuswap, like Walpiri, allows pro-drop. Overt pronominals are only used for emphasis. There is also a split- ergative person marking system for person with third person behaving as ergatives/absolutives.[6] This is shown in(16)-(17).

(16)   čntés
                  kw-n-t-∅-és
                  punch-fc-tr-3abs-3erg
                  He punched him.

(17)   čntém
                  punch-fc-tr-3abs-pass
                  He was punched.

In the Wh-questions (18)-(19) when it is the absolutive that is questioned the verbal morphology is the same as in (16)-(17).

(18)   swéty̓   k-čntés
                  swéty̓   k-ču-n-t-∅-és
                  who   irr-punch-fc-tr-3abs-3erg
                  Whom did he punch?

(19)   swéty̓   k-čntém
                  swéty̓   k-ču-n-t-∅-ém
                  who irr-punch-fc-tr-3abs-pass
                  Who was punched?

There is reason to suppose that a focussing device is also operating within the pronominal system. When it is the ergative that is questioned the predicate is detransitivized and the clitic sequence /w-əs/ is added.

(20)   swéty̓   k-čntémǝs
         swéty̓   k-ču-n-t-Ø–ém-w-ǝs
         who   irr-punch-fc-tr-3abs-pass-?-3nom
         Who punched him?

Pro-drop is not entirely free. When there is a single post-verbal nominal it will be interpreted as the absolutive.[7]

(21)   x̣i-st-Ø-és   ɤ-John
         like-caus-3abs-3erg   det-John
         She likes John.
         *John likes her.

(21) has only one interpretation in which the empty pronominal is linked to the ergative and the overt nominal is linked to the absolutive. Sentence (22) is felt to be incomplete by Shuswap speakers.

(22)   *ɤ-John x̣istés

In order to express the interpretation 'John likes her' (23) would be used.

(23)   tǝ-John   x̣ʷi-st-Ø-ém-ǝs
         obl-John   like-caus-3abs-pass-3nom
         John likes her.

It is likely that a topic hierarchy has something to do with the conditions on pro-drop in that subjects are most likely to be topics.

In this section it has been shown that Shuswap has some of the properties associated with non-configurationality. Both the scrambling of arguments and the distribution of empty pronominals are part of a focus system. I now turn to weak crossover.

2.0 Weak Crossover

Weak crossover effects occur when a quantifier moves across a pronoun with which it is indexed. Neither the resulting variable nor the pronoun c-command each other. This is shown in (24).

(24)   *Who$_i$ does his$_i$ mother love t$_i$?

Under current theoretical assumptions the behaviour of constructions like (24) that exhibit weak crossover effects provide evidence for traces and for VP constituency. Notice that when the Wh-quantifier is extracted from subject position there are no weak crossover effects and two interpretations are available.

(25)   Who$_i$ t$_i$ loves his$_i$ mother?

(25) represents a distributive interpretation whereas it is also possible to interpret the pronoun as a deictic. Wh-quantification is an example of syntactic movement in English. Assuming movement at LF for quantifier raising and focus the contrasts in (26)-(27) show the same behaviour regarding weak crossover effects.

(26)   *His$_i$ mother loves everyone$_i$.

         Everyone$_i$ loves his$_i$ mother.

(27)   *His$_i$ mother loves JOHN$_i$.

         JOHN$_i$ loves his$_i$ mother.

The unacceptable interpretations in (26)-(27) are parallel to (24) assuming movement at LF. These are represented in (28).

(28)   *[Everyone$_i$ [his$_i$ mother loves t$_i$]].

         *[JOHN$_i$ [his$_i$ mother loves t$_i$]].

These weak crossover constructions are standardly ruled out in a number of ways. Chomsky (1975) ruled them out by linear precedence relations. This was stated as the Leftness Condition given in (29).

(29)   LEFTNESS CONDITION
         A variable cannot be the antecedent of a pronoun to its left.

On the other hand Koopman and Sportiche (1983) ruled out these constructions by conditions on the binding of variables by operators. This was stated as the Bijection Principle given in (30).

(30)   BIJECTION PRINCIPLE
         Every operator must locally bind exactly one variable, and every variable must be
         locally bound by exactly one operator.

There have been other proposals such as a binding condition that the variable must c-command the pronoun (see Georgopoulos (1991)). Precedence may be necessary in the statement of the behaviour of anaphors and pronouns in Japanese (Saito and Hoji (1983)). Georgopoulos (1991) argues that in Palauan both precedence and c-command of the antecedent are necessary and ultimately derives the weak crossover effects from an extension of the ECP. As precedence does not appear to be a factor in Shuswap I shall assume the Bijection Principle, returning to some of the predictions made by Georgopoulos in the conclusion. (30) repeats the standard weak crossover case for English.

(31)   *Who$_i$ does his$_i$ mother love t$_i$?

(31) will be ruled out by the Bijection Principle in the following manner. The Wh-quantifier binds its trace (which is not c-commanded by the possessive pronoun contained in the complex noun phrase). The trace is therefore $\overline{A}$-bound and is a variable. The possessive pronoun is in subject position and (assuming a VP) is not bound by the trace in argument position. The possessive pronoun is therefore also a variable by this account. This construction will be ruled out given (31) which forces the uniqueness of operator binding. On the other hand there is nothing to rule out (32).

(32)   Who$_i$ t$_i$ loves his$_i$ mother?

In this construction the Wh-operator $\overline{A}$-binds its trace, which functions as a variable. However the trace which is in an argument position A-binds the possessive pronoun, which is therefore a bound pronoun. The construction is permitted because the operator only binds one variable. The quantifier raising (26) and focus constructions (27) can receive a parallel analysis.

The analysis of the English constructions is based on the assumption that there is a VP in English. Should there be no VP (33) should have a possible interpretation and not exhibit weak crossover effects.

(33)   Who$_i$ does his$_i$ mother love t$_i$?

Assuming that there is no VP the Wh-operator would $\overline{A}$-bind its trace which would then be in a configuration to A-bind the possessive pronoun. This interpretation is apparently available in Warlpiri.

(34)   Ngana ka   nyanungu-nyangu   maliki-rli   wajilipi-nyi?
         whom   pres   he-poss   dog-erg   chase-non-past

         Who$_i$ is his$_i$ dog chasing?

In (34) the Wh-operator can be interpreted as co-referential to the possessive pronoun. This consti-
tutes importance evidence bearing on the status of configurationality in Warlpiri. Similarly Hungar-
ian apparently lacks weak crossover.

(35)   kit$_i$ szeret   t$_i$ az   pro$_i$ anyja
         whom   loves   the   mother-his

         Whom$_i$ does his$_i$ mother love?

(36)   mindenkit$_i$ szeret   t$_i$ az   pro$_i$ anyja
         everybody-acc   loves   the   mother-his

         His$_i$ mother loves everybody$_i$.

See Georgopoulos (1991) and Speas (1991) for a discussion of languages that do not exhibit weak
crossover effects. I now turn to the Shuswap facts.

3.0 Weak Crossover in Shuswap

3.1 Wh-Quantification

(37) is a construction in which the Wh-operator binds a variable that is interpreted as the subject.

(37)   swéty̓   k-x^{w}i-st-∅-és   r-qé?čə-s
         who   irr-like-caus-3abs-3erg   det-father-3poss

         Who likes her father?

The construction is judged to be ambiguous by speakers of Shuswap. Under one reading the posses-
sive pronoun can have a deictic interpretation although the preferred reading is one where the pos-
sessive pronoun and the variable are coindexed giving a distributive interpretation.[8] This is
represented in (38).

(38)   swéty̓$_i$ t$_i$ k-x^{w}i-st-∅-és r-qé?čə-s$_i$

(39) is a construction in which the Wh-operator binds a variable that is interpreted as the object.

(39)   swéty̓   r-qé?čə-s   k-x^{w}i-st-∅-és
         who   det-father-3poss   irr-like-caus-3abs-3erg

         Who does her father like?

This construction has only one interpretation available, that in which the possessive pronoun is given
a deictic interpretation. The impossible reading is represented in (40).

(40)   *swéty̓$_i$ r-qé?čə-s$_i$ k-x^{w}i-st-∅-és t$_i$

That this construction is impossible is predicted by the Bijection Principle. The operator would bind
both the possessive pronoun and its variable.

3.2 Quantifier Raising

The following constructions provide examples of quantification.

(41)   x̣ʷəx̣ʷéyt t'-swɛt   x̣ʷi-st-∅-és   ɤ-qéʔčə-s
             everybody   like-caus-3abs-3erg det-father-3poss
             Everybody likes her father.

In (41) there are two interpretations available. One interpretation has a deictic reading and the other has a distributive reading where there is coreference between the variable and the possessive pronoun. The distributive reading is represented in (42).

(42)   x̣ʷəx̣ʷéyt t'-swɛt$_i$ t$_i$ x̣ʷistés ɤ-qéʔčə-s$_i$

On the other hand when the quantifier binds a variable in object position it is impossible to interpret the possessive pronoun as coreferential.

(43)   ɤ-qéʔčə-s   x̣ʷistés   x̣ʷəx̣ʷéyt   t'-swɛt
             det-father-3poss like-caus-3abs-3erg   everybody
             Her father likes everybody.

This can be represented as (44).

(44)   *x̣ʷəx̣ʷéyt t'-swɛt$_i$ ɤ-qéʔčə-s$_i$ x̣ʷistés t$_i$

3.3 Focus Constructions

(45)-(47) are focus constructions in which the focussed element is a subject. In each of these constructions the preferred reading is one in which the possessive pronoun refers to 'Mary', although a deictic reading is possible.

(45)   ɤ-Mary   ɤiʔ   x̣ʷi-st-∅-és   ɤ-qéʔčə-s
             Mary   deic like-caus-3abs-3erg det-father-3poss
             MARY likes her father.

(46)   yəɤéy ɤ-Mary x̣ʷi-st-∅-és   ɤ-qéʔčə-s
             deic   Mary   like-caus-3abs-3erg det-father-3poss
             MARY likes her father.

(47)   ɤ-Mary   ɤiʔ   ɤ-qéʔčə-s   x̣ʷi-st-∅-és
             Mary   deic det-father-3poss like-caus-3abs-3erg
             MARY likes her father.

It is not possible to interpret (47) as 'It is Mary that her father likes.' The focus construction would be a passive (see Gardiner (1991)).

(48)   ɤ-Mary   ɤiʔ   x̣ʷi-st-∅-ém   tə-qéʔčə-s
             det Mary deic like-caus-3abs-pass obl-father-3poss
             MARY is the one who is liked by her father.

Focus constructions in Shuswap, due to conditions on co-reference and disjoint reference, therefore lack the relevant configurations that are expected to be associated with weak crossover.

To summarize, Shuswap has weak crossover effects in Wh-question and quantifier constructions with variables in object position. These provide evidence of VP constituency and configurationality in Shuswap.

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4. Conclusion

It should be noted that the facts for Palauan (Georgopoulos (1991)) pose problems for the Bijection Principle and other accounts of weak crossover. In (49)-(50) the quantifier binds the pronoun and the variable (both in non-c-commanding A positions).

(49)   ng-te'a$_i$ a lilsa $_{-i}$ a rtonaryi   er   ngii$_i$
            who   3-saw-3S   neighbors P   her
            Who$_i$ did her$_i$ neighbors see $_{-i}$?

(50)   ng-te'a$_i$ a longull   er   ngii$_i$ a rengelekel pro$_i$
            who   3-respect P   her   children-3S
            Who$_i$ do her$_i$ children respect $_{-i}$?

These constructions are grammatical in Palauan and show no weak crossover effects. Georgopoulos argues that weak crossover can be derived by a conjunctive version (head and antecedent government) of the ECP. She further argues that variables are [-pronominal] and must be licenced by the ECP. The Canonical Government Configuration (CGC) establishes the directionality of government. For Palauan a VOS language it can be seen that the CGC is to the right and that the Specifier is canonically governed in the same direction as the complement. It is the fact that both the variable and the pronoun are properly governed that allows these constructions to escape weak crossover effects.

It is standardly assumed that there are no underlying VSO languages. These languages are thought to result by either verb movement or V-adjunction of the subject. Shuswap, a surface VSO language has a CGC to the right. Georgopoulos predicts that in an underlying SVO language there ought to be weak crossover effects due to the Specifier not being in the CGC and thus not being properly governed. Interestingly this makes the right predictions for Shuswap and may provide an argument for underlying SVO order.

In this paper I have presented evidence that Shuswap, a language with relatively free word order, has weak crossover effects. This provides an argument for a VP constituent in Shuswap and that subjects and objects must be hierarchically distinguished.

Notes

1   A good summary is provided in Speas (1991).

2   Shuswap is spoken on the Interior Plateau of British Columbia and is the northernmost member of the Interior Salish language family. It is a surface VSO language with a system of pronominal person marking on the predicate. Shuswap is spoken with several minor dialectal differences. The data in this paper is representative of the Deadman's Creek/Kamloops area. I would like to thank in particular Leslie Jules of Kamloops, Mona Jules of Chu Chua, Annie-May Jules, Basile Deneau of Skeetchestn, and Joe Michel of Adams Lake, who have helped me to understand their language. I would also like to thank Ewa Czaykowska-Higgins, Henry Davis, Donna Gerdts, Mandy Jimmie, and M. Dale Kinkade for participating in a working group on the syntax of Interior Salish and for helpful comments on a presentation of this data. Ross Saunders has also provided considerable advice and support. Any errors however, remain with the author. Research for some of this work has been funded by the Melville and Elizabeth Jacobs Fund, and the Phillips Fund of the American Philosophical Society.

3   This set of diagnostics is from Hale (1983). In Hale (1982) a larger set of diagnostics was proposed.

4   The following abbreviations have been used: abs (absolutive), acc (accusative), appl (applicative), aux (auxiliary), caus (causative), compl (completive), deic (deictic), det (deter-

miner), emph (emphatic pronoun), erg (ergative), exp (expectational), fc (full control), incompl (incompletive), irr (irrealis), inv (invisible), nom (nominative), obl (oblique), P (preposition), pass (passive), poss (possessive), qu (question), tr (transitive).

5   Some speakers will accept 'Her father likes Mary' with disjoint reference. Others will not accept it at all with either interpretation and offer passives. For disjoint reference in constructions like 'Mary likes her father' an applicative is often selected rather than a causative.

6   Split ergativity is treated extensively in Gardiner and Saunders (1991).

7   This rule was proposed by Gerdts (1988) for Halkomelem.

8   Speakers suggest that the following construction would be used for disjoint reference:

(51)   swély̓   k-x^{w}əy-xí-t-Ø-m-əs   tə-qé?čəs
        who   irr-like-appl-tr-3abs-pass-3nom obl-father-3poss

        Who likes her father?

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TWO TYPES OF OBLIQUE APPLICATIVES IN KINYARWANDA[*]

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1. Locatives and Instrumentals as Objects.

In the Bantu language Kinyarwanda, as Kimenyi (1980) demonstrates, many "obliques"—such as the Locatives in (1) and the Instrumentals in (2)—can be expressed either as prepositional phrases, as in (1a) and (2a), or as objects in an applicative construction, as in (1b) and (2b).[1]

(1) a. Umugóre   y-oohere-je   umubooyi   kw'iisóko.
       woman   she-send-asp   cook   to market
       "The woman sent the cook to market."

    b. Umugóre   y-oohere-jé-ho   isóko   umubooyi.[2]
       woman   she-send-asp-to   market   cook
       "The woman sent the cook to market."

(2) a. Umugabo   a-ra-andik-a   íbárúwa   n'ííkárámu.
       man   he-pres-write-asp   letter   with pen
       "The man is writing a letter with the pen."

    b. Umugabo   a-ra-andik-iish-a   íbárúwa   íkárámu.
       man   he-pres-write-instr-asp   letter   pen
       "The man is writing a letter with the pen."

Kimenyi (pp. 81-82; 94-96) shows that the "obliques" in (1b) and (2b) are objects by a variety of tests, including passivization, pronoun incorporation, and relativization, as shown in (3) for Locatives and (4) for Instrumentals.

(3) a. Iposita   y-oohere-j-w-é-ho   íbárúwa   n'úmugabo.
       post office   it-send-asp-pass-asp-to   letter   by man
       "The post office was sent a letter to by the man."

    b. Úmwáalímu   y-a-ry-oohere-jé-ho   igitabo.
       teacher   he-pst-it-send-asp-to   book
       "The teacher sent the book to it."

    c. íshuûri   úmwáalímu   y-oohere-jé-ho   igitabo
       school   teacher   he-rel-send-asp-to   book
       "the school that the teacher sent the book to"

(4) a. Íkárámu   i-ra-andik-iish-w-a   íbárúwa   n'úmugabo.
       pen   it-pres-write-instr-pass-asp   letter   by man
       "The pen is used to write a letter by the man."

    b. Úmwáalímu   a-ra-y-aandik-iish-a   íbárúwa.
       teacher   he-pres-it-write-instr-asp   letter
       "The teacher is writing a letter with it."

c. Dore íkárámu umugabo y-aandik-iish-a   íbárúwa.
  look pen   man   he-rel-write-instr-asp letter
  "This is the pen that the man uses to write the letter."

The structure of (1b) and (2b) has sparked much discussion, since, as noted by Kimenyi, the initial direct object in (2b) retains its object properties. For example, it undergoes passivization, pronoun incorporation and relativization, as seen in (5).

(5) a. Íbárúwa   i-ra-andik-iish-w-a   íkárámu.
    letter   it-pres-write-instr-pass-asp pen
    "The letter is being written with a pen."

  b. Umugabo a-ra-y-andik-iish-a   íkárámu.
    man   he-pres-it-write-instr-asp pen
    "The man is writing it with a pen."

  c. íbárúwa umugabo y-aandik-iish-a íkárámu
    letter   man   he-write-instr-asp pen
    "the letter that the man is writing with a pen"

Since the Instrumentals in (2b) also show object properties, researchers (including Gary and Keenan (1977), Kimenyi (1980), and Bresnan and Moshi (1990)) have been led to the conclusion that such clauses have more than one direct object, thus violating the Stratal Uniqueness Law of Relational Grammar (Perlmutter and Postal (1983)):

(6) Stratal Uniqueness Law
   Let 'term$_x$' be a variable over the class of R-signs, that is '1', '2', or '3'. Then: If arcs A and B are both members of the C_k stratum and A and B are both term$_x$ arcs, then A=B.

Stated informally, the Stratal Uniqueness Law prohibits more than one nominal bearing the same term relation (1, 2, or 3) per stratum.
  In contrast, the initial direct object in the locative applicative in (1b) loses its object properties, as the data in (7) show, and so has been claimed by Kimenyi (1980) to be a chômeur.

(7) a. *Igitabo cy-oohere-j-w-é-ho   íshuûri n'úúmwáalímu.
    book   it-send-asp-pass-asp-to school by teacher
    "The book was sent to school by the teacher."

  b. *Úmwáalímu y-a-cy-oohere-jé-ho íshuûri.
    teacher   he-pst-it-send-asp-to school
    "The teacher sent it to school."

  c. *igitabo úmwáalímu y-oohere-jé-ho íshuûri
    book   teacher   he-send-asp-to school
    "the book that the teacher sent to school"

No Stratal Uniqueness Law violation is posited in the case of Locative applicatives.[3]
  Thus, for Kimenyi there are two types of oblique-to-object advancement in

Kinyarwanda: those like Instr-to-object that result in double objects, as represented in the stratal chart in (8), and those like Loc-to-object that result in the chômage of the initial object, as represented in the stratal chart in (9).

(8)	1	P	2	INSTR		(9)	1	P	2	LOC
	1	P	2	2			1	P	CHO	2
	man	write	letter	pen			woman	sent	cook	market

Kimenyi's analysis raises two important questions. First, is there an alternative analysis which posits structures which conform to the Stratal Uniqueness Law? Second, why is there this difference between Instrumental and Locative applicatives? After all, if two object positions are available in Kinyarwanda, as necessary for (8) under Kimenyi's approach, why not make use of both object positions in Locative applicatives? Or alternatively, if Kinyarwanda has a way of licensing 2-chômeurs in Locative applicatives, why not make use of this relation in Instrumental applicatives?

This paper seeks to answer both of these questions. To address the issue of Stratal Uniqueness first, an alternative to Kimenyi's analysis is immediately apparent (cf. Perlmutter and Postal 1983). Instrumentals in applicatives are not direct objects, as posited by Kimenyi, but rather indirect objects, as represented in (10).

(10)	1	P	2	INSTR		(11)	1	P	2	LOC
	1	P	2	3			1	P	CHO	2
	man	write	letter	pen			woman	sent	cook	market

This proposal is consistent with what we know about indirect objects in Kinyarwanda. As Kimenyi (pp. 64-68) notes, both the direct object and the indirect object of ditransitive clauses like (12) exhibit object properties.

(12)	Umuhuûngu	y-a-haa-ye	umukoôbwa	igitabo
	boy	he-pst-give-asp	girl	book

"The boy gave the book to the girl."

Following Dryer (1983), we represent (12) as:[4]

(13)	1	P	3	2
	boy	give	girl	book

As (14) and (15) show, both the direct object and the indirect object can passivize, appear as incorporated pronouns, and relativize.

(14) a. Igitabo cy-a-haa-w-e umugóre n'ûmugabo
     book it-pst-give-pass-asp woman by man
     "The book was given to the woman by the man."

   b. Umugabo y-a-ki-haa-ye umugóre.
     man he-pst-it-give-asp woman
     "The man gave it to the woman."

c. igitabo	umuhuûngu	y-a-haa-ye	umukoôbwa
book	boy	he-pst-give-asp	girl

"the book which the boy gave the girl"

(15) a.
Umugóre	y-a-haa-w-e	igitabo	n'ûmugabo
woman	she-pst-give-pass-asp	book	by man

"The woman was given the book by the man."

b.
Umugóre	y-a-mu-haa-ye	igitabo.
woman	she-pst-him-give-asp	book

"The woman gave him a book."

c.
umukoôbwa	umuhuûngu	y-a-haa-ye	igitabo
girl	boy	he-pst-give-asp	book

"the girl to whom the boy gave the book"

The direct object and indirect object do differ in several respects. For example, as Kimenyi (p. 182) points out, when both the direct object and indirect object are incorporated pronouns, the direct object precedes the indirect object, as (16) shows. The alternative order—that is, the incorporated indirect object preceding the direct object—is impossible.

(16)
Umugabo	y-a-yá-b-éerets-e
man	he-pst-them-them-show-asp

"The man showed them [pictures] to them [people]."

We see that pronoun incorporation also supports our claim that the applied instrumental is a final indirect object. As an incorporated pronoun it must follow the incorporated form of the direct object, as (17) shows.

(17)
Umugabo	a-ra-yi-y-aandik-iish-a.
man	he-pres-it-it-write-instr-asp

"The man is writing it with it."

We see then that an analysis positing final 3-hood for the instrumental in applicatives is consistent with the Kinyarwanda data. This analysis not only conforms with the Stratal Uniqueness Law, but it also allows a means for differentiating Instrumental applicatives from Locative applicatives, as discussed further below.

Let's turn next to the second problem: Why are Instrumental and Locative applicatives different?

2. Locatives vs. Instrumentals.

We propose that the applicative constructions in (1b) and (2b) differ because the structures that underlie them (i.e. (1a) and (2a)) differ. Contrary to other researchers' assumptions that both Locatives and Instrumentals are "oblique" nominals in initial structure, we claim that only Locatives, although they are obliques are nonetheless arguments of the predicate. Instrumentals, we claim, are not arguments of the main predicate in initial structure, but rather are adjuncts, and in RG terms, they constitute a predicate domain of their own. First, we give a number of ways in which Locatives and Instrumentals differ. Afterwards, we make our analyses of initial Locatives and Instrumentals more precise and show how the effects in section 2 are predicted. Furthermore, we show how the different initial structures

lead to applicatives with the different properties discussed above.

2.1 Oblique pronoun incorporation.

As illustrated above, object pronouns are incorporated into the verb complex in Kinyarwanda. An incorporated pronoun form *-ha* also exists to refer to Locatives:

(18)   Ba-ra-kí-há-shyir-a.
         they-pres-it-there-put-asp
         "They put it there."

In contrast, there is no form of incorporated pronouns for unadvanced Instrumentals, but only advanced Instrumentals in applicative structures like (2b) can be incorporated pronouns.

2.2 Oblique Subjects.

Kimenyi (pp. 129-130) shows that Locatives can be directly passivized, without being first advanced to object. In such passives, as in (19), the Locative appears with its preposition in subject position and the verb takes locative agreement.[5]

(19)   Kw'iiposita   h-ooherej-w-e   íbárúwa   n'ûmugabo.
         to post office   it-send-pass-asp   letter   by man
         "To the post office was sent the letter by the man."

Instrumentals, however, do not appear as subjects in such constructions:

(20)   *N'ífkárámu   i-ra-andik-w-a   íbárúwa   n'ûmugabo.
         with pen   it-pres-write-pass-asp   letter   by man
         "With the pen is written the letter by the man."

Unlike Locatives, Instrumentals appear as subjects only in applied constructions, as in (4a).

2.3 Object/subject reversal.

Kimenyi (pp. 141-146) discusses a structure in which the word order of the subject and the object nominals is reversed, giving the sentence a "passive reading". No passive morphology appears on the verb or on the postposed subject. The verb in such clauses agrees with the preposed object, as illustrated in (21b).

(21) a. Umuhuûngu   a-ra-som-a   igitabo.
         boy   he-pres-read-asp   book
         "The boy is reading the book."
     b. Igitabo   cyi-ra-som-a   umuhuûngu.
         book   it-pres-read-asp   boy
         "The book is being read by the boy."

Locatives behave like objects with respect to object/subject reversal, since they can appear in preverbal position, as in (22). In this case the verb takes locative agreement (see Kimenyi, pp. 141-142).

(22) Kw'iishuûri   ha-gii-ye   umúnyéeshuûri.
      to school   it-go-asp   student
      "To school went the student."

Unadvanced Instrumentals, however, cannot appear in preverbal position in a reversal construction, as (*23) shows.

(23) *N'ííkárámu   i-ra-andik-a   úmwáalímu.
      with pen   it-pres-write-asp teacher
      "With pen writes the teacher."

2.4 Topicalization strategies.

As Kimenyi (pp. 191-196) points out, Locatives and Instrumentals are topicalized using different strategies. Locatives, like subjects, objects, indirect objects, and benefactives, are topicalized directly: the phrase appears to the left of the clause and the verb takes agreement/incorporation cross-referencing the preposed element. An example of a topicalized direct object appears in (24) and of a topicalized Locative in (25).

(24) Igitabo,   úmwáana   a-ra-gi-som-ye.
      book,   child   he-pres-it-read-asp
      "The book, the child has just read it."
(25) Kuú   ntebe,   ábáana   ba-ra-h-iica-ye.
      on   chair   children   they-pres-there-sit-asp
      "On the chair, the children are sitting on it."

The Locative appears with its preposition and the verb shows locative agreement.

In contrast, Instrumentals cannot be topicalized in this fashion:

(26) *N'ííkárámu,   umukoôbwa   a-ra-y-andik-a   íbárúwa.
      pen   girl   she-pres-it-write-asp letter
      "The pen, the girl is writing a letter with it."

Instead, a second strategy, involving a resumptive pronoun, is used to topicalize Instrumentals:

(27) Íkárámu,   umukoôbwa   a-ra-andik-a   íbárúwa   ná   yo.
      pen   girl   she-pres-write-asp letter   with   it
      "The pen, the girl is writing a letter with it."

This strategy is used to topicalize other elements, including possessors and nominals within relative clauses. However, Locatives cannot be topicalized in this manner, as (*28) shows.

(28) *Íntebe,   umukoôbwa   a-z-iicar-a   kûrí   yo.
      chair   girl   she-fut-sit-asp   on   it
      "The chair, the girl will sit on it."

2.5 Possessor ascension hosts.

As proposed by Kimenyi (pp. 97-98) and refined by Bickford (1986), Kinyarwanda has possessor ascension, where a possessor ascends to take on an object role.[6] As seen in (29a), possessors typically follow their heads and are introduced by a preposition, but when they ascend to object, as in (29b), they precede their heads and appear without a preposition.

(29) a. Umuhuûngu   y-a-twaa-ye   igitabo   cy'ûmukoôbwa.
        boy   he-pst-take-asp   book   of girl
        "The boy took the book of the girl."
     b. Umuhuûngu   y-a-twaa-ye   umukoôbwa   igitabo.
        boy   he-pst-take-asp   girl   book
        "The boy took the girl's book."

In the above example, the object serves as the host for possessor ascension. Locatives can also host ascension, as (30b) shows.

(30) a. Úmwáana   y-a-andits-e   izíná   rye   mu   igitabo   cy'ûmugabo.
        child   he-pst-write-asp   name   his   in   book   of man
        "The child wrote his name in the man's book."
     b. Úmwáana   y-a-andits-e   umugabo   mu   igitabo izíná   rye.
        child   he-pst-write-asp   man   in   book   name   his
        "The child wrote his name in the man's book."

In contrast, unadvanced Instrumentals cannot serve as possessor ascension hosts:

(31) a. Umuhuûngu   y-a-andits-e   íbárúwa   n'ííkárámu   y'ûmukoôbwa.
        boy   he-pst-write-asp   letter   with pen   of girl
     b. *Umuhuûngu   y-a-andik-i-ye   íbárúwa   umukoôbwa   n'ííkárámu.
        boy   he-pst-write-appl-asp letter   girl   with pen
        "The boy wrote the letter with the girl's pen."

2.6 Derivational causatives.

Kimenyi (pp. 164-165) discusses causatives formed with the derivational affix -iish. In such causatives, the causee appears immediately after the verb:[7]

(32) Umugabo   a-ra-som-eesh-a   ábáana   ibitabo.
      man   he-pres-read-caus-asp   children   books
      "The man is making the children read the books."

As (33) shows, derivational causatives can be formed on a clause containing a Locative.

(33) Umugóre   y-iica-j-e   úmwáana   kuú   ntebe.
      woman   she-sit-caus-asp   child   on   chair
      "The woman made the child sit on the chair."

In contrast, derivational causatives cannot be formed on clauses that contain Instrumentals:

(34) *Úmwáalímu   a-ra-andik-iish-a   umúnyéeshuûri   n'íikárámu.
      teacher   he-pres-write-caus-asp   student   with pen
      "The teacher made the student write with a pen."

2.7 Summary.

We have shown that Locatives and Instrumentals differ systematically in a variety of constructions. Locatives have a more privileged status than Instrumentals in that they can appear as incorporated pronouns, subjects in passives, preposed nominals in subject reversal constructions, direct topics, possessor ascension hosts, and as an element in the inner structure of a derivational causative. Locatives do many, though not all, of things that direct and indirect objects do, though they often require special morphology to do so. This sets up a three way distinction in argument struture for Kinyarwanda. There are two classes of arguments: **direct arguments** (like direct and indirect objects), **oblique arguments** (like the locatives discussed here), and non-argument **adjuncts** (like instrumentals).

3. Our analysis.

Next we turn to the problem of assigning relational structures to Locatives and Instrumentals and showing how these structures relate to applicative constructions.

The discussion above has led to the conclusion that unadvanced Locatives, like those in (1a) above, are oblique arguments of the predicate, and thus are appropriately represented by the structure in (35).

(35)   1   P   2   **LOC**
        woman send   cook   market

Given that locatives are initially oblique, we account for locative applicatives like (1b) by positing advancement. To make our claim precise, we posit that Locative advancement in Kinyarwanda involves first an advancement to 3 and then an advancement to 2. Evidence for this claim comes from examples like (36b) where Locative advancement takes place in a clause which contains an initial indirect object.

(36) a. Umugóre   a-ra-he-er-a   umuhuûngu   ibitabo mw'iishuûri.
        woman   she-pres-give-appl-asp   boy   books   in school
        "The woman gave the boy books in school."
     b. Umugóre   a-ra-he-er-a-mo   ishuûri   umuhuûngu   ibitabo.
        woman   she-pres-give-appl-asp-loc school   boy   books
        "The woman gave the boy books in school."

Not only is the direct object placed en chômage, as in (7) above, but, as Kimenyi (p. 96) notes, the indirect object also loses its object properties. For, example, it does not passivize (37a), nor is it referred to by an incorporated pronoun (37b).[8]

(37) a. *Umuhuungu   a-rá-hé-er-w-á-mo   ishuûri   ibitabo   n'ûmugóre.
        boy   he-pres-give-appl-pass-asp-in school   books   by woman
        "The boy is given the books in the school by the woman."

b. *Umugóre   a-rá-mu-hé-er-á-mo   ishuûri   ibitabo
   woman   she-pres-him-give-appl-asp-loc   school   books
   "The woman is giving him the books in the school."

Thus, we posit Loc-3-2 advancement for examples like (36b), as represented in (38).

(38)   1   P   2   3   LOC
         1   P   2   CHO   3
         1   P   CHO   CHO   2
     woman   give   books   boy   school

To put this in other terms, assigning the Locative a direct argument position is only possible if other direct arguments are delinked or dumped from their positions.

Instrumental applicatives are very different in this respect. Instrumentals are not arguments of the main predicate in initial structure but rather are adjuncts constituting a predicate domain of their own that is linked to the main clause to form a sentence, as represented by the bracketed structure for (2a) given in (39).

(39) [[Umugabo arandika íbárúwa][n'ííkárámu.]]

The adjunct domain is island-like with respect to constructions affecting argument structure. Thus, Instrumentals cannot appear as incorporated pronouns, subjects in passives, preposed nominals in object/subject reversal constructions, direct topics, and possessor ascension hosts. Also, Instrumentals are predicted not to be able to form Causatives, since derivational causatives in Kinyarwanda are not formed on complex structures.

Furthermore, Instrumentals are also ineligible for advancement ot object. Thus an advancement analysis of Instrumental applicatives like (2b), like those posited in (8) or (10) above, are inappropriate. However, a construction is available in RG that appropriately allows structure sharing between two predicate domains: the multipredicate clause, as posited by Davies and Rosen (1988). Multipredicate clauses, which are a reworking of the notion of Clause Union in classic RG, have been posited in the analysis of many kinds of structure-sharing constructions, including Causatives, Desideratives, Resultatives, Adversity Passives, Light Verbs, Serial Verbs, Possessive Ascension, Noun Incorporation and Duration/Frequency adverbs (see Gerdts 1988, in press, and references therein). We suggest that this concept can also be used in the treatment of Instrumental applicatives.

First, we illustrate the notion of multipredicate clause by discussing derivational causatives in Kinyarwanda. For a Causative such as (40), we propose the structure in (41).

(40)   Umugabo   á-r-úubak-iish-a   abákozi   inzu.
       man   he-pres-build-cause-asp   workers   house
       "The man is making the workers build the house."

(41)   P   1   2
      1     $\hat{P}$ P   3   2
     man   build   -iish   workers   house

The analysis in (41) claims that (40) is a single clause with two predicate domains. The first

predicate -*ubak* "build" has two arguments: a subject and a direct object. The Causative morpheme is the second predicate. Besides having a subject of its own (the "causer"), the second predicate also inherits the direct object from the inner clause. Furthermore, the subject of the first predicate is **revalued** as the indirect object of the second predicate. Thus, the Causative morpheme has the effect of increasing the valence of -*ubak* "build" from a two-place predicate to a three-place one. The claim then is that Kinyarwanda causatives, like causatives in French, Georgian, Ilokano, Turkish, and many other languages, are structure building. These languages contrast with Chamorro, Choctaw, Halkomelem, Swahili, and many other languages, whose causatives are not structure building (see Gerdts in press, and references therein). Positing the first type of causative for Kinyarwanda is consistent with the fact that both the causee (cf. 42) and the initial direct object (cf. 43) have object properties (Kimenyi, pp. 170-171); for example, they passivize and can appear as incorporated pronouns:

(42) a. Abákozi   bá-r-úubak-iish-w-a   inzu   n'ûmugabo.
        workers   they-pres-build-caus-pass-asp   house   by man
        "The workers are made to build the house by the man."
     b. Umugabo   a-rá-b-úubak-iish-a   inzu.
        man   he-pres-them-build-caus-asp   house
        "The man is making them build the house."
(43) a. Inzu   í-r-úubak-iish-w-a   abákozi   n'ûmugabo.
        house   it-pres-build-caus-pass-asp   workers   by man
        "The house is being made to be built by the workers by the man."
     b. Umugabo   a-rá-y-úubak-iish-a   abákozi.
        man   he-pres-it-build-caus-asp   workers
        "The man is making the workers build it."

We claim that Instrumental applicatives likewise involve a multipredicate clause.[9] In fact, this is a multipredicate clause with the same structure, and also the same morphology as a causative.[10] Thus, we would also represent (2b) as in (44); the Instrumental is the subject of a first predicate that is revalued to 3, while the direct object of the first predicate inherits its role.[11]

(44)   P   1   2
         1   P̂   P   3   2
        man   write   -iish   pen   letter

The structure in (44), since it posits that both the Instrumental and the direct object are final objects, explains why both nominals have object properties (cf. (4) and (5) above).
    There are several ways in which the Causee in derivational Causatives and the Instrumental in applicatives behave like indirect objects rather than direct objects, thereby supporting this analysis. Recall that, when both direct objects and indirect objects appear as incorporated pronouns, the indirect object follows the direct object, as (45):

(45)   Umugabo   y-a-yá-b-éerets-e
        man   he-pst-them-**them**-show-asp
        "The man showed them [pictures] to **them** [people]."

The incorporated pronoun referring to the Causee in (46) and the Instrumental in (47) appears after the pronoun referring to the direct object, as predicted by (41)/(44).

(46) Umugabo   a-rá-yi-b-uubak-iish-a.
      man   he-pres-it-them-build-caus-asp
      "The man is making them build it."
(47) Umugabo   a-ra-yi-y-aandik-iish-a.
      man   he-pres-it-it-write-instr-asp
      "The man is writing it with it."

In summary, we claim that Instrumental applicatives do not involve Instrumental adjuncts in initial structure. Rather, they are multipredicate clauses having the same structures as derivational Causatives in Kinyarwanda. These are structure building, therefore instrumental applicatives are finally ditransitive.

4. Multiple Applicatives.

Our analysis differs significantly from Kimenyi's in several respects. For example, it does not posit that both Locatives and Instrumentals in applicative constructions are initial obliques as Kimenyi's does. The difference in the two analyses becomes clearer when we consider cases of multiple applicatives, that is, examples like (48) which are simultaneously both an instrumental applicative and a locative applicative.

(48) Úmwáalímu   y-a-andik-iish-ijé-ho   ikíbáho   imibáre   íngwa.
      teacher   he-pst-write-instr-asp-on   board   math   chalk
      "The teacher wrote math on the blackboard with chalk."

In the initial structure assigned to such clauses by Kimenyi both the Locative and the instrumental of initial obliques and both advance to object. A priori, either instrumental advancement could be earlier than locative advancement, as represented in (49a), or vice versa as represented in (49b).

(49) Prediction under Kimenyi's analysis:

a.	1	P	2	LOC	INSTR
	1	P	2	LOC	2
	1	P	CHO	2	CHO
	teacher	write	math	board	chalk

b.	1	P	2	LOC	INSTR
	1	P	CHO	2	INSTR
	1	P	CHO	2	2
	teacher	write	math	board	chalk

In fact, Kimenyi supplies the data that allows us to choose between these analyses. As predicted by (49a) but not (49b), only the Locative nominal shows the properties of final object in multiple applicatives. So, for example, the locative can be the subject of a passive, as in (50), but the instrumental and the initial object cannot be, as (*51) and (*52) show.

(50) Ikíbáho   cy-a-andik-iish-ij-w-é-ho   imibáre   íngwa   n'úúmwáalímu.
      board   it-pst-write-instr-asp-pass-asp-on   math   chalk   by teacher
      "The blackboard was written math on with chalk by the teacher."

(51) *Íngwa   y-a-andik-iish-ij-w-é-ho   ikíbáho   imibáre   n'úúmwáalímu.
      chalk   it-pst-write-instr-asp-pass-asp-on   board   math   by teacher
      "The chalk was used to write math on the board by the teacher."

(52) *Imibáre   y-a-andik-iish-ij-w-é-ho   ikíbáho   íngwa   n'úúmwáalímu.
      math   it-pst-write-instr-asp-pass-asp-on   board   chalk   by teacher
      "Math was written on the board with the chalk by the teacher."

Kimenyi's analysis (49a) thus accommodates the correct results.[12] However, there is no rationale given for the prohibition of (49b). Apparently, this must be stipulated in the grammar.

Our grammar fares better in this respect. The analysis in (53) involving first the revaluation in the multipredicate clause and then Locative advancement predicts the correct array of data: only Locatives show final object properties.

(53) Prediction under our analysis:

	P		1	2	LOC
	P		1	2	LOC
1	P̂	P	3	2	LOC
1	P̂	P	CHO	2	3
1	P̂	P	CHO	CHO	2
teacher	write	iish	chalk	math	board

Furthermore, an alternative analysis which would require Locative advancement in the inner stratum and revaluation in a latter stratum is independenly ruled out for Kinyarwanda. In Kinyarwanda there is a general prohibition on argument restructuring rules in the inner predicate domain of any multipredicate construction. For example, passives, reflexives, and object/subject reversals are all ruled out in the inner domain of Causatives or Instrumental applicatives in Kinyarwanda.[13] Given the general inner freeze for Kinyarwanda, nothing further needs to be said about multiple applicatives like (48).

5. Conclusion.

We have shown that Locatives and Instrumentals in Kinyarwanda have different structures: Locatives are oblique arguments; Instrumentals are adjuncts. This posited difference in structure explains why Locative applicatives and Instrumental applicatives differ. Locative applicatives involve the advancement of an oblique to object; the initial direct object is a chômeur as expected in Locative applicatives. Instrumental applicatives, however, do not involve Instrumental adjuncts in initial structure. Rather, they are multipredicate clauses having the same structures as derivational Causatives in Kinyarwanda.

Our analysis motivates a difference between Locative and Instrumental applicatives that follows from their initial structures. The difference between these structures under Kimenyi's

analysis was merely stipulated. Under our analysis this difference is expected. Moreover, the constructions we posit for Kinyarwanda, namely oblique advancements creating chômeurs and valence-increasing multipredicate clauses, are well attested in languages of the world.

Furthermore, given that Kinyarwanda has inner clause freeze effects in multipredicate clauses, we make the correct prediction concerning the multiple applicative construction. As the analysis in (53) shows, revaluation in the multipredicate clause precedesLocative advancement; thus, only the locative nominal exhibits object properties

A further feature of our analysis is that it accommodates the Kinyarwanda data without violating the Stratal Uniqueness Law. We propose then that Kinyarwanda is not a multiple object language, as claimed by Gary and Keenan, Kimenyi, and others, and it cannot be used to motivate the concept of multiple object languages in universal grammar.

Notes.

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[1]Much of the data in this paper is from Kimenyi (1980). We have followed his system of interlinear glosses, which he gives on p. xv. The following Relational Grammar abbreviations are used: 1 subject, 2 object, 3 indirect object, CHO Chômeur, INSTR Instrumental, LOC Locative, P Predicate, and $\hat{P}$ P-chômeur.

[2]Our Kinyarwanda consultant thinks that sentences like (1b) are somewhat artificial. He considers the sentences in (3) to be less so.

[3]In the parlance of Bresnan and Moshi (1990), Kinyarwanda is a symmetrical language if (2b) is considered but an asymmetrical language if (1b) is considered.

[4]This contrasts with an analysis for (12) involving retreat (Perlmutter and Postal 1983, Perlmutter 1989), as represented in (i):

(i)

	1	P	2	3
	1	P	3	2
	boy	give	book	girl

See Gerdts and Whaley (1991) for a brief discussion.

[5]Bresnan and Kanerva (1989) give an extensive discussion of the same phenomenon in Chicheŵa.

[6]Bickford (1986) argues that inalienable possessors ascend to 2 while alienable possessors ascend to 3.

[7]A variety of forms mark the causative, including -eesh and -j.

[8]Kimenyi's data and those of our consultant thus contradict the data in Dryer (1983).

[9]This claim is the RG equivalent of the structure for English instrumentals posited by Lakoff (1968). Lakoff's analysis, however, is a biclausal one while ours is monoclausal.

[10]Noting that Instrumental applicatives and Causatives take the same verbal morphology -iish, Kimenyi (p. 164) suggests: "Causatives and instrumentals are in fact drawn from the same structure, the only difference being that while subjects of causatives are always animate, those of instrumentals are inanimate." However, he does not give a reanalysis of instrumental applicatives along these lines.

[11]Revaluation in Kinyarwanda is actually more complicated than this, as discussed in Gerdts and Whaley (in preparation). The inner 1 is revalued as a 2, 3, or 4, depending on the valence of the second predicate.

[12]However, the data in (50)-(52) are problematical for the analysis of multiple applicatives given by Perlmutter (1989). Perlmutter posits that Instrumental applicatives involve retreat-inducing advancements to 2, while Locative applicatives involve chômage-inducing advancements to 2, and posits the following structure for sentences like (48):

(i)	1	P	2	INSTR	LOC
	1	P	3	2	LOC
	1	P	3	CHO	2
	teacher	write	math	chalk	blackboard

Thus, both the theme and the locative nominals should exhibit object properties and (52) is incorrectly predicted to be grammatical.

[13]Due to lack of space, we give no discussion of inner freeze effects here. See Gerdts and Whaley (in preparation) for data and discussion.

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RECIPROCITY IN SPANISH: A PUZZLE OF SCOPE
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1.0. **Introduction**[1]. Heim, Lasnik, and May (1991a, henceforth HLMa) note an interesting contrast in the behavior of the following sentences in English (their 78a-b):

1. a) They look like each other.
   b) They look alike.

As HLMa point out, when embedded, the two sentences have distinct properties (their 79a-b):

2. a) John and Mary think they look like each other.
   b) John and Mary think they look alike.

Sentence (2a) is ambiguous between broad and narrow scope interpretations. Thus, (2a) can either mean 'John thinks he looks like Mary, and Mary thinks that she looks like John' (the broad reading) or 'John and Mary think they (John and Mary) look like each other'(the narrow reading). In contrast, (2b) can only be construed with narrow scope. For HLMa the ambiguity of (2a) receives an explanation in terms of the morphological complexity of the reciprocal expression "each other". Specifically, the quantificational distribution element "each" is adjoined to an antecedent, which is then subject to QR via the rule move-α at logical form (see May 1977, 1985). Put simply, this allows for different scope interpretations, depending on how far up the phrase marker "each" is moved. In contrast, the morphologically simplex "alike" contains no detachable distribution element, and, as a result, only the narrow scope reading is available.
  Of interest here is the fact that HLMa base their argument on the distinction between reciprocal meaning that is incorporated within a morphologically simplex versus a morphologically complex item. In support of this claim, they offer the following minimal pair of sentences from Italian (attributed to Luigi Rizzi):[2]

3. a) I due pensano [di essersi   battuti]
      the two thought be-each other-clitic beaten
   b) I due pensano [di avere prevalso l'uno sull'altro]
      the two thought have prevailed the one over the other

  HLMa note that when taken by themselves, the embedded clauses in (3a-b) are both contradictory, but that only (3b) receives a non-contradictory reading in

the embedded construction. In a manner analogous to their treatment of the English data in (1-2), HLMa claim that this distinction is attributable to the fact that the clitic in (3a) forms a morphological unit with the verb to which it is attached and, thus, cannot be moved at LF. In contrast, they follow Belletti (1982) in arguing that the full form of the Italian reciprocal "l'uno...l'altro" includes a distributor "l'uno" which can be detached and moved at LF. Though no specific analysis is provided, it is assumed that the broad scope, and hence non-contradictory, construal of (3b) stems from the adjunction of "l'uno" to the antecedent "I due".

With these facts in mind, I consider the question of scope in Spanish reciprocal constructions. In sections 2 and 3, I present a surprising scope asymmetry between non-full (clitic) and full reciprocal constructions, which indicates that unlike English, the full reciprocal "el uno al otro" in Spanish does not allow for broad scope interpretation when embedded. In section 4, I argue that "el uno al otro" in Spanish is best analyzed as an adjunct, rather than as the subcategorized argument of the verb. And In section 5, I explore HLM's (1991b) "each-binding" variant of the movement analysis in HLMa. In 5, I argue that the above asymmetry can be accounted for in terms of the obligatory local A'-binding of the variable "el uno" of the adjoined "full form".

2.0 **Scope Ambiguities and Spanish "se"**. In looking at Spanish reciprocals, then, HLMa's analysis predicts that we should encounter similar scope restrictions for non-full reciprocal forms, that is, constructions containing only the reciprocal clitic[3]. Quite simply, if the clitic forms a morphological unit with the verb, no distribution element such as the English "each" is available for movement. Thus, embedded non-full reciprocals should be limited to narrow scope interpretations. In fact, this is not the case. Embedded clitic reciprocal constructions in Spanish systematically permit broad scope interpretations. Consider, for example, the data in 4-5, where (4b and 5b) can be considered structurally analogous to the Italian (3a).

4.a) Juan y María creían que   pro se habían visto.
    J   and M   thought that   cl.had   seen
    'Juan and María thought they had seen each other'
  b) Juan y María creían PRO haberse visto.
    J   and M   thought   have-cl seen
    'Juan and María thought they had seen each other'
5.a) Franco y Carrillo juraban que pro se odiaban.
    F   and C   swore   that   cl-hate
'Franco and Carrillo swore that they hated each other.'

b) Franco y Carrillo juraban PRO odiar<u>se</u>.
   F   and C   swore   hate-cl
'Franco and Carrillo swore that they hated each other.'

Both (4) and (5) are clearly ambiguous between broad
and narrow construals. Thus, (4) can be interpreted as
follows: 1) Juan thought he saw María, and María thought
she saw Juan (broad scope); 2) Juan and María thought
they (Juan and María) saw each other (narrow scope).
Likewise, (5) can either mean: 1) Franco swore that he
hated Carrillo, and Carrillo swore that he hated Franco;
or 2) both men swore that they (both of them) hated each
other.
    More evidence in support of the availability of wide
scope interpretations is found in the Spanish analogue to
(3a). HLMa claim that Spanish speakers "spontaneously
reject" the Spanish analogue to this sentence as "somehow
deviant". However, they do not specify which of the
possible analogues they provided for their informants.
The data in (6-7) can both be considered analogues of
(3a), and both are ambiguous between contradictory
(narrow scope) and non-contradictory (broad scope)
interpretations.

6. Emilio y Pedro creían PRO haber<u>se</u> vencido.
   E   and P   thought   have-cl defeated
   'Emilio and Pedro thought they had defeated each
                                                other'
7. Emilio y Pedro creían PRO haber<u>se</u> ganado.
   E   and P   thought   have-cl won
   'Emilio and Pedro thought they had won (over) each
                                                other'

    In contrast to Italian, then, it is clear that
Spanish systematically allows for broad scope construals
of embedded clitic reciprocals.
3.0 Scope and the Full Reciprocal "el uno al otro".
    The ability of clitic reciprocals to take wide scope
is, in fact, recognized by HLMa in a footnote (n.17).
They provide the following example:

8. Juan y María me confesaron secretamente que <u>se</u>
gustaban. Ambos piensan que no son correspondidos.
    'Juan and María confessed to me secretly that they
(clitic) liked each other. Both think that their feelings
(lit.: they) are unrequited.

    Obviously, a broad construal must be available here;
otherwise, the assertion that each believes that s/he is
unrequited would be anomalous. Of particular interest,

however, is that HLM claim that the circumstances under
which clitics can take wide scope are distinct from those
under which wide scope is available for their non-clitic
counterparts. As I have argued above, clitic reciprocals
regularly take broad scope. Ironically, however, it is
not clear that non-clitic reciprocals in Spanish do, in
fact, permit regular broad scope construals when
embedded. Consider the data in (9). Note that unlike
Italian, the reciprocal clitic obligatorily doubles the
reciprocal pronoun "el uno al otro" in the full form.
This issue is addressed in section 4 below.

```
9. a) Juan y María creían que pro se  habían visto el uno al otro
      J  and M    thought that  cl. had    seen the one the other
      'Juan and María thought they had seen each other'
   b) Juan y María creían PRO haberse    visto el uno al otro.
      J  and M    thought    to have-cl seen  the one the other
      'Juan and María thought they had seen each other'
```

In contrast to the ambiguous readings available for
(4a-b) above, (9a-b) can only be construed with narrow
scope. That is, the sentences in (9) can only mean that
"Juan and María thought that they (Juan and María) saw
each other." If, by analogy with English and Italian
(Belletti 1982), we maintain that the full reciprocal
contains an autonomous distributor "el uno", the lack of
a wide scope interpretation for (9) is surprising.
Paradoxically, in fact, the presence of the full form
enforces a narrow interpretation in sentences with
embedded reciprocals. This is seen clearly in the
following "full forms" corresponding to (6-7) above.

```
10. Emilio y Pedro creían PRO haberse vencido  el uno al otro.
    E      and P    thought    have-cl defeated the one the other
    "Emilio and Pedro thought they had defeated each other"
11. Emilio y Pedro creían PRO haberse ganado el uno al otro.
    E      and P    thought    have-cl won    the one the other
    "Emilio and Pedro thought they had won (over) each other"
```

Contrary to what is predicted by HLMa on the basis
of the Italian data in (3), only contradictory
interpretations are available in (10-11). In short, the
Spanish reciprocal is doubly puzzling: clitic reciprocals
permit scope ambiguity in embedded sentences, while full
reciprocals are only be interpreted with narrow scope.
4.0 **The Structure of the Reciprocal**. In order to treat
the issue of why full reciprocals prohibit broad scope
interpretations, it is useful to consider the structure
of the full reciprocal form. As noted above, full
reciprocals require clitic doubling in Spanish,
regardless of whether the verb subcategorizes for an
accusative or a dative object. In this sense, full

reciprocal (and reflexive) forms pattern with pronouns in triggering obligatory clitic doubling. Consider, for example, the familiar paradigms for non-reciprocal clitics:

12. *Accusative Clitics*   *Dative Clitics*

a. Juan cortó el pan.   d. Pedro le   pegó a Juan.
   Juan cut   the bread.   Pedro cl-dat. hit   Juan
                              'Pedro hit John'

b. Juan lo   cortó e.   e. Pedro le   pegó e.
   Juan cl-acc. cut   Pedro cl-dat. hit
   'Juan cut it'   'Pedro hit him'

c. *Juan lo   cortó el pan.   f. *Pedro pegó a Juan.
   John cl-acc cut   the bread   'Pedro hit Juan'
   'John cut the bread

      With respect to clitic doubling, accusative R-expression objects cannot be doubled, while dative R-expression objects must be doubled.[4] In (12a-c), the verb 'cortar' takes an accusative object. Thus, the accusative clitic "lo" cannot double the direct object "el pan", as seen in (12c). In contrast, the verb "pegar" in (12d-f) subcategorizes for a dative object. Here, the clitic <u>must</u> double the indirect object, as seen by the ungrammaticality of (12f). In both cases, the clitic surfaces when the object is an empty category, a fact which has led researchers such as Jaeggli (1986) to argue that clitics in Spanish can absorb case.[5]
      Interestingly, the distinction between "accusative" and "dative" verbs with regard to clitic doubling is lost when the "argument" of the verb is a pronoun. As shown in (12), the accusative assigning 'ver' and the dative assigning 'pegar' must surface with a clitic when they take pronominal objects.

13. *Accusative Clitics*   *Dative Clitics*

a. La   vi   a ella.   d. Le   pegué a él.
   cl-acc. saw-I   her   cl-dat. hit-I   him
   'I saw her'   'I hit him'

b. Vi   a María.   e. Le   pegué a Juan.
   saw-I María   cl-dat. hit-I   John
   'I saw Mary'   'I hit John'

c. *Vi   a ella.   f. *Pegué a él.
   saw-I her   hit-I him
   'I saw her'   'I hit him

      Of interest is the fact that in accusative forms, the appearance of a clitic is obligatory in two

environments: 1) when the argument of the verb is
missing, as in (12b); and 2) when the argument of the
verb is pronominal, as seen in the contrast between (13a)
and (13c). Additionally, it is important to note that
both dative and accusative clitic doubled pronominal
objects are marked constructions in Spanish. The full
pronoun is primarily used to mark a referential contrast
(see Jelinek 1984; Piñar 1991), and is thus given a
phonological prominence not found for non-pronominal
objects. It is not unreasonable, then, to hypothesize
that pronominal objects are not actually arguments, but
rather, adjuncts to the verb phrase, as Jelinek (1984)
argues. If this is the case, the seemingly odd fact that
accusative clitics must double post-verbal pronominal
objects, but cannot double R-expression objects, receives
a simple explanation. The two environments licensing
clitic doubling in accusatives are collapsed into one:
accusative clitics must surface when the subcategorized
argument is not overt. (13a) can thus be represented as
in (14), where, following standard assumptions (e.g.
Rizzi 1986), the clitic forms a chain with a coindexed
empty category.

14. La_1 vi e_1 [a ella]
    cl-acc. saw-I   e   her
    'I saw her'

    Returning to the issue of the reciprocal
construction, we recall that the full form "el uno al
otro" is obligatorily doubled by the reciprocal/reflexive
clitic, as shown in (15):

15.a) Juana y Pepe   se vieron el uno al otro.
      Juana and Pepe cl saw   the one the other
      Juana and Pepe saw each other
   b) *Juana y Pepe vieron el uno al otro.
      Juana and Pepe saw   the one the other.

The ungrammaticality of (15b) shows that "el uno al otro"
patterns with object pronouns in triggering obligatory
"clitic doubling." And, as with the pronouns, the "full
form" of the reciprocal is marked in Spanish, insofar as
its primary role is to disambiguate, that is, to
distinguish between possible reflexive or reciprocal
interpretations. (15a) can thus be assigned the structure
in (16), where "el uno al otro" is adjoined to VP.

16) $_{IP}$[Juana y $Pepe_1$ $_{VP}$[[se_1 vieron e_1]$_{NP}$el uno al otro]]
     J and P   cl saw   the one the other
    'Juana and Pepe saw each other'

In contrast, the non-full or clitic reciprocal is assigned the structure in (17), (see Rizzi 1986 and Manzini 1986 for a similar treatment of Italian "si"):

17) $_{IP}$[Juana y Pepe$_1$ $_{VP}$[se$_1$ vieron e$_1$]]
    J and P   cl saw
    'Juana and Pepe saw each other'

Note that if this analysis is on the right track, the descriptive generalization that emerges for Spanish is that only R-expressions can appear as overt arguments of the verb. Non-R-Expressions arguments are represented in terms of a chain consisting of an empty element and either a pronominal or an anaphoric clitic, with the clitic pronoun constituting the overt instantiation of the subcategorized argument. As I will show, the treatment of the full reciprocal "el uno al otro" as an adjunct allows for a straightforward account of the puzzle of scope described above.

5.0 **Accounting for the Scope Asymmetry**.

As pointed out in (2), the fact that clitic reciprocals permit wide scope readings poses technical problems for the "each-movement" type of analysis of HLMa. However, responding to Williams (1991), Heim, Lasnik and May (1991b; henceforth HLMb) propose an alternative analysis for English reciprocals, in which "each" is not moved, but rather, A'-bound by a distribution operator "D" adjoined to an antecedent of the reciprocal. Different scopes thus arise as a function of the distance between the variable "each" and its binder. If "each" is bound by an operator in the matrix clause, a wide scope interpretation obtains, while binding by an operator in the embedded clause accounts for the narrow reading. This is shown in (18): (their 7)

18.a) [[John and Mary]$_1$ D$_2$]$_2$ think they$_2$ like [each$_2$ other]$_3$
  b) [[John and Mary]$_1$ D$_4$]$_4$ think [[they$_1$] D$_2$]$_2$ like [each$_2$ other]$_3$

Here, (18a) represents the broad construal, as the variable "each" is bound by the D-operator adjoined to the matrix subject [John and Mary]. (18b) represents the narrow reading, as "each" is bound by the operator adjoined to the subject of the embedded clause.

In looking at the questions raised by the Spanish reciprocal, I will adopt the essential insight of the HLMb analysis of English. Specifically, I will argue that the constituent "el uno" patterns analogously with the

English "each" in functioning as a bound variable which
provides the contrast argument for "el otro" (see HLMa
for details relating to the semantics of the reciprocal
construction). Unlike English "each other", however, the
full reciprocal "el uno al otro" is an adjunct rather
than an argument, and, as a consequence, the bound
variable "el uno" is subject to strict locality
conditions. In contrast to the full form, I argue that
the morphologically "simplex" clitic reciprocal contains
no bound variable and is analyzed as an anaphor, subject
only to Condition A of the Binding Theory (Chomsky 1981,
1986, etc.). Scope ambiguities involving the clitic form
follow simply from whether the A-binder of the clitic
chain is itself a product of bound variable or
coreference anaphora.
5.1 **Clitic Scope**. Let us first address the case of the
non-full reciprocal. Consider the data in (4), here
repeated as (19);

19.a) Juan y María creían que pro se$_i$ habían visto e$_i$.
      J and M   thought that   cl. had   seen   e
      'Juan and María thought they had seen each other'

Simplifying somewhat from Chomsky (1986), if the chain
consisting of the reciprocal clitic and its coindexed
empty category is an anaphor, it must be bound in the
least complete functional complex (CFC) containing a
possible antecedent. In this case, the anaphoric chain
(se$_i$,e$_i$) must be bound within the IP containing "pro",
which c-commands the empty category and constitutes a
possible antecedent. Recalling the examples in (18), two
possible representations are available for the IP
containing pro. These are shown in (20):

20.a) [[Juan y María]$_1$D]$_2$ creían que pro$_2$ **se**$_2$ habían
        visto **e**$_2$.
   b) [Juan y María]$_1$ creían que [[pro$_1$]D$_2$]$_2$ **se**$_2$ habían
        visto **e**$_2$.
        J   and M   thought that pro   cl had
        seen   e
        'Juan and María thought they had seen each other'

      Scope ambiguity is thus accounted for as follows.
(20a) exemplifies the broad construal. Specifically,
"pro" receives its interpretation via bound variable
anaphora with the distributed matrix subject, as it bears
the index of the entire distributed NP. Given Condition
A, "pro" must be coindexed with the anaphoric chain
(se$_2$,e$_2$). As a result, the distributed NP of the matrix
clause takes scope over the whole sentence, thus

producing the broad reading. In (20b), however, the interpretation of "pro" is derived via its coreferential indexation with the non-distributed [Juan y María]. In turn, "pro" itself is subject to distribution by the operator D. Finally, the anaphoric chain, pace Condition A, is coindexed with the entire distributed NP $[[pro_1]D_2]_2$, thus providing the narrow construal. In short, broad scope obtains when the anaphoric chain is coindexed with an antecedent which receives its interpretation via bound variable anaphora. And narrow scope is accounted for via the coindexation of the anaphor with an antecedent subject to distribution under D. Note in (20b) that (se_2, e_2) cannot be coindexed with "pro" itself, as "pro" is not an argument, but rather, a constituent of the argument $[[pro_1]D_2]2$, and thus does not constitute a potential A-binder of the anaphor.

5.2 **Full Reciprocal Scope**. Given the analysis here, the full reciprocal construction contains an anaphoric chain (se_i, e_i) as well as the adjunct "el uno al otro". Like the English "each other" on the HLMb analysis, I argue that the full form contains a variable, "el uno" which must be A'-bound by a distribution operator. Recall that unlike "each other", however, the NP "el uno al otro" is an adjunct to VP, rather than an argument. Consider, then, (9a), here repeated as (21).

21. Juan y María creían que pro <u>se</u> habían visto <u>el uno</u> <u>al otro</u>.
      J   and M   thought that   cl. had   seen   the one the other
      'John and Mary thought they had seen each other'

      Following HLMb's treatment of "each other", (21) can be structurally represented as in (22):

22.a) *[[Juan y María]₁D₂]₂ creían que pro₂ ᵥₚ[[se₂ habían
            visto e₂] ₙₚ[el uno₂ al otro]₃].
     b) [Juan y María]₁ creían que [[pro₁]D₂]₂ ᵥₚ[[se₂ habían
            visto e₂] ₙₚ[el uno₂ al otro]₃].
            'Juan and María thought they had seen each other'

As in (20), the indexation in (22) satisfies Condition A with respect to the A-binding of the anaphor (se_2, e_2) by the subject of the embedded clause. In addition, however, the variable "el uno" must also be properly bound by an operator in A' position. In (22a), the closest A'-binder is the D operator adjoined to the matrix subject. Since the broad scope construal is not possible with embedded full reciprocals, I conclude that the variable "el uno" is subject to a strict locality condition. Specifically,

I claim it must be antecedent governed by its binder. Thus, the unavailability of the wide scope interpretation represented in (22a) is due to the fact that the bound variable is not antecedent governed by its binder, the D operator adjoined to the matrix subject[6].

Clearly, the possibility of wide scope interpretation in the English analogue to (22a) indicates that English permits long distance binding of the variable "each", while Spanish does not. An explanation for this difference lies in the argument/adjunct distinction. As a variable within an adjunct it is not unreasonable to expect that "el uno" should be subject to strict locality constraints, similar to those found for movement from adjuncts. Consider, for example, parallels to wh-extraction from adjuncts (see Lasnik and Saito 1984, Chomsky 1986b, etc.):

23) *How do you wonder who fixed the car t
24) *How did John announce a plan to fix the car t

Interestingly, though the embedded Spanish full reciprocal does not involve movement, the same adjunct island effects seen in (23-24) seem to obtain.

In contrast to (22a), the closest A'-binder in (22b) is adjoined to the subject NP of the embedded clause. Here, the clitic chain is A-bound by the embedded subject "pro" under distribution by D. The variable "el uno" is A'-bound and antecedent governed by the D adjoined to the embedded subject "pro". And the result is the narrow interpretation.

6.0 **Conclusions**. The data in this paper reveal a surprising scope asymmetry between full reciprocal and reduced or clitic reciprocal constructions in Spanish. Embedded clitic reciprocals permit both broad and narrow scope interpretations, while embedded full reciprocals are limited to narrow construals. This asymmetry is not predicted by the "each movement" theory of HLMa, and the fact that the Spanish data are more easily accommodated within the context of the "each-binding" framework of HLMb, constitutes an argument in favor of the latter approach.

Under my analysis, the lack of broad scope in embedded full reciprocal constructions finds an explanation in the argument adjunct distinction. The full reciprocal "el uno al otro" is analyzed as an adjunct to VP, with a variable "el uno" providing the contrast argument for "el otro". This variable must be bound by a distribution operator D, under strict locality conditions. Drawing parallels to wh-extraction from adjuncts, I claim that the D operator must antecedent

govern the variable, thus blocking broad scope construals. The clitic reciprocal contains no bound variable and is analyzed as an anaphor, subject only to Condition A of the Binding Theory. Scope ambiguities involving clitic reciprocals are derived straightforwardly from whether the A-binder of the clitic chain is itself interpreted via bound variable or coreference anaphora.

Notes
1. I would like to thank Andy Barss, Molly Diesing, Pilar Piñar, and Laura Conway for help with the issues addressed here. I also thank Pilar Piñar, Montse Sans, Rosa García, Raquel Mejía, Jorge Lemus and Esther Lemus for their native speaker intuitions on the examples used throughout. All errors are, of course, my own.

2. It is not altogether clear what is meant by "minimal pair" here. A significant difference between the two sentences would seem to be that the embedded verb meaning 'beat' in (3a) subcategorizes for an accusative NP, while the verb meaning 'prevail' does not take an NP complement. The presence of the reciprocal clitic would thus be impossible in (3b). The question of whether a non-contradictory construal of (3a) is available with the full reciprocal remains open.

3. As with other romance languages such as French and Italian, the reciprocal clitic is homophonous with the reflexive clitic. For simplicity, I refer only to the 3rd person clitic "se" throughout.

4. In the description of the data here, I limit myself to standard Peninsular Spanish, which does not allow clitic doubling of accusative objects. See Jaeggli (1982,1986).

5. See Suñer (1987, 1988) for a different perspective on the role of clitics.

6. Apparently, when there is no c-commanding long distance binder, a broad construal is available. Consider the following:

i. Sus_1 entrenadores dijeron que pro_1 se_1 ganarían e_1 [el uno_1 al otro]
   'Their coaches said they would beat each other.'

   Here, "pro" is coindexed with the non-c-commanding possessive "sus", and a non-contradictory reading is permitted. I leave this question for further research.

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Palatalized Velars and the Representation of Front Vowels
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1. Introduction

In this paper, I discuss the question of the representation of the so called front or palatalized velars, and its relevance to the question of the representation of front vowels.

First, I argue, on the basis of phonetic and phonological evidence, that palatalized velars do not exist, not in the sense in which there are palatalized labials or palatalized coronals. In other words, I argue that there are no complex segments with the primary velar articulation and the secondary articulation of a front vowel. Given this position, the question arises as to the representation of the sounds heard in words like "cat", 'Kevin', or 'keep' The answer I offer is neither novel nor controversial: I argue that these sounds are single dorsals which contrast with ordinary velars by being [-back].

Second, I consider the velar issue in the context of recent proposals concerning the representation of front vowels. In general, these proposals fall into two categories: those that treat front vowels as dorsal (Halle (1983), Sagey (1986), Gorecka (1989)), and those that treat front vowels as coronal (Clements (1979, 1990), Hume (1989)). Since the proposals due to Clements and Hume represent velars as dorsal, and front vowels as coronal, they predict that there should be complex segments which are velar, and which have the secondary front vowel articulation: in fact they predict that there should be segments like palatalized velars, which would pattern with palatalized coronals, palatalized labials and so on.[1] This prediction is a consequence of the fact, observed by Halle (1983), and Sagey (1986), that any two independent articulators can be combined into a complex segment.

The proposals which treat front vowels as dorsal, on the other hand, predict that palatalized velars should not exist: if both front vowels and velar consonants are coronal, then, palatalized velars are blocked on the assumption that a single articulator cannot produce two constrictions simultaneously.

Since the proposals that treat front vowels as coronal cannot account for the fronted velar facts, and the proposals which treat front vowels as dorsal can, I submit these facts as evidence that front vowels are phonologically dorsal.

Finally, I consider the arguments for treating front vowels as coronal. I argue that both the facts which have motivated these proposals, as well as the fronted velar facts can be explained in a feature system which recognizes passive articulator features such as palatal or velar, in addition to active articulator features like coronal or dorsal. This is the feature system proposed in my dissertation (Gorecka (1989)). I argued for it on the basis of palatalization, velarization, and other

phenomena in which sounds form natural classes in terms of constriction location features rather than in terms of active articulators.

2. Fronted and palatalized velars are not different sounds:

Let us begin with the question of palatalized vs. fronted velars. In phonetics, the two labels are often distinguished as follows: palatalized velars are posited in languages which have an underlying contrast between the front and the plain velar, fronted velars are considered allophones of velars before front vowels.

Keating and Lahiri (1990) present acoustic and articulatory evidence that the labels "palatalized velars" and "fronted velars" refer to the same phonetic type: a sound produced with the constriction in the back of the hard palate. Fronted and palatalized velars are also acoustically identical: when they precede a front vowel (which is the only position in which they can be compared, since fronted velars do not occur anywhere else), their spectral prominence corresponds to the third formant of the vowel.[2] Given these findings, there is no reason to distinguish between fronted and palatalized velars in articulatory terms; therefore, from here on I will refer to both underlying and derived variants as "fronted velars"--for short.

3. Is /k´/ a single or a complex segment?

Even with the issue of fronted vs. palatalized velars resolved, the question that remains is whether fronted velars are to be treated as [-back] dorsals or as palatalized dorsals[3], with the secondary front vowel constriction. The two options are sketched out in (1):

(1)

        (a) k´:   (b) kʲ:

        Place   Place
          :   :

         dorsal   coronal   dorsal
        - back
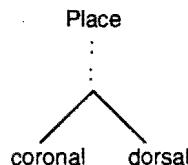
As already pointed out, it is not the case that the two representations in (1) can be generated simultaneously and compared within any currently available feature model. Instead, the different models that are available make different predictions on this subject. Let us consider these predictions.

Even though a number of views on segment representation have been presented in recent literature, as far as the treatment of front vowels is concerned, most of these views can be divided into two categories: the first category consists of proposals which assume that front vowels are dorsal; in the second category are the proposals which treat front vowels as coronal.

The proposals which assume that the active articulator in front vowels is the tongue body, must represent fronted velars as single segments, namely [-back] dorsals. They are incapable of representing these sounds as complex segments, because they treat both velars and front vowels as dorsal, and there cannot be simultaneous complex articulations produced with a single articulator. For the same reason there are no labialized labials or coronalized coronals.

The proposals which assume that front vowels are coronal must represent fronted velars as complex segments: these proposals eliminate the feature [back], and replace it with the coronal node. Consequently, they treat [-back] harmony as a coronal harmony. Since fronted velars can trigger [-back] harmony (e.g., in Turkish) it follows that they must be coronal, in addition to being dorsal.

Both phonetic and phonological evidence supports the single articulation view of fronted velars. As pointed out by Keating and Lahiri (1990), fronted velars do not look like doubly articulated sounds on X-rays: they do not involve two constrictions nor one long constriction, typical of complex segments such as palatalized coronals or labials; rather, their constriction is of the same length as in other velars.

Next, consider the phonological patterning of fronted velars, as observed in Russian and Bulgarian. Both these languages have fronted velars in the underlying inventory, as well as the full series of palatalized consonants. They also have phonological processes which manipulate palatalized segments. Thus they provide an excellent base for testing the different hypotheses about fronted velars.

Russian has a well known rule which spreads secondary palatalization from any palatalized segment onto the sibilants /s/ and /z/. The data are shown in (3) (the segment inventory of Russian is shown in (2)):

(2)   Segment inventory of Russian (Jones and Ward (1969)): p, p^j, b, b^j, f, f^j, v, v^j, m, m^j, t, t^j, d, d^j, ts, s, s^j, z, z^j, n, n^j, l, l^j, r, r^j, č, š, ž, k, g, k´, x, i, ɨ, u, e, o, a.

(3)   sp + at^j --> spat^j sp + it --> s^{j}p^{j}it   'sleep'
      jazv + a --> jazvə   jazv + e --> jaz^{j}v^{j}e   'ulcer'
      kresl + o --> kr^{j}eslə   kresl + e --> kr^{j}es^{j}l^{j}e   'armchair'

(3) illustrates the effects of two rules: one spreading palatalization from a front vowel onto the preceding consonant, and the second rule, spreading palatalization from the consonant onto the preceding sibilant.

Next, let us examine the way in which these rules treat velars. First, we observe in (4) that velars become fronted (or palatalized) before front vowels:

(4)   knig + a --> kn^{j}igə   knig + e --> kn^{j}ig´e   'book'
       ruk + a --> ruka   ruk + e --> ruk´e   'hand'

This could be viewed as a sign that they are subject to the same rule which affects labials, coronals, etc. However, note that after having been fronted (or palatalized), they do not have the palatalizing effect on the preceding sibilants. This is shown in (5):

(5)   mask + a --> maska   mask + e --> mask´e   'mask'
       mezg + a --> m^{j}ezga   mezg + e --> m^{j}ezg´e 'pulp'

Let us summarize the facts: we observe that the trigger of the rule which spreads palatalization onto sibilants is any palatalized segment. This rule does not treat fronted velars as palatalized.
    Note: while the facts in (5) could be accounted for in terms of rule ordering (perhaps velars are not palatalized at the point when palatalization spread applies), this solution only shifts the peculiarity of velars elsewhere: it requires that they be immune to the rule which spreads palatalization from a front vowel onto a labial or coronal.
    Another possibility that must be ruled out is that velars have a depalatalizing effect on palatalized sibilants. The following data indicate that underlying palatalized sibilants are not affected by the following velars, fronted or otherwise:

(6)   s^{j}is^{j}ka   s^{j}is^{j}k´i   'boobies'
       mos^{j}ka   mos^{j}k´i   'little dogs'
       avos^{j}ka   avos^{j}k´i 'little bags'
       os^{j}ka   os^{j}k´i   'little axis'

There is yet another way in which velars in Russian fail to pattern with other segments under palatalization. In the context of cyclic palatalization, virtually all consonants of Russian turn into their palatalized counterparts. Examples illustrating the effect of the cyclic suffix /-it^j/[4] on stem-final consonants are shown in (7):

(7)   sposob + Ø --> sposəp   pri + sposob + it^j -> pr^{j}ispʌsob^{j}it^j
       way   n. sg.   'way'   prep.   way   V   'to adapt'

       molot + Ø --> molət   molot + it^j --> məlʌt^{j}it^j
       hammer n.sg. 'hammer'   hammer V   'to thresh'

mir + Ø --> mʲir   mir + itʲ --> mʲirʲitʲ
peace n.sg. 'peace'   peace V   'to reconcile'

oxran + a --> ʌxranə   oxran + itʲ --> ʌxrʌnʲitʲ
protection n.sg. 'protection'   protection V   'to protect'

bel + ij --> bʲelij   bel + itʲ --> bʲelʲitʲ
white n.sg. 'white'   white V   'to whitewash'

gotov + ij --> gʌtovij   gotov + itʲ --> gátovʲitʲ
ready n.sg. 'ready'   ready V   'prepare'

groz + a --> grʌza   groz + itʲ --> grʌzʲitʲ
storm n.sg. 'storm'   storm V   'to threaten'

Let us now consider the effect of cyclic palatalization on the voiceless velar stop. This segment has a fronted counterpart in the UR, as demonstrated in (8):

(8)   Underlying /k´/ in Russian (Jones and Ward (1969)):

tk´ot   'weaves' ·   luk´anəf   'proper name'
k´uvʲetka   'tray'   k´osk´er   'kiosk attendant'

Now, if fronted velars were indeed palatalized counterparts of plain velars, then, given that cyclic palatalization is structure preserving, we would expect it to derive fronted velars. This effect is observed commonly across languages: if the segment inventory of a language contains a palatalized counterpart (e.g., /tʲ/) of the segment targeted for palatalization (/t/), the result of palatalization is the palatalized counterpart (/tʲ/) (see Gorecka (1991) for further discussion). Contrary to this expectation, in Russian, velars turn into palato-alveolars under cyclic palatalization:

(9) ruk + a -->   ruka   po + ruk + itʲ   --> pəručitʲ
      hand n.sg. 'hand'   prep. hand V   'entrust'

      muk + a -->   mukə   muk + itʲ --> mučitʲ
      torture   n.sg. 'torture'   torture V   'to torture'

      drug + Ø -->   druk   drug + itʲ --> družitʲ
      friend   n.sg. 'friend'   friend V   'to be friendly'

Clearly, as shown in (9), the phonology of Russian does not treat fronted velars on a par with palatalized segments.

    Next, let us consider the facts of Bulgarian. The segment inventory of the language is shown in (10):

(10)   Segment inventory of Bulgarian (Scatton (1984)): p, pʲ, b, bʲ, f,
fʲ, v, vʲ, m, mʲ, t, tʲ, d, dʲ, ts, tsʲ, s, sʲ, z, zʲ, n, nʲ, l, lʲ, r, rʲ, č, dž,
š, ž, k, k´, g, g´, x, x´, ı, ɨ, e, u, o, a)

Bulgarian has a process which depalatalizes palatalized consonants
before front vowels. Effects of this process are shown in (11). In (11a)
stems which end in palatalized consonants are followed by non-front
vowels; here, the palatalization is preserved; in (11b), the same stems
are followed by front vowel suffixes; here the palatalization is no longer
present. Finally, examples in (12) show that palatalized and plain
consonants contrast before non-front vowels:

(11)(a)   konʲ + o --> konʲo   (b)   konʲ + e --> kone   'horse'
          učitelʲ + ət --> učitelʲət   učitelʲ + i --> učiteli 'teacher'

(12)   ston + i --> stonit   ' the moan'
          konʲ + i --> konʲit   'the horse'

In the environment in which palatalized consonants are depalatalized,
velars are fronted[5]:

(13)   błag + Ø --> błag   błag + i --> błag´i   'sweet'
       knig + a --> kniga   knig + i --> knig´i   'book'

The same is true of underlying fronted velars: they remain fronted before
front vowels[6]:

(14)   telk´ + a --> telk´a   telk´ + i --> telk´i   'axe'

Here, again we are faced with the behavior of fronted velars which does
not parallel the behavior of palatalized consonants. Simply put, fronted
velars look like they are structurally distinct from palatalized segments.

   Let us summarize the observations made so far: first, we have
considered the articulatory evidence, and noted that it does not support
the complex articulation view of fronted velars. Second, we have
examined the behavior of fronted velars in Russian and Bulgarian, and
concluded that fronted velars in these languages do not behave like
palatalized segments.

   At this point someone could argue against making universal
claims on the basis of the phonologies of two languages, which, to make
things more difficult, are genetically related. However, it is not the case
that we must rely solely on Russian and Bulgarian for evidence about
fronted velars: Consider something as common as velar fronting. It
should not be dismissed from phonology as an automatic process, as
there are languages which do not have it, and even in languages which

do have it, not all velars are subject to it. For example, in Polish the voiceless velar fricative is not fronted.

Let me now point out the following: if velar fronting were indeed an example of palatalization (as it is implied by the theories which treat front vowels as coronal), there would be no explanation for the fact that it occurs so commonly, and, most of the time, **in the absence** of other palatalization phenomena.

The frequency of velar fronting suggests that there is an intimate relationship between velars and front vowels. In the next section I will show that this intimacy is easily explained if both types of segments are assumed to be dorsal.

4. Are front vowels coronal?

By now, I have considered a whole range of arguments against treating fronted velars as complex segments, structurally parallel to palatalized segments. The same arguments, viewed together with the fact that the traditional labels "fronted velar" and "palatalized velar" map onto one phonetic type, lead us to conclude that palatalized velars do not exist. Not in the sense in which the word "palatalized" implies secondary front vowel articulation.

As I have pointed out earlier, this state of affairs is difficult to explain under the assumption that front vowels are coronal. This is because there cannot be a universal prohibition against segments which are both coronal and dorsal, as velarized coronals do occur: for example, in Russian, all consonants which are not palatalized, are by default velarized; this includes all coronals. Similarly, Shona has velarized coronals. By contrast, the theories which treat both velars and front vowels as dorsals actually **predict** that there should not be palatalized velars, as such segments would necessarily involve the dorsal articulator executing two constrictions simultaneously. The representation which such theories assign to a fronted velar is that of a [-back] dorsal. This representation accounts straightforwardly for the behavior of fronted velars reported in this paper: if fronted velars are [-back] dorsals, then they are segments with a single articulation, and should not be expected to act like complex segments.

This representation also makes it easy to understand the facts of velar fronting: If fronted velars are [-back] dorsals, then it follows that they are derived through the spreading of the feature [-back] from a front vowel onto the dorsal node of a plain velar. Clearly, such a process does not involve the creation of a complex segment. This is a highly desirable result, as the phenomena which create complex segments have a rather marked status in the languages of the world; palatalization of a labial or a coronal is nowhere near as common as velar fronting.

Another advantage of this treatment of fronted velars, and the analysis of velar fronting which it entails, is that it explains why velar fronting stands in no relationship to palatalization phenomena in any

given language. It predicts that there should be languages which have velar fronting and no palatalization, and this is true of languages such as French, Spanish, German, and many more.

5. Dealing with the facts on which the coronality of front vowels has been based; constriction location features

Let us now turn again to the question of the representation of front vowels. If the fronted velar facts are viewed as evidence for treating front vowels as dorsal, then it is natural to ask how the phonological theory is to account for some of the phenomena which are dealt with within the proposals to treat front vowels as coronal. In particular, the question is how the consonant vowel interaction facts, such as palatalization, or pharyngealization are to be accounted for.

Consider, as an example, the issue of palatalization, beginning with a simple case of a dental/alveolar turning into a palato-alveolar before a high front vowel in Japanese:

(15)(a)   Segment inventory of Japanese (Maddieson (1984)):
i, ɯ, ɛ, ɔ, a, p, pː, b, t, tː, ď, ts, s, sː, z, n, ɾ, č, čː, dž, š, šː, çː, j, k, kː, g, ŋ, ɣ̃, w, h.

(b)	tatami	'mat'	tegami	'letter'
	čiči	'father'	šita	'under'
	natsu	'summer'	kata	'person'
	čizu	'map'	uči	'house'

If front vowels are dorsal and palato-alveolars are coronal, then how is the palatalization process to be represented? In the original SPE model, there were linking rules which basically interpreted [-back] [+anterior coronals] as [-anterior] coronals. However, as pointed out by Clements (1976), these rules somehow failed to capture the intuition that palatalization is an assimilatory process.

This intuition is well rooted in phonetic evidence: the palato-alveolar and the front vowel do share an articulatory property: they are both produced with a constriction against the hard palate!

In a system which adheres closely to the SPE feature inventory, such as Sagey (1986), this similarity between palato-alveolars and front vowels cannot be represented, because in such a system only the coronal sounds can be characterized as articulated against the hard palate; only the coronal sounds can be characterized as [-anterior].

Suppose, however, that we free the feature [-anterior] from its dependency on coronal; suppose that we make it a privative feature, say, "palatal", and make it accessible to both the coronal and the dorsal articulator--we will get a system capable of representing palatalization as

an assimilatory process, without having to posit the coronality of front vowels.

This way of accounting for palatalization, when extended to natural class phenomena which group together sounds like velar consonants and back rounded vowels, or pharyngeal consonants and low vowels, leads to a view of segment representation in which all sounds are specified in terms of passive articulators. This is the system for which I have argued in my dissertation. The general schema for representing the point of articulation in such a system is shown in (16):

(16)

```
                          Place
                            |
                       Constriction
                          /    \
                      Site    Articulator
                                  |
                                [+/-F]
```
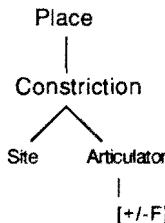
Site: {labial, anterior, palatal, velar, pharyngeal}
Articulator: {lower lip, coronal, dorsal, radical}
F: {[high], [back], [ATR], [distributed]}

Let us now consider the representations which a palato-alveolar, a front vowel, a plain velar, and a fronted velar receive in this model:

(17)

```
     /č/:                /i/:               /k/:               /k'/:

    Place               Place              Place              Place
      |                   |                  |                  |
      C                   C                  C                  C
     / \                 / \                / \                / \
Palatal  Coronal   Palatal  Dorsal     Velar  Dorsal      Velar  Dorsal
           |                 / \                                    |
      +distributed       -back -high                             -back
```
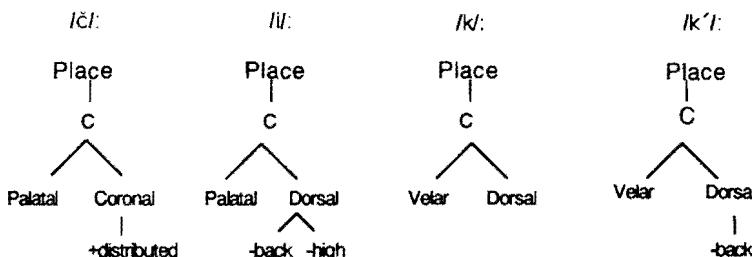
It is easy to see how these representations account for the palatalization phenomena, and the fronted velar facts at the same time. First, they satisfy the requirement that front vowels and palato-alveolars form a natural class for the purpose of palatalization: they share the feature Palatal Site. Second, they account for the absence of palatalized velars: since both front vowels and velar consonants are dorsal, they cannot

form a complex segment, on the assumption that one articulator cannot execute two constrictions simultaneously (Halle (1983), Sagey (1986)). By the same token, cyclic palatalization facts in Russian are explained: if the spread of palatal constriction onto a velar cannot result in a complex segment, then it follows that the output of such a process must be a simple segment. In the case of Russian, reanalysis produces a palato-alveolar: a palatal sound executed with the coronal articulator, because Russian does not have the palatal stop: a palatal sound produced with the dorsal articulator.

Let us now turn to velar fronting. Earlier, I have accounted for it in terms of the spread of [-back] from the front vowel onto the dorsal node of the velar consonant. However, with the representations which allow site features, a better explanation suggests itself. Consider the number of articulators that can form a constriction against the soft palate: there is just one: the dorsal articulator. This means that under any theory of underspecification (cf. Archangeli (1984), Archangeli and Pulleyblank (1986), Steriade (1987)), velars do not need to be specified as dorsal in the Underlying Representation. Given this, velar fronting and in fact all cases of velars tracking the articulatory configuration of the tongue body in a vowel can be treated as derived through feature filling spreading of the dorsal articulator onto a velar constriction. This process is illustrated in (18):

(18)   Velar fronting:
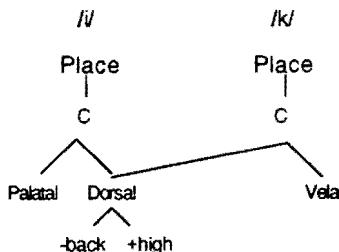
Finally, in order to account for the fact that velar fronting is such a common phenomenon, I assume, primarily on the basis of compensatory lengthening facts, that rules which fill in features by spreading take precedence over the rules which assign default values.

6. Summary:

Let me now summarize briefly the points made in this paper. I have addressed here the question of the representation of fronted velars and its relevance for the representation of front vowels. I have argued

that fronted velars cannot be treated as palatalized segments, and I have shown that the absence of palatalized velars is best explained on the assumption that front vowels and velar consonants are both produced with the dorsal articulator. I have then considered the question of how the theory which treats front vowels as dorsal might account for the facts that are dealt with within the theories which treat front vowels as coronal. I have suggested that both these facts and the fronted velar facts receive natural explanation within the model of segment representation which recognizes constriction location features.

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[1]Although not considered in this paper, the proposals to represent sounds solely in terms of constriction location features, or equivalent (e.g., Hulst (1989), Kaye Lowenstamm and Vergnaud (1985)), make the same predictions with respect to palatalized velars. Or, more accurately, they lack the capacity to rule out such segments.

[2] According to Keating and Lahiri (1990), before back vowels "palatalized velars" have mid frequency peak.

[3]Where palatalization is assumed to be coronalization.

[4]/-itʲ/ is really composed of /-i/, a denominal suffix, and /-tʲ/, the infinitival suffix. This detail is omitted in the analysis, as it it has no consequence for the interpretation of the facts.

[5] Before cyclic suffixes all velars turn into palato-alveolars.

[6] Stem-final fronted velars are not very common in Bulgarian. I owe this particular example to Ernest Scatton, p.c.

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Compounding Verbs in Sekani

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1 Introduction: Sekani (Athapaskan) Verbs

The morphology of Athapaskan verbs is rather remarkably complex. It is perhaps most simply described, from an atheoretical point of view, in terms of a template consisting of various slots or positions into which the verb stem and various classes of affixes may be inserted.[1,2] There have been a variety of attempts to integrate this complexity into current linguistic theory, including the works by Rice, Speas, McDonough, and Hargus cited in the references. In a sense, the most ambitious of these was that by Hargus, whose model of the Sekani verb closely parallels the analysis of English proposed by Kiparksy and by Mohanan as well as others working within the framework of Lexical Phonology. The basic starting point for this model, and many other morphological theories, is the assumption that the stem forms the core of the verb to which affixes are successively attached, in an order partly determined by the levels to which they have been assigned, as indicated in (1). The main point of the present paper is to argue that in fact we must recognize a different constituency for the Sekani verb, one according to which the set of morphemes known as the conjunct prefixes are combined with one another to form a constituent which does not include the verb stem; instead, the verb stem and this conjunct constituent form a sort of compound, as in (2). I will refer to these two analyses as the stem-core hypothesis and the compounding hypothesis respectively.

(1)   The Stem-Core analysis:

[ɣuyə   ɣə   z   gwət]   "they poked them"   (p. 127)
/ ɣuyə   ɣə   s   gwət /
   3pO   3pS   cnj   poke
    7   8   10   stem
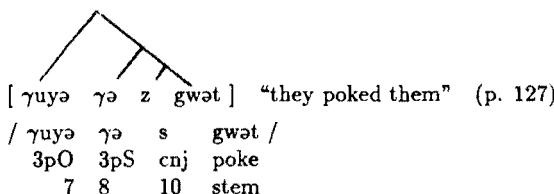
(2)   The Compounding analysis:

[ɣuyə   ɣə   z   gwət]
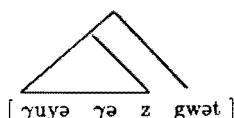
A fundamental premise of this paper is that the domains within which phonological processes apply constitute prosodic constituents (see Nespor and Vogel 1986 for an introduction to the Prosodic Hierarchy). That this is true for the phonology of words as well as the phonology of phrases has been argued by Inkelas (1989), as well as Booij and Rubach (1984), Nespor and Vogel (1986) and Cohn (1989). I will show that the constituency of the stem-core model makes a variety of incorrect predictions regarding rule domains in Sekani and must be replaced by the compounding model. This conclusion complements McDonough (1990)'s analysis of Navajo by adding a discussion of the domains of phonological rules to her observations regarding syllable structure. Towards the end of the paper, I will discuss the manner in which the constituency of the compounding hypothesis is to be derived.

A brief overview of the Sekani verb will be helpful. From the examples in (3), we can see that the verb stem comes basically at the end of the entire verb, followed only by an aspectual suffix which will not concern us here. Preceding the verb are a potentially large number of prefixes which can be broken down into a number of different classes based on their order, function and phonological properties. The classification of prefixes can be summarized in the chart or template given at the end of the paper, where the order of classes, the major phonological boundaries, and their membership are indicated. Also indicated are the levels of Hargus's lexical phonology model and the separation of prefixes into the conjunct and disjunct regions. A note on notational conventions: in sqaure brackets are the surface (phonetic) forms; below are morpheme-by-morpheme indications of the assumed underlying representation, a gloss, and the position class to which the morpheme belongs.

(3) a. [chechusədənìt'ats][3]   "we two walked into the water"   (p.136)

	/che	chu	sə	də	`nə	ì	d	?ats/
	into_water	water	1dS	der	cnj	1dS	clf	dual go
	2	3	8	9	10	12	13	stem

b. [dadàwhèts'ənįtl'ų]   "we started to set snares, one by one"

	/dah	dà	whè	ts'ə	nə	ì	n	tl'ų/
	up	dstr	incp	1pS	der	der	Pf	tie
	2	4	6	8	9	9	11	stem	(p.138)

One final preliminary comment: I will not be analyzing the disjunct prefixes, which are the least tightly attached of the morphemes in the verb. I assume, as is common in the analysis of Athapaskan languages, that they are attached after the rest of the verb is formed (that is, they are only part of the outermost constituent of the verb); I will have nothing more to say about them here.

2 The Stem-Core hypothesis and Bracket Erasure

There is a significant problem with the stem-core approach, in that, as discussed at length by Hargus, it requires a rather massive violation of bracket erasure in order to determine the applicability of various rules. In this section, I will discuss two such rules, Epenthesis and Voicing Assimilation.

Epenthesis applies to ensure that there is at least one syllabic element in the conjunct portion of the verb. That is, if there is no syllabic element due to a prefix from positions 7 to 12, a schwa is inserted. This is illustrated in (4) and (5), where the underlined schwa in these examples is not associable with any morpheme.

(4)   [əjin]   "S/he sings."   (p.280)

        /   d   yhən   /
             CLF   sing
             13   stem

(5)   [γǫzų sǫhəḷį]   "S/he takes good care of me."   (p.283)

        /   γǫzų   sə   γǫh   ḷį   /
             well   1sO   P   be
                    1   1   stem

Epenthesis, Hargus shows, is not triggered by the overall metrical structure nor by morphological properties of the verb. It really needs to be stated with respect to the conjunct prefixes: if there is no syllabic element due to a conjunct prefix, a schwa is inserted. If the conjunct prefixes belong to several different levels, as Hargus argues based on the fact that they act differently with respect to various rules, then the imposition of this condition on the epenthesis rule requires a clear violation of bracket erasure, given the stem-core hypothesis. To quote her, the problem is that various rules

> ... must refer to the external bracketing of level 1 when [they apply] on levels 3 [or later]. If Bracketing Erasure applies at the end of level 2 as predicted, this information about the extent of level 1 will be lost. (pp. 249-50)

She proposes that certain morphological boundaries can be exceptions to bracket erasure, here specifically those of level 1, so that Epenthesis can be stated as in (6): a schwa is inserted at the beginning of the word if no vowels intervene between the outer conjunct bracket and a level 1 bracket. The rule then applies at level 5.

(6) $\phi \longrightarrow \vartheta \ / \ \_\_ \ [\ C^* \ [_1$

Another rule which leads to the same problem is that of Voicing Assimilation. The voicing of stem-initial fricatives in verbs is predictable on the basis of the preceding segment: they agree. This can be seen in contrasts such as in (7) and (8), where the initial fricative of the stem appears unvoiced after an unvoiced segment and voiced after a voiced segment.

(7)   /   ʔònè   də   s   sòγ / $\longrightarrow$ [ʔònèdəs̱s̱òγ]
         out   der   1sS   spit
         2   9   12   stem   "I spit."   (p. 93)

(8)   /   ʔònè   də   sòγ / $\longrightarrow$ [ʔònèdəẕòγ]
         out   der   spit
         1   9   stem   "S/he spits."   (p.93)

It turns out that the voicing may be triggered by material from any level of the morphology, as seen in (9) and (10), where it is induced by the epenthetic ə, added at level 5 according to Hargus, or by a vowel from a disjunct prefix, also added at level 5.

(9)   /   ə   x̣ǫ   / $\longrightarrow$ [əʔǫ]
                     kill_pl_O
         epen   stem   "S/he kills [pl O]"   (p. 94)

(10)   [nàw̱ə̀t]   "s/he walks fast"   (p.94)

          /   nà   wh̀ə̀t   /
              cont   walk_fast
              2   stem

          (cp. [nàswhə̀t]   "I walk fast"   p. 94)

These examples show that VA must apply late in the derivation, after epenthesis and after the combination of disjunct prefixes and stems; in Hargus's terms, this means at level 5. yet it applies only to; fricatives in the verb stem and not in the prefixes, as seen in (11).[4] The question is how, at level 5, we can distinguish stem-initial fricatives from fricatives added at levels 2-4. The derivations in (12) show that voicing assimilation would overapply, assuming bracket erasure as usual.

(11)   [hàs̱əγìts'ì]   "s/he pinched me"   (p. 95)

          /   hà   sə γə   n   ts'ì   /
              adv   1sO   cnj   Pf   pinch
              2   7   10   11   stem

(12)   [whət]   [səɣiʔàs]   output of level 4
        [nà[whət]]   [hà[səɣiʔàs]]   level 5 affixation
        w   z   Voi. Ass.
        ─────────────   ─────────────────
        [nàwə̀t]   *[hàzəɣiʔàs]
                             (should be [hàsəɣiʔàs])

The solution to this proposed by Hargus is again to retain level 1 brackets (that is, make them exceptions to the BEC) and formulate the rules to make reference to these brackets, as indicated in the formulation of VA given in (13). Voicing spreads onto a fricative following a retained stem bracket.

(13)   Hargus's formulation of Voicing Assimilation:

$$[+\text{voi}] \quad \left[\begin{array}{cc} & C \\ & | \\ \left[\begin{array}{c} +\text{cont} \\ -\text{son} \end{array} \right] & \cdots \end{array} \right]_{stem}$$
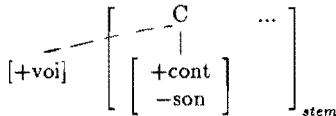
In addition to Epenthesis and Voicing Assimilation, the rest of the rules in (14) would, under the stem-core hypothesis, require retention of level 1 brackets.

(14)   Rules which require retention of level 1 brackets

        Epenthesis
        Voicing Assimilation
        Conjugation ə Deletion
        Continuant Voicing
        Gamma Lowering
        L Deletion
        Perambulative Reduction
        s Voicing
        Suffix Vowel Deletion

Allowing such extensive exceptions to bracket erasure is clearly a step in the wrong direction for a cyclic model of morphology and phonology, yet this is the inevitable conclusion, given the stem-core hypothesis.

3   An alternative: compounding

Consider how these conclusions can be modified given the compounding structure suggested in (2), where the conjunct prefixes form a constituent which is sister to the verb stem. We can reformulate Voicing Assimilation to refer to the juncture between the compound elements, as in (15). I assume that the compound juncture represents a prosodic constituency and therefore persists

despite bracket erasure, which is a condition on morphological representations. A similar revision is possible with Epenthesis, as in (16), where the condition on schwa insertion becomes one stated purely on the conjunct constituent; this rule is a sort of minimality satisfaction, as per McDonough (1990).

(15) Voicing Assimilation revised:

$$
\begin{array}{ccc}
\text{X} &][& \diagup\text{C} \\
| & \diagdown\diagup & | \\
[+\text{voi}] & & \left[\begin{array}{c} +\text{cont} \\ -\text{son} \end{array}\right]
\end{array}
$$

where][is a compound boundary
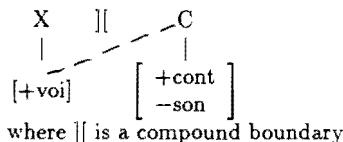
(16) Epenthesis revised:

$$\phi \longrightarrow \textschwa / [\ \_\_ \ C^*]$$

(where [...] is a stem – see McDonough 1990)

The theoretical advantage is clear: no internal brackets need to be retained from level to level; this is the initial motivation for preferring the compounding hypothesis to the stem-core hypothesis. Though there are some complications, all of the rules in (15) can be reanalyzed along the lines in (16).

4 Evaluating the compounding hypothesis

However successful these reformulations, we must consider whether there is any independent motivation for the compounding hypothesis. In fact, we can identify two substantive predictions made by the compounding hypothesis which I will argue are correct and therefore support the model. The predictions are the following:

- First, we predict that the conjunct prefixes will form a domain for the application of various rules.

- Second, we predict that there will be no constituent, and therefore no rule domain, consisting of the verb stem and a proper subset of the conjunct prefixes.

These predictions constitute not only cases where the compounding hypothesis could a priori be disproved, but also, if correct, indications of failings of the stem-core hypothesis, since it would have to treat them as accidents, rather than derivable properties of the grammar.

4.1 Arguments for a conjunct prefix domain and a stem plus classifier domain

Regarding the first of these predictions, the conjunct prefixes form a domain for the application of several rules, listed in (17).

(17)   Rules which treat the conjunct prefixes as a domain:

>   Conjugation ə Deletion
>   Prefix Vowel Deletion
>   Vocalization
>   Conjugation Tone Mapping
>   nə Absorption

These rules must satisfy their structural descriptions entirely within the conjunct prefixes, supporting the claim that these domains constitute morphological constituents. This is illustrated by the case of Conjugation Schwa Deletion. Simplifying a bit, the conjugation morphemes (position 10) are realized as C when they are final in the conjunct domain and are preceded by other conjunct prefixes. Otherwise, they surface as Cə. This alternation is illustrated in (18) and (19).[5]

(18)   [chunaʔəts'əsk'əts]   "We washed (O)"   (p. 143)

/	chu	na	ʔə	ts'ə	`sə	d	k'əts	/
	water	rev	unspO	1pS	cnj	clf	wash	
	3	5	7	8	10	13	stem	

(19)   [chunaʔə̀səsk'əts]   "I washed (O)"   (p. 143)

/	chu	na	ʔə	`sə	s	d	k'əts	/
	water	rev	unspO	cnj	1sS	clf	wash_OBJ	
	3	5	7	10	12	13	stem	

Hargus's version of the rule makes reference to level 1 brackets, but we can treat this as an alternation which is sensitive to the edge of the conjunct constituent, rather than brackets around the stem, as in (21). The Conjugation schwa alternation and the other rules in (19) confirm the first prediction.

(20)   Hargus's formulation:

$$\text{ə} \longrightarrow \phi \;/\; V \quad \{s,n,\gamma\} \;\text{---}\; [_1$$
$$\left\{ \begin{matrix} [+\text{cnj}] \\ [+\text{mod}] \end{matrix} \right\}$$

(applies at level 4)

(21)   Compounding analysis:

$$\mathrm{\partial} \longrightarrow \phi \; / \; V \quad \{s,n,\gamma\} \quad \text{---} \quad]_{conjunct}$$
$$\left\{ \begin{array}{l} [+\mathrm{cnj}] \\ [+\mathrm{mod}] \end{array} \right\}$$

(applies at the end of the formation of the conjunct constituent)

4.2   No inner-prefix plus stem domain

As for the second prediction. In order to demonstrate the existence of a rule domain consisting of inner prefixes plus the stem, what would be needed is a rule which satisfies its structural description with elements from the stem and elements from some inner conjunct prefixes, but not other, outer prefixes. The potentially relevant rules are those which Hargus assigns to level 2 but not (also) to level 3 or 4. There are not many such rules, but those which there are do not meet these requirements. Rules applying on level 2 but not 3 or 4 are given in (22).

(22)   Rules applying on level 2 but not 3 or 4 (after Hargus 1988)

            s Conjugation ə Fronting
            n Conjugation ə Fronting
            L Deletion

The situations regarding the Conjugation ə Fronting rules and for L Deletion are somewhat different. The Fronting rules make no reference to the stem and satisfy their structural descriptions entirely within the conjunct prefixes; as such, they offer no support for inner prefixes and the stem forming a constituent, though they do indicate something about the internal constituency of the conjunct constituent. They are consistent with our prediction. The L Deletion rule actually provides a stronger argument in favor of the second prediction, despite the fact that Hargus' description of the rule makes reference to the stem, or at least to its bracketing. L Deletion deletes all but the last low tone of the conjunct domain, as seen in (23), where the low tone due to the conjugation morpheme in position 10 would be expected to surface on the underlined schwa but because the subject marker in position 12 has a low tone, the conjugation tone is deleted.

(23)   [chechusədə̲nìt'ats]   "we two walked into the water"   (p.136)

/	che	chu	sə	də	`nə	ì	d	?ats/
	into_water	water	1dS	der	cnj	1dS	clf	dual go
	2	3	8	9	10	12	13	stem

Neither low tones from the disjunct prefixes nor from the verb stem are relevant

to this rule, as shown in (24), where the conjugation low surfaces despite low tones on the disjunct prefix in position 2 and the low tone on the stem.

(24)   [tàsə̰sihchèh]   "you [sg] carry me uphill"   (p.137)

/	tà	sə	`sə	n	h	chèh	/
	up	1sO	cnj	2sS	clf	handle_animate_object	
	2	7	10	12	13	stem	

Hargus's statement of the rule is as in (25). A low tone is deleted before another low preceding a level 1 bracket. This rule applies before the addition of the disjunct prefixes.

(25)   Hargus' L Deletion

$$L \longrightarrow \phi \;/\; \_\_ \; L \; [_1$$

She is quite clear about the reason for including reference to level 1 bracket: "[this] version of L Deletion ... will ensure that no stem tones trigger the deletion of low tones in prefixes" (p. 137). That is, reference to the stem serves to prevent the rule from satisfying its structural description with low tones from the stem. Under the compounding hypothesis, a simpler explanation is available: L Deletion doesn't apply to the stem because it applies before the stem has been combined with the conjunct prefixes. We can state the rule as in (26), where the operation is the same but we omit the level 1 bracket.

(26)   L Deletion revised:

$$L \longrightarrow \phi \;/\; \_\_ \; L \; \text{(applies within the conjunct domain)}$$

This rule not only does not support the inner prefixes+stem constituency but is simplified if we assume the constituency of the compounding hypothesis.

4.3   Syllabification and the licensing of codas

So far, we have seen that the compounding analysis would allow us to avoid the retention of morphological brackets from level to level. However, this rather theory-internal issue has been the only argument against the stem-core analysis. There hasn't been any empirical problem with it. There are, however, some empirical data which are problematic for the stem-core treatment. McDonough (1990) noted a very significant generalization regarding the distribution of codas in Navajo which appears to hold true of Sekani as well: the basic syllable is CV, with codas appearing in only two places: at the end of stems, and at the end of the conjunct domain (immediately before the stem). See examples (7), (18), (19), (24), (29) and (30) for conjunct-final codas. The licensing of a word (or stem) final coda is not so surprising; many languages permit codas only word-finally. The licensing of a coda immediately before

the stem is, however, a very strange fact under the stem-core analysis. One could conceivably claim that there was a rule which adjoined a consonant into a syllable immediately before the stem boundary, but this is an odd rule indeed. Worse, it fails to generalize across the two distributions. As McDonough points out, under the compounding analysis, the facts are easily explained: the parts of the compound are symmetric, and each allows an appendix coda. The distribution of codas then is one way in which the compounding analysis is more empirically successful than the stem-core analysis.

4.4   The status of classifiers

There is one set of affixes, namely the position 13 classifiers, which are somewhat ambiguous with respect to whether they count as part of the verb stem or as part of the conjunct domain. On the basis of two rules (D-effect and Palatalization), Hargus assigned them to level 1; that is, they attach to the stem more tightly than any other prefix. The fact that they trigger the D-effect and Palatalization, rules which only apply between the classifiers and verb stems, is explained by assigning both the morphemes and the rules to level 1. One way to interpret this, under the compound analysis, is to treat the classifiers as part of the stem constituent, rather than the conjunct constituent. That is, an example such as (27) should receive the analysis in (28).

(27)   [əsjin]   "I sing." (p. 280)
        /   s   d   yhən   /
            1sS   clf sing
            12   13   stem

(28)   [[s]$_{conjunct}$ [d yhən]$_{stem}$]

However, this causes problems for the description of several alternations in the surface form of the subject markers and the conjugation morphemes. The surface form of the s-conjugation morpheme and of the subject markers, when they are the final morpheme in the conjunct domain, is sensitive to the identity of the following classifier or to its absence; the alternations in question involve the rules of S-Voicing and Aspiration (p. 90), details of the application of the Conjugation schwa Deletion rules (pp. 142-51) and allomorphy of the subject markers (p. 89). I will exemplify only the alternation Hargus dubs s̱ Voicing; the other alternations raise similar issues.

(29)   [tadèz̲ʔǫ]   "s/he lost (a compact object)"   (p. 91)

    /   ta   də   s   ʔò   /
        lose der cnj handle-compact-object
        2   9   10   stem

(30)   [tǫnas̲dah]   "s/he goes back uphill"   (p. 149)

    /   tǫ   na   s   d   dah /
        up   rev cnj clf go
        2   5   10   13   stem

As seen in the preceding examples, the conjugation prefix (position 10) appears as [z] immediately before the stem, but [s] before the d-classifier. That the underlying representation of the s-conjugation morpheme has an /s/ rather than a /z/ is indicated by the fact that it surfaces as [`sə] when not the final conjunct morpheme – see (21). Given the stem-core analysis, the rule (be it phonological or allomorphic) which accomplishes the voicing would have to be able to make reference to the stem, or be able to identify the classifier prefixes, once again requiring retention of level 1 brackets. Hargus's formulation is given in (31).

(31)   Hargus's formulation of S-Voicing

$$s \longrightarrow z \ / \ \_\_ \ [\ \text{stem}$$

If, under the compounding analysis, we treat the classifier prefix as part of the conjunct constituent instead, then we are in a position to reformulate the rule such that it voices the conjugation /s/ if it is strictly final in the conjunct domain:

(32)   Compounding reformulation of S-Voicing

$$\begin{matrix} s \\ [+\text{cnj}] \end{matrix} \longrightarrow z \ / \ \_\_ \ ]_{conjunct}$$

Similar issues arise with the other alternations mentioned in this section; the allomorphy of position 12 subject markers and the deletion of conjugation schwa are sensitive to the identity of the classifier, if any. Aspiration (changing conjugation /s/ to [h]) applies before the l- and h-classifiers. The classifiers are not associable with any particular morphosyntactic properties,[6] so it must be the classifier morphemes themselves which are relevant to these alternations. If the classifiers form part of the stem constituent, then these alternations require access to the internal structure of the stem constituent to determine the applicability of rules to the conjunct constituent, at odds with the claims of the compounding analysis regarding rule domains and the accessibility of morphological structure. I conclude that the classifiers should be treated as

part of the conjunct constituent, leading the analysis of (27) as in (33), rather than (28):

(33)   [[s d]$_{conjunct}$ [γhən]$_{stem}$]

This conclusion requires some rethinking of the analysis of the D-effect, and Palatalization. If the classifiers, except for the h-classifier, are treated as floating autosegments (the d-classifier being [-cont], as suggested in Shaw 1991) and the l-classifier being [+voi] as suggested by Hargus 1988:87), then they may be treated as floating off the end of the conjunct constituent, with the possibility of being linked to the beginning of the verb stem if appropriate. The h-classifier is arguably an underlying /h/ which can surface in the coda of the conjunct constituent.

5   Conclusion

We have seen three arguments for treating the Sekani verb as involving a compounding of the verb stem with a constituent containing the conjunct morphemes: one, it makes it possible to treat the rules which required exceptions to Bracket Erasure as rules which refer to the juncture between the parts of the compound; two, it correctly predicts that various rules will operate on a domain consisting of the conjunct morphemes alone; and three, it explains the absence of rules which apply to inner conjunct prefixes plus the verb stem. Put another way, the constituency of the compounding analysis is used for rules of domain juncture (Voicing Assimilation), domain limit (Conjugation Schwa Deletion), domain span (L Deletion), and for minimality conditions (Epenthesis), as well as explaining facts about phonotactics and the Distribution of closed syllables, as argued by McDonough (1990) for Navajo.

Additional support for this position comes from the need for similar analyses in other languages. The verb in Nimboran, as analyzed by Sharon Inkelas (1991), consists of a verb stem followed by various bound forms which are separated from the stem by a significant phonological or morphological boundary. Inkelas argues persuasively against a templatic account as well as a stem-core account in favor of a view consistent with the compounding hypothesis.

Evidence for affixes forming separate prosodic domains also comes from from Polish, Italian, Japanese, and perhaps also from English. See Poser (1990), Booij and Rubach (1984), and Nespor and Vogel (1986). A final study to mention is that of Simpson and Withgott (1986), who argue that pronominal clitics often form a morphological constituent amongst themselves, prior to their attachment to their host.

There is one final question I would like to raise, though I will leave it unreseolved. I have suggested that the Sekani verb is a compound, yet I have

said very little about what that means in terms of the grammar. What sort of compound is it? The arguments have primarily involved prosodic constituency and phonological rule domains. What about its morphological or syntactic constituency? The default assumption would seem to be that they should be the same as the phonological constituency, yet a variety of work has shown that this is not always the case. See Kiparsky (1982) for a discussion of bracketing paradoxes, Inkelas (1989) for a general discussion of morphological and phonological mismatches, and Booij and Rubach (1984), Nespor and Vogel (1986), Cohn (1989) and Poser (1990) for discussions of affixes and stems forming separate prosodic domains, at odds with their morphological structure. The compounding hypothesis could be true of prosodic structure but the morphosyntactic structure could reflect the stem-core hypothesis. This is roughly the position adopted by Rice (1990) with respect to Slave. Alternatively, the morphosyntactic structure could match the prosodic structure more closely, leading to an analysis such as that of Speas (1990) or Inkelas (1991) according to which the conjunct morphemes are combined with one another morphologically before they combine with the stem. There is some support for the latter position, in that the affixes in positions 9-12 do undergo a variety of unproductive alternations which might best be interpreted as evidence for their forming a morphological constituent or even a portmanteau morpheme, as proposed by McDonough (1990) for Navajo. This remains an issue for further research.

Endnotes

[1]Such a template is given at the end of the paper.

[2]This paper is greatly indebted to Sharon Hargus's exemplary dissertation, which is the source of all the Sekani data cited here. Although I will be arguing against her conclusions regarding the overall structure of the Sekani verb, it is the thoroughness of her analysis which has made this paper possible. In the current draft, I have assumed that she is essentially correct regarding underlying representations and operations, and have restricted my investigations to the domains of rule application.Others who deserve thanks for discussion and suggestions include Pat Shaw, Sharon Inkelas, Bill Poser, and Diana Archangeli.

[3]Some transcription conventions:

wh = voiceless labiovelar fric.	ts' = alveolar ejective
ch = voiceless palatal stop	k' = velar ejective
l= voiceless lateral fricative	dz = voiced alveolar stop
j = voiced palatal stop	y = voiced palatal fricative
$\underset{\cdot}{V}$ = nasalized vowel	$\dot{V}$ = low toned vowel (syllable)
tl' = lateral ejective	

[4]If the voicedness of vowels, as a redundant specification, is not available early in a derivation, then Voicing Assimilation would have to apply late (at

or after level 5) even when the trigger is part of an affix added at an early level, as in (31).

[5]Under certain combinations of classifiers and disjunct morphemes this rule will apply even without a preceding vowel. The details are unclear.

[6]As Hargus says, "[i]n many forms which contain classifiers, the classifier appears to have no synchronic function, but is simply lexically specified [by the verb stem]" (p. 80).

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Templatic description of the Sekani verb (modified from Hargus 1988)

Position Class:	1	2	3	4	5	6		7	8	9	10	11	12		
Category:	P	ADV	IS	DIST	REV/CUST	INC	#	OA	DSA	DER	CNJ	MODE	SA	=	CLF+ stem+ aspect
Template Regions:		———— disjunct ————								———— conjunct ————					
Hargus's Levels:		———— level 5 ————							— levels 3&4 —		——— level 2 ———					— level 1

4	5	6	7	8	9	10	11	12
dà	na	xò	sə	γə	tsʼə	ˋnə	γo	s/i
yadà			nə	tsʼə	γə	ˋsə	γə	nə/n
			yə	sə	lə	γə	n	i
			naxə		də			ah/a
			wha		u			
			xə		įdə			
			naxə		zə			
			γu/ya		nə			
			γi/ya		i			
			ʔədə					
			ła					
			wə/γo					
			ʔə					

Key:
P incorporated postposition (+pronoun object)
ADV adverbial elements
IS incorporated stem
DIST distributive
REV/CUST reversative, customary
INC inceptive
OA object agreement
DSA deictic subject agreement
DER derivational, aspectual,
CNJ conjugation
MODE mode, aspect
SA subject agreement
CLF classifier

THREE CASE OF RESTRUCTURING IN MODERN PERSIAN

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I.   Introduction

Much has been written recently about "incorporated" structures, especially in the years since the appearance of Mithun's (1984) comprehensive discussion, which brought to light both the widespread nature of these structures and their historical development. This paper relies on insights from two important analyses of incorporation: Baker's (1988) carefully motivated analysis in terms of syntactic head-movement, and Sadock's (1985) claim that two alternative analyses can be assigned to a single string of elements. To these we add a third treatment of our own, which involves manipulating syntactic structures by a process we call "Restructuring". At the moment, we exclude discussion of Grimshaw and Mester's (1988) important syntactic analysis of Japanese forms similar to those we deal with in section 2 of this paper, because their data crucially ignore the lexicalized kind of examples which are of central concern to us.
     Briefly, then, the universe of analyses we will be working with looks like (1):

(1) Three Alternative Proposals:
    a. Baker (1988): Syntactic Head-Movement
    b. Sadock (1985): Dual Structure Assignment
    c. Heny/Samiian (1991): Restructuring

We will begin with the examination of N-V compound structures in Modern Persian, which superficially resemble Baker's case of noun incorporation (1988). However, we will show that the Persian facts fail to justify the appeal to as strong a tool as syntactic movement. In fact, the Restructuring analysis we adapt is reminiscent of Sadock's assignment of dual morphological and syntactic structures to a single string of words, since we could easily claim that the speaker has available both original and "restructured" versions for any given string. However, we leave our rule unspecified as to membership in a given component of grammar (morphology or syntax). The status of both input and output structures we also leave unspecified, to be determined by independent principles.

We illustrate our analysis using incorporation-like
N-V structures in Section II. In sections III and IV,
we apply this process to two other structures in
Persian, showing that it is capable of treating a broad
range of seemingly dissimilar facts.

II. Case One: Dual-Structure Compound Verbs

Baker's "noun incorporation" moves the head noun of
a complement (typically a direct object) into a position
clearly inside the verbal morphology, forming a new
compound-like unit with the verb. The process is very
productive for the languages which Baker stresses, such
as Mohawk and Southern Tiwa. The syntactic nature of the
process shows up most clearly in cases where the head
leaves behind a possessive, numeral, or adjectival
modifier, as in (2):

    2.   Incorporation (Baker 1988)
    2a.   Wa-hi-   nuhs- ahni:nu: John
          AOR-1sS/3M-house-buy   John
          "I bought John's house"   (Oneida, p. 96)

    2b.   Wisi be-seuan-mu-ban
          two 1sS:B-man-see-PAST
          "I saw two men" (Southern Tiwa, p. 94)

In (2a), from Oneida, the possessor "John" is
stranded in normal direct object position. In (2b),
from Southern Tiwa, the numeral "two" is likewise left
on its own by the movement of its head noun "men" into
the verb: this kind of example provides strong evidence
for incorporation as movement of a nominal head from a
direct object NP.
Baker further argues for the syntactic nature of
the process forming configurations like (2) on several
grounds.   The process is highly productive in the
languages he considers, applying to virtually any verb-
object pair; this productivity is, of course, a
traditional hallmark of syntax and notoriously lacking
in many morphological processes.   Furthermore, the
incorporated noun can be specific in reference, even
potentially serving as the first reference to the object
it names (but see Ouhalla 1990 and Williams 1989 for
some criticism of this latter claim).   Again, this
points away from the lexicon; it has often been noted,
for instance, that the reference of nouns inside
compounds cannot be construed as specific, and such a
noun cannot serve as antecedent to a personal pronoun
(cf. "I went to a ball game last week and the first
batter hit it").

Consider, now, in contrast, the characteristics of a superficially similar set of Persian N-V compounds, formed from a noun which could be thought of as the direct object, in some sense, of the verb with which it is compounded. But beyond the surface similarity, this kind of construction is totally different, as summarized in (3). First, these forms involve only a handful of verbs, whose semantic contribution to the compound is minimal (cf. English "take a walk" or "have a bath"). Furthermore, Baker's other arguments for incorporation as a syntactic process do no hold: since modifier-stranding of the type in (2) is impossible in Persian, no air-tight case for movement can be made on syntactic grounds. Semantically, too, these forms contrast with those of Mohawk, Oneida and Southern Tiwa: the incorporated N can never be specific in reference or show any of the signs of specific or definite reference.

3. Persian Dual-Structure N-V Compounds:
    a. Non-productive (formed only with a small set of semantically neutral verbs, e.g. kardan, "to do"
    b. No modifier-stranding possible.
    c. No specific reference or first-mention possible in interpreting N.

Added to this is the lack of clear proof for syntactic movement elsewhere in the language; all in all, we conclude that a syntactic analysis of these forms, illustrated in (4), runs into significant empirical problems, and complicates the grammar of Persian unnecessarily.
Obviously, an alternative account is preferable. Although we will have little occasion to repeat this later in this paper, it is clear from the facts in (3) that the process we propose must be capable of producing "words". In fact, we will claim that Restructuring of the sort we envision can produce output on both the word and phrasal levels, depending on the operation of other highly general principles which constrain the process as well as its output.
First, consider the straightforward examples of Persian N-V compounds in (4):

4a. Ba dust- an-es harf-zad   o ba'd raft
    with friend-pl-clit word-strike/pst/3s & then
    left
    "He spoke with his friends and then left"

4b. Bush dar in jalase <u>tasmim</u> <u>gereft</u> ke. . .
    Bush in this meeting decision take/pst/3s
    that. . .
    "In this meeting, Bush decided that. . . "

4c. Hasan dar naql -e in dastan <u>estebah-kard</u>
    Hasan in telling-EZ this story mistake
    make/pst/3s
    "In telling this story, Hasan made a mistake

Like their counterparts in Oneida, Southern Tiwa
and Mohawk, the N-V constructions we are focusing on
have counterparts clearly involving an NP-plus-V
syntactic formation; the counterparts to (4a-c) are
given in (5):

5a. <u>Harf-ha-yas-ra</u> ba dustan-es zad o ba'd raft
    <u>word-pl-clit-obj</u>
    "He said what he had to say to his friends,
    then left".

5b. Bush <u>tasmin-e mohemm-i</u> dar in jalase <u>gereft</u>
    ke. . . .
    decision-EZ-important-indef
    "Bush took an important decision at this
    meeting that.."

5c. Hasan <u>estebah-at-e</u> <u>faravan-i</u> dar naql-e in
    dastan <u>kard</u>
        mistake-pl-EZ many-indef
    "Hasan made many errors in telling this story"

Striking here is the intervention of other material
between N and V, as well as the modification of N (by
possessive, plural, and object markers in (5a), by
adjectival modifiers and the indefinite marker in (5b)
and (5c). The appearance of adjectives and possessors
makes it clear that we are dealing with NP here, not N;
and the presence of the object maker <u>-ra</u> in (5a) places
these constructions clearly on the level of syntactic
VP, not compound verb. A systematic treatment of the
compound-phrasal differences can be found in Heny
(1985), which outlines tests for compound status
involving the appearance of clitics, nominalization
types and subjunctive form as well as semantic
transparency.
     Now, to reiterate and illustrate our earlier claim,
the head nouns in (5) cannot be extracted to form N-V
units by incorporation Oneida-or-Mohawk style. Any
attempt to extract N from its phrase results in instant,
serious ungrammaticality, as in (6):

6. *Bush [e] -e mohemm-i dar in jalase tasmin; gereft.. (cf. 5b)

Thus, there is no mechanism for incorporation in NP-V structures containing any syntactic elaboration of N; even markers of inflectional morphology such as plural block the formation of a clear compound-like form. However, surprisingly enough, the converse seems also to be true: a non-elaborated "bare" noun cannot occur in the clearly phrasal kind of environment found in (5). No material may intervene between N and V if N is unmodified, as shown in (7).

7a. *harf ba dustan-es zad o ba'd raft
7b. *Bush tasmin dar in jalase gereft ke..
7c. *Hasan estebah dar naql-e in dastan kard

The problem with (7a-c) lies not in the elements that make them up, since the words are identical with those in (4a-c). Nor are bare, uncompounded, and unmodified direct objects banned in Persian; (8) below is superficially similar to (7c) above, except that it contains no potentially compoundable N-V pair; this again suggests the need for some way to allow the idiosyncracies of word formation to be accessible to the analysis of (4) through (7):

8. Hasan masin az in mard xarid
   Hasan car from this man buy-pst-3s
   "Hasan bought a car from this man".

To explain (7), one needs some consistent notion of basic VP-internal word order; unfortunately, there is no unanimity on this point in Persian. There are obviously two possibilities for the type of head-final VP in (7), and those are given in (9):

9a. NP - PP - V
9b. PP - NP - V

Neither structure yields a comfortable solution to the ungrammaticality of (7). (9a) would force us to explain why unmodified NP's must move out of basic position to a place immediately adjoining the verb. (9b), on the other hand, would require a constraint barring the "scrambling" of just one particular set of unmodified NP's.

Given the difficulty of using a syntactic analysis here for the reasons already stated, we can turn at this point to a solution adapted from Sadock's "Autolexical

Syntax"; this approach allows implicitly direct access to the word list in the lexicon in cases where compounding is less than fully productive. Taking structure (9b) as the syntactic base, we can adapt this view to claim that the native speaker assigns independent morphological and syntactic structures to the relevant N-V strings, as in the simplified version of (7c) in (10):

10:
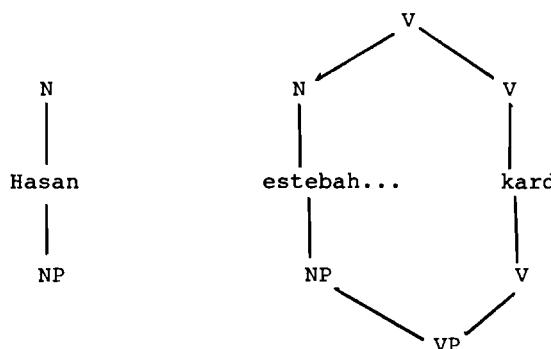
The syntax sees <u>estebah</u> <u>kard</u> as a VP; the morphology analyzes it as a verbal compound. The inflexibility in order is explained directly by Sadock:

>   11. ...morpheme ordering is generally completely
>   rigid and in any case in much stricter than
>   phrasal ordering. Thus, where there is a
>   conflict between the two, it will be the
>   principles of morpheme ordering that win out.
>   (Sadock 1985, P. 407)

Applying this principle, we could easily reach the conclusion that (7) is ungrammatical because it gives precedence to the demands of syntax instead of morphology. And overall, this view seems closer to capturing the dual structures we end up with in the language. However, two problems occur. First, it has been argued in detail elsewhere (Heny 1985) that Persian verbal compounds show the characteristics of V-Bar, not zero-level, lexical verbs, and that morphological theory must be formulated in such a way as to allow such formations. It is hard to imagine deriving the characteristics of this lexical-but-V-Bar status from the dual structure in (10).

The second problem with this approach -- or rather, the comparable strength of the Restructuring approach, will be dealt with in the last section. Meanwhile, we present here our own analysis-in-progress of this data, which involves rule (12):

12. Restructuring
    Restructure non-branching N with its unique sister, where "non-branching" N refers to the structure:

$$
\begin{array}{c}
N'' \\
| \\
N' \\
| \\
N
\end{array}
$$
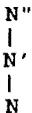
The term "restructure" itself must be dealt with in more detail. For now, applied to the cases we are considering, it can be read as an instruction to make N the sister of V in the most efficient way. This means pruning the N" and N' labels, turning (13a) into (13b) below:

13a.

$$
\begin{array}{c}
\quad\quad V' \\
N'' \\
| \\
N' \\
| \\
N \quad\quad V
\end{array}
$$

13b.

$$
\begin{array}{c}
\quad\quad V' \\
N \quad\quad V
\end{array}
$$
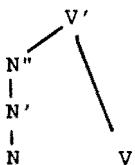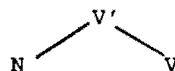
The compound retains V' status, although it functions semantically etc. as a word, possibly by virtue of its lexical specification. In fact, this rule reflects an asymmetry among verbal compounds in Persian. Forms like (10) are paralleled by others, such as PP-V compounds, where V-Bar status is more obvious at the surface by virtue of the existence of an already formed prepositional phrase (for example, be-kar bordan, literally "to-work-bring", meaning "to use").

The "unique sister" specification in (12) will explain the occurrence of cases like (8); typically, structures which involve the sequence bare-N plus PP plus V are indirect object structures. Thus, they fail to meet the environment for restructuring, since the non-branching in such structures has no "unique" sister. This question needs further work, including detailed

examination of any other potential sequences which allow
bare nouns as direct objects.

To summarize, the Restructuring approach seems to
us more appropriate for the Persian data than Baker's
incorporation analysis, since it avoids the undesirable
consequences of involving syntactic movement where so
few typically syntactic characteristics can be found.
Furthermore, although a multiple-structures analysis
like Sadock's seems close to the present approach, this
framework seems to lead to two problems. First, it seems
to offer little to distinguish between (7) and (8).
Second, it implies a division between syntax and
morphology stronger than we wish to defend at this
stage.

As a final comment here, it is worth pointing out
that the process we are calling "Restructuring", however
nebulous it may be at this point, is unlikely to add
anything significant to the power of a grammar. In
fact, some such process will be needed to deal with
traditional "pruning", and also to account for its
namesake, the well-known "restructuring" of the marginal
take advantage of type in English. We are assuming
that, with the proper· constraints built in, this
proposal need add no special new power to a grammar. In
fact, we will proceed in the next two sections to show
that this simple proposal has the added advantage of
being applicable to configurations which, on the
surface, are quite dissimilar.

III. Case Two: P-N Adjectives

Restructuring will extend quite neatly to encompass
P-N adjectival compounds such as those in (14):

   14. a.   por-rang ("full" + "color"):   "richly
            colored, strong (tea)"
       b.   por-qovvat ("full" + "power"):   "powerful"
       c.   bi-xab ("without" + "sleep"):   "sleepless"
       d.   bi-care ("without" + "recourse"):   ·
            "unfortunate"
       e.   ba-deqqat ("with" + "care"):   "careful"
       f.   ba-hus ("with" + "intelligence"):
            "intelligent"

Note that, although on the surface different, these
are precisely the kinds of forms we have been dealing
with: a normally Case-assigning head, accompanied by
its normal (nominal) complement type, in the usual order
(here, N following P).   In fact, it is surprisingly
difficult, for many of these forms, to distinguish
between PP and Adjective, since the two have virtually

identical ranges of occurrence, and they are often
virtually identical in meaning. But, as with the verbal
compounds considered in section II, the native speaker
intuitively "feels" a difference: she knows that the
forms in (14) are adjectives, while identical forms with
modified nouns would be prepositional phrases, carrying
meanings like "with animal-like intelligence", "with the
greatest care", etc.
    A straightforward application of Restructuring
works to explain this native intuition, and the ease
with which forms like this become lexicalized, as do
their verbal counterparts -- though the precise
relationship between the process we are studying and the
lexicon remains unclear. This time, the process looks
something like (15):

15a.   P'   15b.   [αF]

    P   N"   P   N
             |
             N
             |
             N
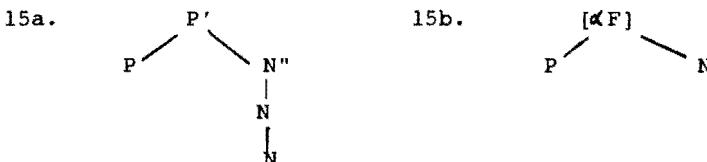
    Again, a non-branching nominal complement triggers
the simplification process; again, a lexicalized
formation is the end result. But this time, the
categorial label itself seems to be
problematic, since the original phrasal type should have
been Prepositional. The answer to this categorial
problem lies outside
the scope of this paper. For the moment, we have
adopted the notation "alpha-features" to refer to the
single clear similarity in the traditional feature
specifications for preposition and adjective, i.e. [-V,-
N] and [+V,+N] respectively.

IV. Case Three: NP-Internal Structure

    Samiian (1983 and forthcoming) outlines in detail
the occurrence of the paricle -e, called "ezafe", to
link various modifiers within all non-verbal category
projections in Persian. To take NP as example, (16)
illustrates the range of this particle, which occurs
with adjectives, possessor, and locative prepositional
phrases:

    16a.ketab-e bozorg
        book-EZ big

"A big book"

16b. ketab-e Ali
     "Ali's book"

16c. ketab-e ru-ye-miz
              on EZ table
     "The book on the table"

One notable feature of the ezafe, however, concerns us here: it never occurs within NP preceding a prepositional phrase which would be regarded as "subcategorized", a complement or closely linked argument to the Head Noun. Note the ungrammaticality of the second particle in both (17a) and (17b):

17a. bahs-   e jaleb   (e*)   ba
     Shirin discussion-EZ   interesting-EZ
     with Shirin "The interesting discussion with
     Shirin"

17b. dadan-e   pul   (*e) be dustan
     give   -EZ money EZ to friend
     (inf)

Samiian has explained this by reference to NP-internal structure, claiming that the N-Bar level is the domain of ezafe insertion. Restrictive modifiers such as adjectives occur at this level; but the prepositional complements in (17) are joined at the higher level of NP. Thus, the basic structure for (17a) is given in (18):

18.
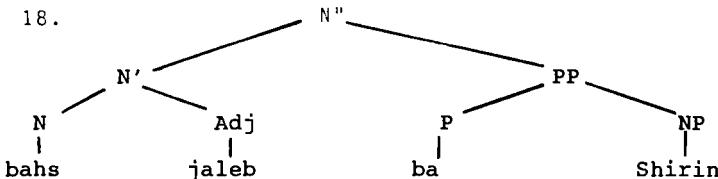
Now, a baffling counterexample occurs in (19), which is fully grammatical with ezafe preceding just the kind of element it normally cannot accompany; in fact, (19) is identical to (17a) -- except for the absence of the adjective jaleb, "interesting""

19. bahs-e-ba Shirin
    "a discussion with Shirin"

But the rule in (12), with only a slight
modification, gives us a very straightforward
explanation for this. The structure in (18), precisely
because it lacks the modifier, strikes us as satisfying
the spirit of rule (12), which is trying to identify and
simplify non-branching nominal structures at the right
level. The main difference in this case is that the N
we are dealing with is a head, rather than a complement;
it seems reasonable to assume that heads should be
treated differently, either by general principle or by
revision of the original rule, now re-stated as in (12')
to allow for non-branching N-bar to be the triggering
factor for heads.

12'. <u>Restructuring</u> (Revised)
 <u>Restructure</u> non-branching N with its unique
 sister, where "non-branching" N refers
 to structure (a) for non-head N, and
 structure (b) for head N:

(a) N"   (b) N'
     | |
     N'   N
     |
     N

The output of Restructuring, too, will be
affected -- in particular, the maximal projection N"
here cannot be "pruned out" as it could in the first two
cases. This, again seems reasonable; note that all we
are doing here is excluding the maximal projection from
playing a role in both input and output structures.
 At any rate, the crucial feature of Restructuring,
to make N and PP sisters, should remain, producing
something like (20):

20.
 N"
 |
 N'
  N   PP
  | P   NP
  | | |
 bahs   ba   Shirin
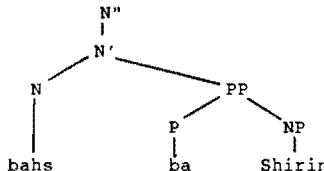
Like the two cases above, the immediately
dominating output node we propose is at a single-Bar

level. However, unlike these, there is no way for this
structure to be lexicalized, since it contains itself a
full phrasal category. Williams (1989) is not alone in
emphasizing that morphology has no place for the level
XP. Hence, while both earlier applications of rule (12)
could lead to lexicalized constructions, this one must
create a phrase, because of well-known, presumably
universal, principles.

In cases like (17b), the restrictive (or N-Bar
level) modifier must be present, since the verb "give"
obligatorily carries its full argument structure in the
infinitival form.   Thus, there will never be an
exception to the ban on ezafe in this type of example.

It is worth mentioning at this stage an alternative
analysis of (19) which has been explored by Samian and
others, involving a small [pro] element before the PP.
With such an approach, the two cases in (21) would be
analyzed in parallel fashion:

    21a. bahs-e- Ali ba Shirin   "Ali's discussion with
        Shirin"
    21b. bahs-e-[pro] ba Shirin "[pro]'s discussion
        with Shirin"

Of course, if the structure in (21b) were
plausible, the invisible NP represented by [pro] would
be the trigger for the ezafe; like Ali in (21a), this
[pro] would be attached at N-Bar level. Thus, the ezafe
would simply be showing up in its normal domain, and
there would be nothing more to explain.   But a
convincing argument against this proposal can be based
on the degree of exceptionality it requires in terms of
the distribution of [pro]. This null pronominal form
has not been convincingly shown to be necessary anywhere
inside the NP in Persian. The analysis raises empirical
problems as well, since the occurrence of just this type
of [pro] within the N-Bar level would require the
presence of a PP modifier at N" level, to prevent cases
like (22), where the NP ends in [pro], hence ends
phonologically in ezafe.

    22. *bahs-e [pro]

V. Conclusion

We have shown that an interesting set of seemingly
disparate phenomena can be explained by reference to
one, quite simply stated rule of Restructuring, which is
likely to be needed independently in the grammars of
most languages. Though more work is needed to specify
the constraints which must apply to this process and the

structures which serve as its input and output, we feel
that it is a viable and potentially flexible tool to
explore further within frameworks which assume some
flexibility in the boundary between syntactic and
morphological domains.

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Pronominal arguments in Gitksan?[1]
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In this paper I consider the status of person-marking affixes in Gitksan, a Tsimshianic language of the Pacific Northwest. I conclude that these affixes function as agreement rather than as arguments, and that therefore Gitksan should not be classed as a pronominal argument language (Jelinek 1984).

1. The data
Gitksan has the following series of person marking suffixes which can attach to any lexical head:

(1.)	sing	plural		
1	-y'	-m'	-y' [2]	-m'
2	-n	-sim'	-n	-sim'
3	-t	-ti: - t[3]	-t	-diit

The distribution of these person markers is illustrated in (2) through (7) using the 1st person singular suffix /-y'/. Attached to a noun, as in (2), the suffix indicates the possessor. Attached to a preposition, it may realise an oblique argument of a verb, as in (3), or the object of a preposition, as in (4). Attached to a verb it may indicate either a subject, as in (5) - (6), or an object, as in (7). [4]

(2.)	wilp - **y'**	
	house - 1sg	
	"my house"	*wilbiy'*
(3.)	kən'am - ə - t - ɬʔəna:x lo: - **y'**	
	give - erg-3 - cn bread prep - 1sg	
	"S/he gave me the bread"	*gin'amithl anaax looy'*
(4.)	w'itxʷ - t John quʔ - **y'**	
	come -cn at - 1sg	
	"John came to my place"	*w'itxwt John go'oy'*
(5.)	kup - ə - **y'** - ɬ hon	
	eat - erg-1sg-cn fish	
	"I ate the fish"	*gubiy'hl hon*
(6.)	ne: - ti: w'itxʷ - **y'**	
	not -contr come - 1sg	
	"I didn't come"	*needii w'itxwiy'*
(7.)	ne:ti: - t kaʔ - **y'**	
	not - 3 see - 1sg	
	"S/he didn't see me"	*neediit ga'ay'*

Two types of evidence seem to suggest that these suffixes serve the same function as full NPs. First, the suffixes occur in the same string positions as nominals with the same grammatical function - immediately after a lexical head. This can be seen by comparing (2) - (7) with (8) - (13) below, which have nominal arguments.

(8.) wilp - s - t Mary
      house -case cn
      "Mary's house"   *wilps Mary*

(9.) kən'am - ə - t - ɬ ʔəna:x ʔa - s - t Mary
      give   - erg- 3 -cn bread prep -case-cn
      "S/he gave Mary the bread"   *gin'amithl anaax as Mary*

(10.) w'itxʷ - t John quʔ - s - t Mary
      come   - cn   at -case-cn
      "John came to Mary's place"   *w'itxwt John goʔos Mary*

(11.) kup - ə - s - t Mary - ɬ hon
      eat - erg-case-cn   -cn fish
      "Mary ate the fish"   *gubis Maryhl hon*

(12.) ne: - ti: w'itxʷ - s - t Mary
      not -contr come - case-cn
      "Mary didn't come"   *needii w'itxws Mary*

(13.) ne: - ti: - t kaʔ - s - t Mary
      not -contr - 3 see - case- cn
      "S/he didn't see Mary"[5]   *neediit ga'as Mary*

Secondly, the suffixes appear to be in complementary distribution with full nominals. This is illustrated in (14) - (16) with the possessor argument of a nominal. In (14) the possessor is realized by the 3rd person suffix /t/, while in (15) the possessor is realized by the nominal "John". It is ungrammatical for the /t/ suffix and the nominal to cooccur, as in (16).

(14.) wilp - t
      house - 3
      "his/her house"   *wilpt*

(15.) wilp - s -t John
      house -case-cn
      "John's house"   *wilps John*

(16.) *wilp - tᵢ- s -t Johnᵢ

Similar distributional restrictions can be observed with the arguments of verbs. In (17) and (20) the subject is realized by the /t/ suffix, while in (18) and (21) it is realized by a full nominal. It is ungrammatical for the suffix and the coreferential nominal to cooccur, as in (19) and (22).

(17.) ləmo: - ə - t ᵢ - t Peterⱼ
      help - erg - 3 - cn
      "S/he helped Peter"   *hlimooyitt Peter*

(18.) ləmo: - ə   - s - t Johnᵢ - t Peterⱼ
      help - erg - case-cn   - cn
      "John helped Peter"   *hlimooyis Johnt Peter*

(19.) *ləmo: - ə - tᵢ - s - t Johnᵢ- t Peterⱼ

(20.) naks - x^w - ə - t$_i$ - t John$_j$
       spouse-pass-erg-3 -cn
       "S/he married John"   *naksxwitt John*
(21.) naks - x^w - ə - ł hanaq' t-x^{w}əst$_i$ - t John$_j$
       spouse-pass-erg-cn woman cn-that - cn
       "That woman married John"   *naksxwihl hanaq' tustt John*
(22.) *naks - x^w - ə - t$_i$ - ł hanaq' t-x^{w}əst$_i$ - t John$_j$

2. An incorporation analysis?

The distributional facts just described could be accounted for by claiming that person-marking affixes and nominals are generated in the same structural positions. This proposal automatically accounts for the fact that the suffixes cannot cooccur with NPs, and for the fact that the person markers have the same linear position as the NPs. The person-marking affixes could subsequently be phonologically incorporated onto the preceding head, as in Anderson's (1982) analysis of Breton person marking affixes.[6]

Clearly, however, such an analysis predicts that person marking suffixes will not cooccur with coreferential nominals. The analysis is thus challenged by sentences such as the following:

(23)   łəmo: - ə - t$_i$ - ǥat - s -t Kathy$_i$ - t John
       help -erg - 3 -rep -case-cn   -cn John
       "Apparently Kathy helped John"
                                    hlimooyitgats Kathyt John
(24.) naks - x^w - ə - t$_i$ - ǥat - ł hanaq' -x^{w}əst$_i$ - t John
       spouse-pass-erg- 3 - rep -cn woman cn- that - cn
       "Apparently that woman married John"
                                    naksxwitgathl hanaq' tustt John
(25.) ne: - ti: ye: - t$_i$ - əma - s - t John$_i$ qu? - ł Vancouver
       not -contr go - 3 - dub -case-cn   to -cn
       "John probably didn't go to Vancouver"
                                    needii yeedimas John go'ohl Vancouver

Sentences of this type, which contain postverbal evidential enclitics (underlined), allow the /t/ suffix to cooccur with a coreferential NP - "Kathy" in (23), /hanaq/ ("woman") in (24), and "John" in (25). These sentences cannot be accounted for under an analysis which generates person marking affixes and nominals in the same structural positions.

The contrast between, on the one hand, sentences such as (19) and (22), in which nominals may not cooccur with a coreferential suffix and, on the other, sentences such as (23)-(25), in which nominals must be accompanied by a coreferential pronominal suffix, clearly presents an analytical problem. A solution to this problem, which I adopt in principle, is proposed by Tarpent (1988). Tarpent's analysis is based on data from Nisgha, a language closely related to Gitksan. However, as I illustrate below, the analysis can also be applied to Gitksan.

Tarpent claims that the /t/ suffix is always present underlyingly when there is 3rd person nominal argument. Under this analysis, surface forms such as those in (23)-(25), in which the suffix cooccurs with the nominal, pattern as expected, and it is sentences such as (19) and (22), in which the suffix cannot surface, which pose a

problem. Tarpent attributes the absence of the /t/ suffix in such sentences to a phonological process of /t/ deletion which can be represented informally as follows:

(26.) t-deletion rule[7]
$$t \rightarrow \emptyset / \_ \begin{Bmatrix} s \\ ł \end{Bmatrix}$$

My data suggest that the deletion process is more restricted in Gitksan than in Nisgha, applying obligatorily only when the /t/ is the 3rd person morpheme. Thus I modify the rule to encode this restriction:

(27.) Revised t-deletion rule
$$t \rightarrow \emptyset / \_ \begin{Bmatrix} s \\ ł \end{Bmatrix}$$
$$[3]$$

Under this analysis, the underlying representations of sentences such as (18) and (21) are the following:

(28.) ləmo: - ə - $\underline{t}_i$ - s -t John$_i$ - t Peter$_j$
help - erg - 3 -case-cn - cn
"John helped Peter"

(29.) naks - x^w - ə -$\underline{t}_i$ - ł hanaq' t-x^{w}əst$_i$ - t John$_j$
spouse-pass-erg- 3 -cn woman cn-that-cn
"That woman married John"

However, on the surface, the /t/ person markers (underlined) are not realized, because the /s/ morpheme in (28) and the /ł/ morpheme in (29), which follow the /t/ suffix, trigger /t/ deletion.

Two features of Nisgha and Gitksan morphosyntax conspire to ensure that this rule almost always operates to delete a /t/ person marker when it is coreferential with a following nominal. First, no phrasal constituent may intervene between a lexical head, which hosts person affixes, and its nominal arguments. Secondly, a nominal which is coreferential with a person suffix is always preceded by a connective which has the form /s/ or /ł/. As a result, in almost all cases in which a /t/ person suffix cooccurs with a coreferential nominal, the suffix is immediately followed by a connective which has the form /s/ or /ł/, and the suffix is thus deleted by (27).

The crucial feature of sentences such as (23) - (25) which allows the /t/ suffix to cooccur on the surface with a coreferential nominal is the presence of the postverbal evidential clitics - the reportive /qat/ in (23) and (24), and the dubitative /əma/ in (25).[8] Clitics of this type are the only elements which can intervene between a person marking affix and a following coreferential nominal, and thus block the application of the t-deletion rule. As a result, sentences containing such clitics are the only ones in which doubling of the person affix and the nominal is apparent on the surface.

Thus, with minimal modification, Tarpent's analysis of the distribution of the person markers in Nisgha can be adopted in the analysis of Gitksan to account for the apparent complementary distribution of nominals and person markers.

3. Pronominal vs Nominal Argument Analysis

An important consequence of adopting Tarpent's analysis is that it entails that person markers are obligatorily present in (at least some) sentences, while nominals are optional. Tarpent (1988) has used this to argue that Nisgha is a pronominal argument language (Jelinek (1984))[9], in which person affixes function as arguments, while nominals are optional adjuncts.

The fact that a language has obligatory person marking and optional nominals does not necessarily mean that it is a pronominal argument language, however. An alternative interpretation is that the person affixes function as agreement, while the nominals fill argument positions. Belvin (1990), for example, has suggested that this is the appropriate representation for certain person affixes in Nisgha. I shall refer to this approach as the "nominal argument" analysis. Under this type of analysis, argument positions can be filled either by independent nominals or by the empty pronominal *pro*, licensed and identified through coindexing with agreement.

In the remainder of the paper I compare how these two hypotheses account for the Gitksan data . I conclude, on the basis of a range of evidence, that the nominal argument analysis provides a better account of a range of data from the language.

3.1 Adjunct / Argument Asymmetries
3.1.1. Word Order
One argument against a pronominal argument analysis of Gitksan comes from facts of word order.

Certain elements of the Gitksan sentence are freely ordered. This is illustrated in (30) - (31), which show that the adverb /tə?awɬ/ "today" can occur either before or after the PP /quʔ - ɬ Hazelton/ "in Hazelton":

```
(30.)  kaʔ - ə - y'   - t  John  [quʔ - ɬ Hazelton]  [tə?awɬ]
                                     PP                  adv
       see -erg- 1sg - cn        at  - cn               today
       "I saw John in Hazelton today"
                            ga'ay't John go'ohl Hazelton da'awhl
(31.)  kaʔ - ə - y'   - t  John  [tə?awɬ] [quʔ - ɬ Hazelton]
                                    adv        PP
       see - erg - 1sg - cn       today    at  - cn
       "I saw John today in Hazelton"
                            ga'ay't John da'awhl go'ohl Hazelton
```

Other sentential elements are subject to tight ordering constraints, however. The ordering of the subject, verb and object is strictly VSO, as is illustrated in the following data set.[10],[11] Only (32), which has VSO order, is grammatical.

```
(32.)  kup - ə - t - s  - t Mary - ɬ hon
          V              S        O
       eat   -erg- 3 -case -cn  - cn fish
       "Mary ate the fish"                      gubis Maryhl hon
(33.)  *kup - ə - t - ɬ hon -( s )- t Mary
           V          O          S
(34.)  *(s) t Mary kup - ə - t ɬ hon
            S     V            O
```

(35.) *(s) t Mary ł hon kup - ə - t
          S   O   V

(36.) *(ł) hon -(s) - t Mary kup -ə - t
          O   S   V

(37.) *(ł)hon kup - ə - t s - t Mary
          O   V   S

Under the nominal argument analysis, this asymmetry with respect to ordering restrictions is not unexpected, since it correlates with the distinction between adjunct and argument positions. The freely ordered elements are adjuncts, and the strictly ordered elements are arguments.

The ordering facts appear to be problematic for the pronominal argument analysis of Gitksan, however. It is a standard characteristic of adjuncts that they are freely ordered. Since in a pronominal argument language all NPs are adjuncts, all NPs should be freely ordered in such a language. This is true, for instance, of Warlpiri (Jelinek (1984)) and Mohawk (Baker (1991)) which are claimed to be pronominal argument languages. The strict ordering of subject and object nominals in Gitksan therefore poses a problem for the pronominal argument analysis of the language.

Thus word order constraints in Gitksan constitute one argument against a pronominal argument analysis of the language.

3.1.2 Long distance extraction asymmetries

Further evidence against a pronominal argument analysis of Gitksan comes from an adjunct/argument asymmetry with respect to extraction out of subordinate clauses, illustrated in (38) - (40).

(38.) na: - ł ha   - n'i: - qu:t - n   tsə   ?ant kup -t - ł hon .
        who-cn instr - on   - heart-2sg comp extr eat -3-cn fish
        "Who do you think ate the fish?"

                              naahl han'iigoodin ji ant guphl hon

(39.) n'it John-ł həsaq - y' tim ?ant kup -t- ł hon
        3sg   -cn desire -1sg that extr eat -3-cn fish
        "It's John I want to eat the fish"

                              n'it Johnhl hasagay' dim ant guphl hon

(40.) *t Mary - ł taw'ł - t John qu? - ł Hazelton łis m'in - ku: - ti - t
        cn   -cn leave - cn   at -cn   after up -take - erg-3
        (It was Mary John went to Hazelton after he picked up.)

Under the nominal argument analysis, the extraction facts can be characterized as follows. In (38) - (39), in which the subordinate clause is an argument, extraction out of the clause is possible. However, in (40), in which the subordinate clause is an adjunct, extraction out of the clause is barred. Huang's (1982) Condition on Extraction Domains (CED), which claims that extraction is only possible out of properly governed domains, provides an account of these facts[12]. The embedded clauses in (38) - (39) are arguments, properly governed by the verb, and thus extraction is possible. However, the adverbial clause in (40), being an adjunct, is not properly governed, and thus extraction is barred.

This explanation of the extraction facts is not available under the pronominal argument analysis, however. If only pronouns can be arguments, the subordinate

clauses in all the above sentences must be analyzed as adjuncts. If all subordinate
clauses are adjuncts, the CED predicts that extraction from them should consistently
be barred. The grammaticality of the extractions in (34) - (35) thus argues against
the pronominal argument analysis of Gitksan.

3.2 Case-related Asymmetries

3.2.1 Presence of obliques

The preposition /?a/ appears obligatorily before certain NPs in a Gitksan
sentence. As the following sentences illustrate, the semantic role of the NP
preceded by /?a/ varies widely, so that the function of the preposition seems to be
grammatical rather than semantic.

(41.) kən'am - ə - t - s   - t John - ł ʔəna:x ?a - s - t Mary
      give - case-3 -case-cn   -cn bread prep -case-cn
      "John gave the bread to Mary"
                          gin'amis Johnhl anaax as Mary

(42.) kin - ə -t - s Clara- ł łkʷuːɬxʷ-t ?a -ł ts'al   -kə
      give-erg-3 - cn   -cn child   -3 prep-cn half.smoked.salmon-distr
      "Clara gave her child half-smoked salmon"
                          ginis Clarahl hlguuhlxwt ahl ts'algi

(43.) kʷin kəkiy'   -tə -s John-ł kt'iɬxʷ ?a - s - t Mary
      juss look.after-erg-cn   -cn child prep-case-cn
      "John told Mary to look after the children"
                          gun gigiy'dis Johnhl kt'ihlxw as Mary

(44.) q'uts - ə - t - s   - t Tom -ł smax ?a -ł t'uːts'xʷ
      cut -erg-3 -case-cn   -cn bear prep-cn knife
      "Tom cut the meat with a knife"
                          k'ojis Tomhl smax ahl t'uuts'xw

Under the nominal argument analysis, the class of NPs which must be preceded
by /?a/ may be characterized as any arguments other than subject or object. A
principled explanation of this fact can be derived from Case Theory, which requires
that all nominals in argument positions be assigned abstract Case in order to be
visible for theta marking (Chomsky 1986). It appears that in Gitksan, as in many
Romance languages, the verb/Infl can assign structural case to the subject and at
most one object argument. This leaves any additional arguments without Case.
The only way for these NPs to be assigned Case is by the insertion of the Case-
assigning preposition /?a/.

Such an explanation of the function of /?a/ is not available under the pronominal
argument analysis, however. Adjuncts do not need to be Case-marked because
they are not theta-marked, and so under the pronominal argument analysis NPs
should not require Case. Therefore under this analysis it is not immediately
obvious how the presence of the prepositions in sentences such as (41) - (44) can
be explained .

The distribution of the preposition /?a/ is thus another aspect of Gitksan syntax
which seems to be more easily accounted for under the nominal argument analysis.

3.2.2 Morphological marking of extraction

Subjects and objects also behave differently from other elements in the sentence
with respect to extraction.

Extraction of any element except subject and object is consistently marked by the presence of the complementizer /wil/ between the fronted element and the remainder of the clause, as illustrated in (45) - (47):

(45.) k'o:ts **wil** ne: - ti: - t ləmo: - t - s John - t Mary
yesterday comp not -contr - 3 help - 3 - cn   - cn
"It was yesterday that John didn't help Mary"
k'oots wil neediit hlimoos Johnt Mary

(46.) qu? - ł California **wil** ti: taw'ł - t - s   - t Kathy lo: - t
to - cn   comp contr go - 3 -case -cn   to - 3sg(emph)
"Kathy went to *California*"
go'ohl California wildi daw'hls Kathy loot

(47.) t Barbara **wil** - t kən'am - ə - t - s - t Kathy - ł matsəqəle:
cn   comp-3 give   -erg - 3-case-cn   -cn flowers
"It was Barbara Kathy gave the flowers to"
t Barbara wilt gin'amis Kathyhl majagalee

However, extraction of subject and object arguments is never marked by /wil/, but by other special morphology between the fronted NP and the remainder of the clause. /ʔant/ marks extraction of transitive subjects (48), /ł/ marks extraction of transitive objects (49), and /ł/ accompanied by the verbal suffix /ət/ marks extraction of intransitive subjects (50).

(48.) t John **ʔant** ne:ti: - t ləmo: - t - s   -t Mary k'o:ts
cn John extr not - 3 help- 3 -case-cn   yesterday
"It's John who didn't help Mary yesterday"
tJohn ant neediit hlimoos Mary k'oots

(49.) t John - **ł** ləmo: - ə - t - s - t Mary ky'o:ts
cnJohn - cn help - erg- 3 -case-cn   yesterday
"It's John Mary helped yesterday"
tJohnhl hlimooyis Mary k'oots

(50.) t John - **ł** w'itxᵂ - **ət**
cn John- cn come - extr
"It's John who came"
tJohnhl w'itxwit

Under the nominal argument analysis, this distinction can be captured descriptively as a distinction between extraction from positions structurally Case-marked by the verb/Infl and extraction from positions which are licensed in other ways.

Under the pronominal argument analysis, however, according to which nominals are adjuncts and so not Case-marked, such a characterization of the asymmetry is not available. Thus, this asymmetry also argues against the pronominal argument analysis.

3.3 Problems with the /t/-deletion rule
A further potential problem for the pronominal argument analysis of Gitksan relates to the t-deletion rule discussed above, and repeated here.

(51.) t-deletion

$$t \rightarrow \emptyset / \underline{\quad} - \left\{ \begin{matrix} s \\ \textbf{ł} \end{matrix} \right\}$$
[3]

Recall that this rule serves to delete a /t/ person suffix when it immediately precedes a connective with the phonological shape /s/ or /ł/, as in the following example, in which the /t/ suffix (in boldface) is not phonetically realized:

(52.) m'ats-ə - **t** -ł łk^w'-tk'iłx^w - ł ha-n'i:-quyp'aX ?a -ł lu?p
hit -erg-3-cn small-child - cn instr-on-light prep-cn rock
"The child hit the window with a rock"
m'ajihl hlgutk'ihlxwhl han'iigoyp'ax ahl lo'op

A problem for any analysis which adopts this rule is that there is a class of consistent exceptions. In sentences in which the /t/ suffix is immediately followed by the object nominal (because there is no subject nominal) the rule fails to apply, as is exemplified in (53):

(53.) m'ats-ə -**t** - ł ha-n'i:-quyp'aX ?a -ł lu?p
hit -erg-3 -cn instr-on-light prep-cn rock
"S/he hit the window with a rock"
m'a jithl han'iigoyp'ax ahl lo'op

The descriptive generalization seems to be that the /t/ suffix deletes in the relevant phonological environment only if it is also coreferential with the following NP. In (53), the phonological environment is met, but the /t/ suffix fails to delete because it is not coreferential with the following NP /han'i:quyp'ax/ ("window"). However, phonological rules should not be able to access coreference information. Sentences such as (53) thus appear to be problematic for both the nominal argument analysis and the pronominal argument analysis. However, I propose that under the nominal argument analysis the apparent exceptions to the deletion rule can be accounted for in a principled way.

Under a nominal argument analysis, sentences such as (52) and (53) have rather different S-Structures, and I claim that this difference in structure is responsible for the different behavior with respect to the t-deletion rule. Sentences such as (53) have the following structure, with *pro* in subject position, licensed under government by the /t/ agreement suffix[13]:

(54.) m'ats - ə- t $_i$ [*pro$_i$* [t $_V$ - ł han'i:quyp'ax$_j$]]]

In this structure, the /t/ suffix is syntactically quite distant from the connective associated with the object NP, even though they are adjacent on the surface.

In a sentence such as (52), however, the /t/ suffix is syntactically close to the connective of the following NP, which in this case is the subject.

(55.) m'ats - ə- t $_i$ [-ł łk^wə-tk'iłx^w [t $_V$ - ł han'i:quyp'ax$_j$]]]

It appears that t-deletion occurs only if the /t/ suffix is syntactically close to the connective which triggers the deletion.

The necessary structural restriction might be incorporated into the phonological analysis of /t/ deletion in a number of different ways. One possibility would be to impose a government condition on the rule, along the lines of analyses proposed in Kaisse (1985). Alternatively, the rule might be made sensitive to phonological phrasing, following proposals in work such as Selkirk (1984), Nespor and Vogel (1986) and Hayes (1989). Under this approach the syntax cannot be directly referred to in phonological rules, but can have indirect effects in determining certain aspects of prosodic structure.

A solution of this type is not available under the pronominal argument analysis. If Gitksan is a pronominal argument language, the structural relationship between the person-marking suffix and any following NP should be the same, since all NPs are adjuncts:

(56.) [m'ats - ə- t ᵢ] ₛ [-ł łkᵛə-tk'ilxᵛ] [-ł han'i:quyp'aχ]
(57.) [m'ats - ə- t ᵢ] ₛ [-ł han'i:quyp'aχ]

In each case the following NP is an adjunct to the sentence containing the /t/ suffix, regardless of whether that NP is thematically related to the subject or object pronominal. Thus, under this approach it is difficult to account for why the /t/ suffix deletes in (52) and not in (53). [14]

3.4 Positions not realized by a pronominal affix.

Another serious problem for the pronominal argument analysis of Gitksan is the fact that in certain sentence types there are arguments which are not associated with any person markers. For example, in independent sentences, such as the following, the noun phrase associated with the absolutive argument (highlighted) is not realized by any person marking affix but only by an independent nominal..

(58.) paχ - ł **kat ł-xʷin**
        run - cn man cn-this
        "This man ran"   *baχhl gat tun*
(59.) kup - ə - y' - ł **hon**
        eat -erg-1sg - cn fish
        "I ate the fish"   *gubiy'hl hon*

Unlike the cases considered earlier in the paper, the absence of a person marker in these sentences cannot be explained by the t-deletion rule. Even when the deletion environment is not met, as in the presence of the postverbal clitic /qat/, no person marker occurs:

(60.) w'itxʷ - qat - t **John** ky'o:ts   (*w'itxʷ - t - qat - t **John** ky'o:ts)
        come - rep-cn   yesterday   3
        "Apparently John came yesterday"
                                    w'itxwgatt John k'oots

Under the nominal argument analysis, the lack of person markers associated with certain argument positions is not surprising. It is not uncommon crosslinguistically for heads to show agreement only with certain argument positions. In English, for example, the verb/Infl shows agreement only with the subject.

However, for the pronominal argument analysis, the lack of person markers seems a serious problem. One might try to save the analysis by proposing that there is a series of phonetically null person markers coreferential with the absolutive arguments in these cases. However, while it is not uncommon for an agreement paradigm to have some zero members, or to be zero in some environments, a series that is zero for every person and number value in every environment would seem to pose learnability problems.

Thus the lack of person marking in certain sentence types is another aspect of Gitksan which seems incompatible with the pronominal argument analysis.

4. Conclusion

In this paper, I have examined various kinds of evidence relative to the status of person marking elements and independent nominals in Gitksan. Evidence from word order, extraction and Case-marking supports the conclusion that nominals fill argument not adjunct positions in this language, and thus that affixed person markers should be analyzed as agreement elements. This supports the claim that Gitksan is not a pronominal argument language. This conclusion is further supported by exceptions to the phonological rule of "t deletion", and by the fact that certain argument positions are not referenced by any person marking elements.

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In glossing examples, I use the following abbreviations: cn - connective; comp - complementizer; contr - contrastive; dem - demonstrative; dub - dubitative; erg - ergative suffix (see Belvin (1984) and Tarpent (1991) for a discussion of the function of this suffix); extr - extraction marker; interact - interactive clitic; juss - jussive; pass - passive; prep - preposition; rep - reportative.

[2] Italicized representations are in the phonetically based Gitksan practical orthography, presented in Hindle and Rigsby(1973).

[3] Tarpent(1988) shows that the 3pl form is plausibly analyzed as consisting of two morphemes - the /di:/ marking plurality and the /t/ marking 3rd person.

[4] In these cases, whether the suffix realizes the subject or object is not freely variable, but depends on the type of sentence.

[5] This sentence has an alternative interpretation "Mary didn't see him/her".

[6] See Stump(1984) for a different account of the Breton facts.

[7] Tarpent(1988) refers to this as a deaffrication rule. However, since the /t/ and the following /s,j/ belong to separate morphemes, I assume that they do not have the phonological structure of affricates.

[8] Tarpent also cites a number of cases from Boas (1902) in which nominals and person markers cooccurred in other environments. This suggests that the process which normally blocks the cooccurrence of the affix and the nominal in contemporary Nisgha/Gitksan was previously less pervasive.

[9] Jelinek(1984) also claims that pronominal arguments languages are non-configurational. However, it has been shown by Bresnan and Mchombo (1987) for Chichewa and Baker (1991) for Mohawk that a language may be a pronominal argument language without being non-configurational. Thus in this paper I restrict my attention to the issue of whether nominals are arguments or adjuncts.

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[10] Other word orders can be derived by focusing. In such cases, a single focused element occurs in clause initial position. However, such focusing entails special morphological marking and is clearly the result of syntactic movement. Thus such cases do not constitute evidence of free word order.

[11] Apparent counter-examples to this ordering generalization are sentences in which the subject is a 3rd person nominal and the object a first or second person pronominal. In these cases, the nominal subject must (or may for younger speakers) follow the pronominal object:

i.   ka? - ∂ - t; n'i:y' - t John;   ii. % ka? - ∂ - t; - s - t John; n'i:y'
     V   O   S   S   O
    see -erg-3 1sg -cn   see - erg- 3 - case -cn   1sg
    "John saw me"   *ga'at n'iiy't John*   "John saw me" *ga'as John n'iiy'*

However, such data do not constitute evidence that Gitksan is a free word order language, since VOS order is allowed only in sentences of this very restricted type. See Hunt (in prep) for further discussion.

[12] In Chomsky (1986), the CED is subsumed under subjacency.

[13] I assume that the VSO order is derived by verb movement from an underlying SVO order.

[14] Tarpent (1991) proposes that Nisgha sentences of this problematic type have a rather different structure, which she suggests might account for the deletion facts. She claims that in sentences of the type under discussion, the so-called independent sentences, the "object" nominal is in fact a clefted element.

However, although this analysis does account for some morphological facts, various types of syntactic evidence suggest that such an analysis is not possible for Gitksan. For example, if the nominal /han'i:quyp'aX/ in a sentence such as (53) were really a clefted element, one would expect oblique arguments of the main verb, such as /ɬa -ɬ lu?p/ "with a rock", to be able to intervene before the cleft, giving sentences such as the following:

i.   *m'ats-ə -t ?a -ɬ lu?p - ɬ ha-n'i:-quyp'aX
    hit   -erg-3 prep-cn rock- cn instr-on-light
    "What s/he hit with a rock was the window"

However, this ordering is ungrammatical. This is unexpected if the NP /ɬ han'i:quyp'aX/ is really outside the government domain of the verb. See Hunt (in preparation) for more discussion of this issue.

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CLAUSE STRUCTURE AND EXTRACTION IN WELSH

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0. Introduction

From a comparative syntax point of view, one major problem is how to capture the similarities among individual languages, and at the same time account for their differences. The similarities tell us about the invariant properties of natural language, and the differences tell us about the possible range of variations. Both of these factors together define a narrowly constrained class of possible languages, which explains why they can be learned in a relatively short period of time.

Along these lines of approach, the problems that Welsh presents us are that (i) given that it is a language with the surface word order VSO for declarative sentences, as illustrated in (1):

(1) Darllenodd Siôn y   llyfr.
     read   the book
     'Siôn read the book.'

in what respect is Welsh similar to English, a language with the surface order SVO, as the translation in (1) indicates? And (ii) some facts about extraction appear to suggest that there is no long-distance extraction in Welsh, if it is indeed the case, then what does this tell us about the clause structure of the language?

1. Clause structure in Welsh.

Sproat (1985) suggests that Welsh is like English in that it has the same underlying order SVO, but differs from English in that INFL moves to the left of the subject in order to assign Case to it, and that the finite verb moves to the moved INFL to provide it with morphological support, as in (2), deriving the order VSO:

(2) a. D-structure: [s NP [INFL' [VP V] INFL]]]

         morphological support

     b. S-structure: [s INFL$_i$+V$_j$ NP [INFL' [VP t_j] t_i]]]

         Case-assignment

The analysis seems quite reasonable given that when the sentence has an auxiliary, we do have the main verb to the right of the subject, as in (3):

(3) Gwnaeth Siôn darllen y   llyfr.
     did.3SG   read   the book
     'Siôn read the book.'

The similarity between English and Welsh would then be the underlying order, but the difference between them would be the way nominative Case is assigned. In Welsh, it is assigned rightward by INFL, some sort of exceptional case-marking:

but in English, it is assigned either leftward by INFL or by Spec-head agreement (Chomsky (1986)).

Besides the issue of whether exceptional case-marking by INFL can be independently justified, in light of current assumptions about X'-theory (Chomsky (1986)), the movement of INFL to the left of NP in (2b) is not possible since it is not a head position, and movement of the verb directly to INFL would violate the Head Movement Constraint (Travis (1984)). Nevertheless, it seems to be a quite straightforward matter to translate Sproat's analysis into one which incorporates these assumptions. Instead of (2), we will have the representation as in (4), with the verb moving to C via INFL:

(4) a. D-structure: [$_{IP}$ Siôn [$_{VP}$ darllenodd y llyfr]]
     b. S-structure: [$_{CP}$ Darllenodd [$_{IP}$ Siôn [t [$_{VP}$ t y llyfr]]]
     c. LF: [$_{CP}$ Darllenodd$_i$ [$_{IP}$ Siôn [$_{VP}$ t_i y llyfr]]]

Yet, without further assumptions, at the level of Logical Form (LF), the representation in (4c) would be quite different from the one for the English sentence *John read the book* , as shown in (5c):

(5) a. D-structure: [$_{IP}$ John [$_{VP}$ read the book]]
     b. S-structure: [$_{IP}$ John [$_{VP}$ read the book]]
     c. LF: [$_{IP}$ John [$_{VP}$ read the book]]

Huang (1982) proposes that although the *wh*-phrase in a Chinese question remains in its base-position as in (6b) (cf. the declarative in (6a)), it raises at LF, yielding a representation like that in (6c), which is almost identical to the LF-representation for the English question in (7c) (except for the auxiliary):

(6) a. [$_{IP}$ Zhangsan [$_{VP}$ mai-le   shu]]
                          buy-ASP   book
        'Zhangsan bought a book.'

     b. S-structure: [$_{IP}$ Zhangsan [$_{VP}$ mai-le   sheme]]
                                        buy-ASP   what
        'What did Zhangsan buy?'
     c. LF: [$_{IP}$ sheme$_i$ [$_{IP}$ Zhangsan [$_{VP}$ mai-le t_i]]]
     d. Semantics: For which x, x a thing, Zhangsan bought x.

(7) a. [$_{IP}$ John [$_{VP}$ bought a book]]
     b. S-structure: [$_{CP}$ What did [$_{IP}$ John buy t]]
     c. LF: [$_{CP}$ What$_i$ did [$_{IP}$ John buy t_i]]
     d. Semantics: For which x, x a thing, John bought x.

The *wh*-phrase c-commands the rest of the clause, corresponding to the semantics in a straightforward manner.

Along these lines, I would like to take the approach according to which an English sentence like *John read the book* and its Welsh counterpart have exactly the same structure at LF, in addition to the same underlying structure. More

specifically, I would like to adopt the VP-internal Subject Hypothesis as the universal underlying structure, illustrated in (8a), as suggested by Koopman and Sportiche (1985), Kuroda (1986), Kitagawa (1986), Fukui and Speas (1986), among many others:

(8) a. D-structure: $[_{IP} [I° [_{VP}$ Subject $[V$ Object $]]]]$
     b. Raising of subject: $[_{IP}$ Subject $[I° [_{VP} t [V$ Object $]]]]$

However, instead of making the assumption that the VP-internal subject is assigned Case in-situ by INFL, I would like to suggest that it parametrically raises to SpecIP for Case-checking by Spec-head agreement (Chomsky (1989)) in that particular languages may choose the option of raising it at either S-structure or at LF. (Cf. section 2 for why subjects parametrically raise to SpecIP instead of staying inside the VP).

Suppose now that at S-structure the finite verb moves to INFL in Welsh, perhaps for morphological reasons, as suggested in Lasnik (1981), but INFL moves down to V in English as suggested in Emonds (1976, 1978).[1] To account for the superficial word-order difference between English and Welsh, I propose that subjects raise to SpecIP at S-structure in English, but at LF in Welsh. On this view, then, the derivations for the English sentence *John read the book* and its Welsh counterpart would be like those in (9) and (10):

(9) a. D-structure: $[_{IP} [I° [_{VP}$ John $[$ read the book $]]]]$
     b. S-structure: $[_{IP}$ John $[t [_{VP} t [$ read+I° the book $]]]]$

     c. LF: $[_{IP}$ John$_j$ $[$ read+I° $[_{VP} t_j [t$ the book $]]]]$

(10) a. D-structure: $[_{IP} [I° [_{VP}$ Siôn $[$ darllen y llyfr $]]]]$
     b. S-structure: $[_{IP} [I°+darllen [_{VP}$ Siôn $[t$ y llyfr $]]]]$

     c. LF: $[_{IP}$ Siôn$_j$ $[I°+darllen_i [_{VP} t_j [t_i$ y llyfr $]]]]$

As the derivations show, the examples in the two languages have exactly the same D-structure and LF-representation. The conceptual appeal of this approach is that despite their superficial word order differences individual languages do not differ very much in abstract levels of representation like D-structure and LF.

In the ext section, I would like to consider some extraction facts in Welsh as independent evidence for the view of clause structure that I just suggested.

2. Extraction

Consider first short extraction. To question the object in a sentence with only one verb, we can just displace the *wh*-phrase to the SpecCP very much like in English, as illustrated in (11):

(11) $[_{CP}$ Pwy $[$ a $[_{IP}$ welodd$_i$ $[_{VP}$ Siôn $[t_i [t]]]]]]$
          who   PRT   saw.3SG
     'Who did Siôn see?'

However, when the sentence has an auxiliary verb, a (resumptive) clitic pronoun must be used if the object is extracted, as the contrast between (12) and (13) shows

(for our purposes here, I assume that the clitic is base-generated in argument
position under V′, which subsequently cliticizes to the (non-finite) verb at PF):

(12) *[$_{CP}$ Pwy [y [$_{IP}$ [mae [$_{VP}$ Siôn [yn weld *t*]]]]]]
      who   PRT   is   PRT see
     'Who is John seeing?'

(13) [$_{CP}$ Pwy$_j$ [y [$_{IP}$ [mae [$_{VP}$ Siôn [yn ei$_j$ weld]]]]]]
      who   PRT   is   PRT him see
     'Who is John seeing?'

The grammatical difference between (12) and (13) thus strongly suggests that the
option of VP-adjunction for extraction (of objects) as suggested in Chomsky (1986)
is not available.[2] If VP-adjunction were possible, then there is no reason why (12)
should be ungrammatical. The *wh*-phrase can just adjoin to the maximal projections
on its way to the matrix clause. The question now is why the presence of an
auxiliary verb should prevent extraction of the object. An account based on
Chomsky's (1981) Empty Category Principle (ECP) does not seem to be plausible
given that the position from which the object is extracted is properly head-governed
by the verb. Furthermore, since the extraction is not out of an island, antecedent-
government is not at issue either. I would like to propose a subjacency account for
the impossibility of extracting the object in (12).

Recall Chomsky's (1973) subjacency condition, given in (14), which in current
terms allows crossing of at most one bounding node at a time:[3]

(14) The Subjacency Condition
    No movement may involve the positions X and Y in the configuration:
       ... X ... [$_\alpha$ ... [$_\beta$ ... Y ...] ...] ... X ...
    where α and β are cyclic nodes.

The movement of the *wh*-phrase in (13) crosses two maximal projections, namely,
the VP and the IP. If we are to attribute the ungrammaticality of (12) to a
subjacency violation, then it must be that both the IP and and VP in this case are
bounding. But the movement in (13) also crosses a VP and an IP. Since the
example is grammatical, it must be that only one bounding node is crossed in this
case. I suggest presently that the VP in (13) is not bounding.

Notice first that in (13), the (main) verb is to the right of the subject. That is, it
is in its base-position under the VP. Suppose we have a condition on bounding
domains according to which the lexicality of the head is a necessary condition for a
(maximal) projection to be a bounding domain, as in (15) (cf. Déprez (1990) for a
similar condition on barriers to government):

(15)   An XP is bounding only if its head X° is non-empty.

then the grammatical contrast between (12) and (13) can be attributed to the
lexicality of the heads of the VPs in these examples. In (13), the verb has moved to
INFL, hence its projection is not a bounding domain by the condition in (15). The
movement of the *wh*-phrase thus crosses only one maximal projection, namely, the
IP. In (12), however, the verb stays in its base-position. The movement of the
wh-phrase crosses two maximal projections (VP and IP) whose heads are not

empty. In other words, both of these projections are bounding. The movement thus violates subjacency.[4]

I suggested earlier that subjects (parametrically) raise to SpecIP for Case-checking. The extraction facts we saw in (12) and (13) have some bearing on this. Consider the view that subjects in VSO languages like Welsh are assigned Case inside VP (perhaps in SpecVP, cf. Koopman and Sportiche (1987)) and see if it makes the correct predictions with respect to extraction. Under this view, the SpecIP of a sentence with the VSO order would not be occupied by the subject at any level of representation. Consider now the derivation in (16a) for the example in (12) (representation of verb movement is omitted):

(16) a. [$_{CP}$ Pwy [y [$_{IP}$ t_j' [mae [$_{VP}$ Siôn [yn weld t]]]]]]
         who   PRT   is   PRT see
    'Who is John seeing?'

   b. LF raising of subject:

    [$_{CP}$ Pwy$_j$ [y [$_{IP}$ Siôn$_i$ [mae [$_{VP}$ t_i [yn weld t_j]]]]]]
         who   PRT   is   PRT see

Since the example is ungrammatical, there must be a way to disallow the derivation in (16a). The question now is what prevents the object from making a transition in the unoccupied SpecIP, using it as an escape hatch. Whereas the answer to this question is not clear under the view according to which the subject can be assigned (nominative) Case in-situ in SpecVP, in the analysis that I am proposing, it is quite straightforward.

The SpecIP cannot be used as an escape hatch since the position is reserved for Case-checking of the subject (at LF in Welsh). If the (object) wh-phrase were to move through the SpecIP on its way to the SpecCP, the subject would not be able to raise there for Case-checking. One other possibility is to move the wh-phrase directly to SpecCP. However, this derivation would violate subjacency since the movement crosses an IP and a VP with non-empty heads, both of which are bounding domains according to (15).

3. Island effects and agreement in long-distance dependency

Consider now some facts about long-distance dependency, since they appear to have a bearing on subjacency and clause structure of the language. In the example in (17a), like that in (13), a gap is impossible, as its ungrammaticality shows:

(17) a. *[$_{CP}$ Pwy [y [$_{IP}$ [dywedodd$_i$ [$_{VP}$ Mair [t_i
          who   PRT   said.3SG

        [$_{CP}$ t [y [$_{IP}$ gwelodd$_k$ [$_{VP}$ Siôn [t_k t]]]]]]]]]]]
              PRT   saw.3SG
       'Who did Mair say that Siôn saw?'

   b. [$_{CP}$ Pwy$_j$ [y [$_{IP}$ dywedodd$_i$ [$_{VP}$ Mair [t_i
          who   PRT   said.3SG

        [$_{CP}$ [y [$_{IP}$ gwelodd$_k$ [$_{VP}$ Siôn [t_k ef$_j$]]]]]]]]]]]
              PRT   saw.3SG   him
       'Who did Mair say that Siôn saw?'

A resumptive pronominal clitic must be used if the *wh*-phrase has a long-distance dependency, as shown in (17b) (cf. (13)). In the embedded clause of the example in (17a), the movement of the object from under the VP to the embedded SpecCP is possible, just like in (12). The ungrammaticality of (17a) must then be due to the movement from the embedded SpecCP to the matrix clause, which in fact crosses three maximal projections: CP, VP, and IP. The head position of the matrix VP is empty, since the verb has moved to INFL. Therefore, the matrix VP is not a bounding domain, according to (15).

Suppose CP is (potentially) bounding in Welsh (cf. Law (1991) for a discussion of how this can be derived in a principled way). Since the heads of the CPs in (17) are not empty, these projections are indeed bounding domains according to (15). Now, if we indeed have reason to think that the finite verb in (17) is in INFL rather than in C (as I have been assuming), then the IPs in these examples would be bounding. The movement from the embedded SpecCP to the matrix SpecCP would then constitute a subjacency violation.

It is useful to first consider the prediction with respect to long-distance extraction in analyses like Sproat's according to which the verb has moved to C. Suppose the finite verb is in C as shown in the representation in (18):

(18) $[_{CP}$ Pwy $[$ y   dywedodd$_i$ $[_{IP} [t_i$ ´ $[_{VP}$ Mair $[t_i$
        who   PRT   said.3SG

                 $[_{CP} t$ $[$ y   gwelodd$_k$ $[_{IP}$ Siôn $[t_k$ t $]]]]]]]]]$
                   PRT   saw.3SG

'Who did Mair say that Siôn saw?'

The movement to the SpecCP of the embedded clause is again not at issue. However, if the verb is in C, then the movement from the embedded SpecCP to the matrix SpecCP crosses only one bounding domain, namely, the embedded CP. The matrix VP, and IP are not bounding because the heads of these projections are empty. Thus, under the view that verbs move to C in Welsh, the derivation in (18) is possible. an incorrect result. It thus appears that the finite verb is in INFL rather in C.

The grammatical patterning of the examples involving long-distance dependency seems to suggest that there is no movement in these cases (Sadler (1988)). I would now like to present two types of evidence to support this conclusion. One is from constructions involving islands, and the other is from agreement.

Consider the examples in (19) (Sadler (1988)):

(19) a. Pwy y   gofynnodd y dyn imi   a   oeddwn wedi ei   weld?
        who PRT asked.3SG the man to.1SG PRT was.1SG PERF 3SG see
        'Who did the man asked me whether I had seen?'
    b. Pwy y   clywodd   Siôn y newyddion fod Mair wedi ei   weld?
        who PRT heard.3SG   the news   be   PERF 3SG see
        'Who did John hear the news that Mary had seen?'

Long-distance dependency between an element inside an island and another element outside the island is possible with no island effects (Ross (1967)). Thus, if subjacency is a condition on movement (Chomsky (1977)), then the well-formedness of these examples would suggest that they are not cases of movement.

Consider now the agreement paradigm in (20):

(20) a. [IP Darllenasant*i*/*Darllenodd*i*   [VP hwy/*pro* [*t*i*   y   llyfr]]]
         read.3PL/read.3SG   they   the book
         'They read the book.'

   b. [IP Darllenodd*i* /*Darllenasant*i*   [VP y   dynion/dyn [*t*i*   y   llyfr]]]
         read.3SG/read.3PL   the men/man   the book
         'The men/man read the book.'

In Welsh, the subject agrees with the verb in number if it is a pronoun (either null
or overt), as in (20a). However, for non-pronominal subjects, there is no
agreement; the verb shows up in singular number regardless of the number of the
subject, as shown in (20b). As we would expect, when a non-pronominal subject
is extracted, there is no agreement, as shown in (21):

(21) [CP Pa   ddynion [a   [IP *t* [ddarllenodd*i*   [VP *t* [*t*i*   y   llyfr]]]]]]
         which men   PRT   /*ddarllenasant*i*   the book
                                  read.3SG/read.3PL
         'Which men read the book?'

An explanation for the agreement in (21) is straightforward if the example is derived
from the underlying structure in (20b), a structure in which there is no agreement
between the subject and the verb. What is interesting is that if the *wh*-phrase is a
non-pronominal subject having a long-distance dependency, then there is
agreement, as shown in (22a):

(22) a. Pa   ddynion y   dywedodd Siôn y   darllenasant   y   llyfr?
         which men   PRT said3SG   PRT /*darllenodd the book
                                                  read.3PL/read.3PL
         'Which men did Siôn say read the book?'

   b. [CP Pa ddynion [y [IP dywedodd*k* [VP Siôn [*t*k*

         [CP*t* [IP darllenasant*i* /*darllenodd*i* [VP *t* [*t*i* y llyfr]]]]]]]]]

   c. [CP Pa ddynion*j* [y [IP dywedodd*k* [VP Siôn [*t*k*
         [CP [IP darllenasant*i* /*darllenodd*i* [VP *pro*j* [*t*i* y llyfr]]]]]]]]]

If the *wh*-phrase were extracted from the embedded clause as the derivation in (22b)
shows, then we should expect no agreement between the *wh*-phrase and the verb,
since it would come from a position with which the verb does not agree. This
expectation is not borne out, as the example in (22a) with the embedded verb
agreeing with the extracted subject is impossible. On the other hand, if the example
in (22a) has the representation in (22c), then the reason why there is agreement in
this example is precisely because the embedded clause has the same structure as that
in (20a) with a null pronominal subject *pro*, a structure in which there is
agreement.[5]

4. Conclusion

   In the foregoing sections, I argued that clause structures in VSO and SVO
languages do not differ very much in abstract levels of representation like D-

structure and LF. In fact, their superficial word order differences can be derived from a simple choice of raising the subject at S-structure or at LF. If my analysis is correct, then it has two implications for theory of grammar.

As far as clause structure is concerned, we can conclude that the SpecIP cannot be possibly functioning as both an A- and an A'-position (Diesing (1990)), insofar as the notion of a position being both an A and an A'-position is at all a coherent one. We have seen that contrary to the SpecCP, uncontroversially an A'-position, the SpecIP position could not be used as an escape hatch for extraction of objects in constructions with an auxiliary.

Conceptually, given that abstract levels of representation are not available in the linguistic environment, it must be that the language learner is already equipped with some faculty that yields these abstract levels of representation, quite independently of the specific linguistic data that he is exposed to. It is thus unsurprising that both VSO and SVO languages turn out to have the same abstract represenations. A question that we may naturally ask is the structure of clauses in SOV languages.

If it is indeed the case that languages might differ with respect to the directionality of functional categories with respect to their complements, then the difference between SOV and SVO languages would be that INFL is to the right of VP in the former, but to the left in the latter. Otherwise, they have the same logical and hierarchical structure for clauses. It thus remains to be investigated whether the directionality of functional heads can be a dimension along which particular languages might vary.

Acknowledgments

Notes

[1]Alternatively, we may assume that English verbs do not raise to INFL at S-Structure, but at LF. Under this view, the level of representation where verbs raise to INFL is also a parametric dimension along which individual languages may differ.

[2]However, long-distance extraction of PPs is possible, as the grammaticality of the examples in (i) shows ((ia) is from Sadler (1988), (ib) is from Steve Harlow (personal communication)):

(i) a. Am beth y mae Mair yn dadlau efo ei brawd *t* ?
   about what PRT is   PRT argue with her brother
   'What is Mair arguing with her brother about?'

   b. A byw y dywedodd Siôn yr oedd Mair yn siarad *t* ?
   to who PRT said   PRT was   Mair PRT speak
   'Who did Siôn said that Mair was speaking to?'

Law (1991) argues that (successive) adjunction for extraction is structure-preserving (cf. Emonds (1976)). Thus, PPs can be extracted long-distance, since they may be base-generated in adjoined positions.

[3]Rizzi (1978) argues on the basis of the Italian data that the sets of bounding nodes in particular languages might differ. Cf. also Law (1990, 1991) for a discussion of how cross-linguistic bounding variations can be derived in a principled way.

[4]One issue that immediately arises for the condition in (15) is extraction out of a *wh*-island. The example in (ia) involves only a subjacency violation, which typically gives only mildly marginal grammaticality:

(i)   a.   ??What did you wonder who bought?
      b.   [$_{CP}$ what [did [$_{IP}$ you wonder [$_{CP}$ who [[$_{IP}$ t bought t]]]]]]

According to (15), the embedded CP should not be bounding if its head is indeed empty. One possibility is to assume that there is actually an abstract complementizer in the head position of the CP, as suggested in Rizzi (1991). Law (1991) suggests a different formulation of bounding domains which covers both the example in (i) and extraction in English involving modals in adition to those discussed in the text. To keep things manageable within the confine of space allotted to me here, I will assume the condition (15) for simplicity.

[5]Given the alternation between null and overt pronouns in (20a), it should then be possible to have the same alternation in (22). This expectation is not borne out, since the null pronoun is obligatory here (Sadler (1988)). On the basis of the Spanish data in (i), where $j{\neq}i$, but $k{=}i$ or $k{\neq}i$:

(i)   Nadie$_i$ cree   que   él$_j$ /pro$_k$ es   intelligente.
      nobody   believes   that   he   is   intelligent
      'Nobody believes that he is intelligent.'

Montalbetti (1984) suggests the Overt Pronoun Constraint at LF, given in (ii), to account for the fact that only the null pronoun can be bound by the matrix subject quantifier *nadie* 'nobody':

(ii)   Overt pronouns cannot be linked to formal variables iff they occur in a position where the alternation overt/empty is possible.

If we take the *wh*-phrase in (22b) as a quasi-quantifier (Chomsky (1981)), then the contraint in (ii) would effectively disallow that the presence of the overt pronoun.

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Subject anaphors, bound pronouns and the Binding Theory
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1. **Introduction.** The objective of this paper is to study in which way the Avoid Pronoun Principle, as stated in (1), works in Spanish.

    (1) Avoid lexical pronoun when possible (Chomsky, 1981)

       In English, this principle imposes the use of PRO over an overt pronoun when possible. In this way, Chomsky (1981, p. 65) explains the different referential behavior of _his_ in sentences (2a) and (2b).

    (2) a. John would much prefer [his going to the movie]
        b. John would much prefer [his (own) book].

       In (2a) _his_ is disjoint in reference from _John_, since PRO may appear in this position. On the other hand, in (2b) _his_ may refer to _John_, given that PRO may not appear in this position.
       In Spanish, as in other pro-drop languages, the APP forces the presence of PRO or pro, depending on whether the position is governed or not, over a lexical pronoun, as (3)[1] illustrates.

    (3) a. Nadie$_i$ t$_i$ dijo que e$_i$ trabajaría más.
         Nobody t said that e would-work more.
         'Nobody said that he would work more'.
      b.*Nadie$_i$ t$_i$ dijo que él$_i$ trabajaría más.
         Nobody t said that he would-work more.
         'Nobody said that he would work more'.

       The issues with regard to the APP are to define "when possible" and to characterize the properties of the so-called 'empty pronouns' versus the lexical pronouns. The solution proposed in this paper follows Bouchard's (1984, 1985) proposals. Bouchard (1984, 1985) proposes that the relevant distinction is not between lexical pronoun and nonlexical pronoun, but between pronoun and anaphor. In accordance with Bouchard (1984, 1985), this follows from an elsewhere indexing procedure where anaphors are the more specific way of obtaining coreference. His analysis is based on the fact that he considers PRO a pronoun or an anaphor, but never a [+pronominal, +anaphoric] element. I will extend this analysis of PRO to the Spanish pro. I claim that this I-identified null element can be [+anaphoric, -pronominal] or [-anaphoric, +pronominal]. I will base my proposal on the very similar behavior of the so-called Spanish empty pronoun to other [+anaphoric] elements, as NP-traces in raising structures and anaphors in reconstructed structures at LF. I will adopt for my analysis Chomsky's (1986) definitions of the Binding Theory.

2. The Overt Pronoun Constraint. In Spanish, null pronouns do not have the same interpretative behavior as lexically overt pronouns. For example, in (3a) the null pronoun in the subject position of the embedded clause can be bound by a wh-trace, but in (3b) a lexically overt pronoun cannot. In (3b) the sentence is ruled out since coreferentiality is not available given that <u>nadie</u> is not a referential element, in accordance to Montalbetti (1984). The contrast between (3a) and (3b) is accounted for by Montalbetti's (1984, 1986) Overt Pronoun Constraint (OPC) as stated in (4).

> (4) a. An overt pronoun cannot be linked to [t].
> b. (4a) applies only if the alternation overt/empty obtains.

However, the OPC, as stated in (4), does not account for some interesting cases and faces other problems, as we will see below. In this paper, I will study the nature of the overt/empty dichotomy and will give a more accurate and extended version of the OPC. In particular, I propose that in Spanish there is a [+anaphoric, -pronominal] element, without an overt counterpart,[2/3/4] that can be I-identified by Infl, i.e. AGR or a clitic, and it must occupy the highest structural position of an embedded clause at S-structure. In this way, this null anaphor would be able to be bound by an element of the matrix sentence. Its configurational behavior can be equated to those of PRO and NP-traces in raising constructions, as we will see below. In fact, I will propose that this empty anaphoric element (from now on Subject Anaphor (SA)) and PRO are the same thing, assuming Bouchard's (1984) proposals.

As a consequence of this proposal, I posit that the relevant distinction for the OPC is not overt/empty pronoun but anaphor/pronoun, following Bouchard (1984, 1985). I will base my restatement of the OPC on Chomsky's (1986) revision of the Binding Theory. Basically, the idea is that linked (Higginbotham, 1983) and coreferential relations are expressed by different formal elements whenever it is possible.[5] A bound element would be expressed by an anaphor, as long as principle A of the BT allows it, otherwise by a pronoun, i.e. a bound pronoun in Evans' (1980) sense, and a coreferential element would be expressed by a pronoun. Therefore, the cases of overlapping between anaphors and referential pronouns, and between bound pronouns and referential pronouns would follow from the Bindig Theory and the Elsewhere Principle.

3. A contrast between lexical anaphors and lexical pronouns. In (5) and (6)[6] we have an interesting contrast that does not fall under the OPC in (4):

> (5) a. Juan$_i$ habló de   él$_i$.
>   Juan talked about him.
>   'Juan talked about him'
>   b. Juan$_i$ habló de   sí mismo$_i$.

```
            Juan  talked about himself.
            'Juan talked about himself'
       (6) a.*Nadie; habló  de    él;.
            Nobody talked about him.
          b. Nadie; habló  de    sí mismo;.
            Nobody talked about himself.
```

In (5a) the pronoun may corefer with <u>Juan</u> but cannot be bound by <u>Juan</u> as the impossibility of having a sloppy reading in (7a) shows.[7] On the other hand, <u>sí mismo</u> is bound by <u>Juan</u> in (5b) as the grammaticality of the sloppy reading in (7b) shows.

```
       (7) a.Juan; habló de    él;, y  Pedro también.
            John talked about him, and Peter too. (strict/ *sloppy)
          b.Juan; habló de sí mismo; y Pedro también.(*strict/sloppy)
```

In (6a) the pronoun cannot corefer freely with <u>nadie</u> since <u>nadie</u> is not a referential element. In accordance to these data, we can restate the OPC in the following terms:

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       (8) a. An overt pronoun cannot be linked to [t].
          b. (8a) applies only if the alternation overt/empty or
             overt/anaphor obtains.
```

4. Binding Theory (BT). It is clear that the paradigm in (5) presents a problem for standard versions of the BT. According to Chomsky's definitions (1981), the Governing Category in (5) is the matrix sentence. However, the pronoun may not be free.

(5) is also a problem for Chomsky's (1986) version of the BT, since the notion of Complete Functional Complex (CFC) is not applied to PPs in that proposal. Hestvik (1989) proposes to extend this definition to PPs. Under his interpretation, a PP would be always a CFC, since the Grammatical Function compatible with its head is always assigned, otherwise the sentence would be ruled out. This interpretation allows to explain the fact that the pronominal in (5) may be not free. In the case of the anaphor the PP is not the least CFC containing a governor of the anaphor in which the anaphor could satisfy the BT being coindexed with an accessible antecedent, hence, it must be bound in IP.

Chomsky's (1986) proposals are the following:

```
       (9) I is BT-compatible with (α, β) if:
          a. α is an anaphor and is bound in β under I
          b. α is a pronominal and is free in β under I
      (10) For some β such that (i), I is BT compatible with (α, β):
          (i) α is an anaphor or pronominal and β is the least
              CFC containing μ for which there is an indexing J
              BT-compatible with (α, β)[8]
```

Obviously, the notion of SUBJECT and its relevance for the BT

(Chomsky, 1981) must be abandoned under this proposal, since NIC is not operating anymore in Spanish. Chomsky's (1986) version of the BT attempts to do so, the ECP being the principle that accounts for the NIC, as it does for the that-trace effects in (11).

(11) *Who do you think that saw Bill? (Chomsky 1986, p.176)

Interestingly, in Spanish there are no that-trace effects, as the grammatical translation of (11) in (12) shows.

(12) ¿Quién piensas que vio a Bill?

This fact would allow an anaphor to occupy the subject position of tensed clauses under Chomsky's version of the BT, since it does not violate the ECP.

5. On the nature of pro. According to Montalbetti (1984, 1986) the bound element in (3a) can only be a pronoun, relying on standard BT. Chomsky's (1986) version of the BT and the Elsewhere Principle determine the bound element as an anaphor, given that a pronoun cannot corefer freely with a non referential element as nadie, 'nobody'. In the case that we have a referential element as the subject of the matrix sentence, as in (13), then we have two possibilities for the embedded null category: a) a linked anaphor (SA) as in (3a); b) a pro that corefers freely with that referential element.

(13) $Juan_i$ dijo que $SA_i/pro_i/él_i$ trabajaría más.
John said that he would work more.

I will base my proposal on the non occurrence of this empty element in some positions in which a pronominal element may occur and in the behavior of the so-called Spanish empty pronoun which is very similar to that of other [+anaphoric] elements, as NP-traces in raising structures and anaphors in reconstructed structures at LF.

5.1. NP-traces and Subject anaphors.[9] According to Montalbetti's version of the OPC in (4) and to his analysis of the nature of the bound empty category, nadie should be able to bind the ec in (14a), where an object appears preposed to the verb. However the sentence is out when a Pedro does not have a [+focus] interpretation.[10] When the object remains in its D-structure position, as in (14b), the sentence is grammatical.

(14) a.*$Nadie_i$ dijo que a $Pedro_j$ e_i lo_j $vi-o_i$
    Nobody said that to Peter   him-CL-DO saw-AGR
    'Nobody said that he saw Peter.'
b. $Nadie_i$ dijo que e_i vio a Pedro.

Interestingly, this behavior patterns with the one of NP-

trace in raising structures, as $(15)^{11}$ illustrates.

(15) a.*Juan$_i$ parece que a Pedro$_j$ t$_i$ le$_j$ di-o$_i$
     John seems that to Peter   him-**CL-IO** gave-**AGR**
     'It seems that John gave a book to Peter'.
     un libro.
     a book.
   b. Juan$_i$ parece que t$_i$ le$_j$ di-o$_i$ un libro a Pedro.
     John seems that him-**CL-IO** gave a book to Peter.

It seems that the preposed elements in the embedded sentences of (14a) and (15a) intercept the linking relation, when they are not focused. Under the Binding framework that I am assuming, <u>a Pedro</u> would be an antecedent accessible to α, defining α's binding domain as the embedded IP.

I claim that the subject position of IP is the structurally highest A-position in IP at S-structure, and that this position can be occupied at S-structure by a constituent in complement position at D-structure. Saltarelli (1990) proposes that the subject position of psych-verbs is not related to any thematic property, and that mapping onto that position occurs through the Mapping Principle. I extend this analysis to the other kinds of verbs. These preverbal positions, no matter the nature of their thematic relation to the verb, are A-positions as shown by the facts that a quantifier can bind a pronoun from that position, and that a preverbal element in (15) can induce minimality effects for an anaphor.

According to Higginbotham (1983), linking can only occur between A-positions. (16) illustrates the linking of a pronoun by a quantifier from that position.

(16) a. Su*$_{i/j}$ madre escribió a cada$_i$ soldado.
     her   mother wrote   to every soldier.
   b. Cada$_i$ soldado escribió a su$_{i/j}$ madre.
     every soldier wrote   to her mother.
   c. A cada$_i$ soldado le   escribió su$_{i/j}$ madre.
     to every soldier him-**CL-IO** wrote   her mother.
   d. A cada$_i$ soldado su$_{i/j}$ madre le   escribió.
     to every soldier her   mother him-**CL-IO** wrote.

In (16a) the quantifier does not c-command the pronoun as its representation in $(17a)^{12}$ shows. In (16b), (16c) and (16d) the quantifier c-commands the pronoun, as (17b), (17c), and (17d) show, and, therefore, it is able to bind the pronoun.

(17) a.   IP
           / |
     su madre I'
           | \
           I   VP
      escribió   a cada soldado

```
    b.          IP
             /  |
    cada soldado I'
                 |  \
                 I   VP
            escribió  a su madre


    c.          IP
             /  |
    a cada soldado I'
                 |  \
             le escribió  su madre


    d.          IP
             /  \
    a cada soldado IP
                 /  |
            su madre I'
                     |
                 le escribió
```
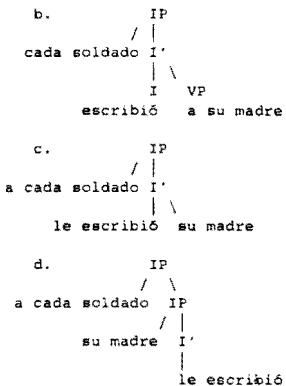
The theoretical point here is that it seems that there is no
difference between the properties of Spec of IP and the ones of that
preverbal adjunct position. This fact posits some problems for the
standard X'-theory, since maybe there is no such Spec of IP
position, if we need to equate it to the preverbal adjunct position.
Probably, a more articulated version of AGR would lead us to a
solution for (17d). I will not pursue any solution now since it is
not the objective of this paper. What is crucial for this paper is
the fact that that adjunct position is an A-position, hence, an
element in that position can act as an accessible subject, and,
also, an element in that position can be linked.
    In summary, in this section I have shown the similar behavior
between an SA and an NP-trace, and how a bound non-overt pronoun is
disallowed, as in (22). This fact is not covered by Montalbetti's
definition of the OPC, given that linking of a [+pronominal] element
in that position should be allowed under his account.

5.2. Reconstruction effects at LF. Larson and Luján (1990) study the
following paradigm in Spanish:

(18) a. Cuando e_i trabaja, Juan_i no   bebe.
        When   he works,   John doesn't drink.
     b. Juan_i no bebe cuando e_i trabaja.
     c. *Cuando él_i trabaja, Juan_i no bebe.
     d. Juan_i no bebe cuando él_i trabaja.

Their account of the different behavior of null and overt
pronouns in Spanish is based on the fact that the latter undergo
obligatory movement at LF but not the former, as focused elements

do. This fact results in vacuous quantification at LF. However,
Larson & Luján's account faces some problems. They do not consider
the fact that in Spanish we have stressed overt pronouns and
unstressed overt pronouns, as they point out for English. As it has
been shown above, we cannot group these two types of pronouns under
the same syntactic label, since they have different syntactic
behavior. It would be theoretically undesirable to have three
different kinds of syntactic pronouns, since there is no evidence
from UG and their characterization would be quite difficult.

Under my analysis, the contrast between (18a) and (18c) has a
straightforward solution, if we analyze (18a) as a case of
connectivity. In (18a) since we have a Subject Anaphor we have the
so-called reconstruction effects at LF.[13] In (18c) such
reconstruction effects do not arise since the pronoun cannot be
bound, given the OPC.

Notice that we have the same OPC effects in other cases of
connectiveness, as the ones presented by the psych-verbs in (19).

(19) a. *Una fotografía de él₁ molestó a Juan₁.
         a   picture   of him bothered to John.
      'A picture of him bothered John'
     b. Una fotografía de sí mismo₁ molestó a Juan₁.
        A   picture   of himself bothered to John
     'A picture of himself bothered John'

The possessive pronoun seems to allow this reconstruction effects as
(20) shows.

(20) Su₁ fotografía divirtió a Juan₁.
     His picture   amused   John.

Possessive pronouns seem to pattern with verbal clitics with regards
to the OPC, as (21) shows.

(21) a. Nadie₁ vio su₁ fotografía.
        Nobody saw his picture.
     b. Nadie₁ dijo que [AGRP1pro₁ [AGRP2Pedro le₁   dio
        Nobody said that   Peter him-CL-IO gave
        'Nobody said that Peter gave him a book'
        un libro]].
        a book.

This is another argument to consider the possessive pronoun as a
clitic, as proposed by Rivero (1986), since a strong pronoun is not
allowed in this context, as (22) shows.

(22) a.*Nadie₁ vio una fotografía de él₁.
        Nobody saw a   picture   of him.
     b. Juan₁ vio una fotografía de él₁.

Therefore, under my account there are only two types of pronouns: focused pronouns ([+ stress]) and nonfocused pronouns ([-stress]). In Martín (1991), I posit that only stress pronouns raise at LF, while unstressed pronouns are discourse bound at D-structure.

6. The OPC revisited. If we consider my reanalysis of the so-called Spanish pro as an element that can be [+anaphoric] or [+pronominal], then we can restate the OPC as in (23)[14].

    (23) **Pronoun Constraint**
        a. A pronoun cannot be linked.
        b. (23a) applies only if the alternation pronoun/anaphor
           obtains.

I should make a final remark that gives an account for cases as (24).

    (24) Nadie$_i$ admitió que la policía sabía que e$_i$ participó
        Nobody admitted that the police knew that he participated
        en el robo.
        in the robbery.

In (24) the SA is not bounded in the least CFC where it can be bounded, the first embedded clause, giving rise to an apparent violation of Principle A. I claim that this SA can be also a long distance subject-oriented anaphor, as the Japanese _zibun_, the Chinese _ziji_, and the Korean _caki_. (For a summary of the most relevant accounts of long distance anaphors, see Katada (1991)). As shown by (25), an element that it is not in the subject position cannot bind this null element.

    (25) *No admitió nadie$_i$ que la policía sabía que e$_i$ participó
        en el robo.

In summary, I have proposed that in Spanish the different behavior of lexical pronouns and non-overt pronouns is better accounted for by an analysis that treats non overt pronouns as anaphors. This proposal reinforces Chomsky's (1986) analysis that reduces Principle A to the ECP, since in Spanish the subject position does not show ECP effects. Finally, my proposal voids the necessity of designing a larger classification of pronouns, than focused and non focused, as implied in Montalbetti (1984) and Larson & Luján (1990).

NOTES
*I would like to thank Alfredo Arnaiz, Jon Franco, Hajime Hoji, Alazne Landa and Mario Saltarelli for their valuable comments, suggestions, and criticisms. Any error is mine.

1. Interestingly in Spanish also PRO is preferred over pro, as (i)

shows:

    (i) a. Nadie_i quiso PRO_i ir a Madrid.
         Nobody wanted to go to Madrid.
       b. Nadie_i quiso que él*_{i/j}/pro*_{i/j} fuera a Madrid.
         Nobody wanted him to go to Madrid.

If we consider the Spanish infinitive and the Spanish subjunctive as anaphoric tenses with respect to the one in the main clause, and a [-finite] AGR as an anaphoric AGR bounded by an NP in the main clause (Borer, 1989), this fact would be accounted for by my proposal, where anaphoric elements are always preferred over other elements as we will see below. In the case of the bound reading, (ia) is preferred over (ib) because (ia) makes use of anaphoric AGR, additionally to anaphoric Tense. In (ib) the necessity of I-identification of a null subject that is not identified by any element in the main clause forces the presence of the subjunctive to achieve the I-identification of a null element, in accordance to Borer's (1986) principle:

    (ii) An empty category must be I-identified.

2. A possible candidate for being an overt counterpart is _él mismo_ 'he himself'. However, as posited by Mckay (1991), I believe that _mismo_ 'self' is only an emphatic element that serves to contrast an individual (or group of individuals) with some salient class. (i) shows that it cannot covary freely with a subject anaphor:

    (i) A nadie_i dijo Juan que e_i/*él mismo_i fuera:
       Juan didn't say anyone to go.

3. There is some evidence from Universal Grammar to support this claim. This evidence comes from the languages that traditionally are considered not to be subject to the Nominative Island Constraint (NIC) as Chinese (Aoun & Li, 1990), Japanese (Katada, 1991), and Korean (Yang, 1984).

4. Obviously, this claim faces some learnability problems since, apparently, there is no positive evidence for the children. However, there is some evidence that the Elsewhere Principle is operating, as the data in fn. 1 shows. Also, the abstraction of the distribution of the data must lead the learners to the same conclusions that this paper if its argumentation is correct. In particular, the fact that anaphors, but not pronouns, can be bound by non referential elements must allow the learners to identify this empty element as an anaphor.

5. In Martín (1991), I claim that, in fact, pronouns cannot express bound relations at all, but only referential relations. Also, see this paper for a discussion of donkey anaphors.

6. Notice that _él mismo_ 'he himself' is possible here as (i) illustrates, when _nadie_ has a referential/partitive interpretation:

   (i) Nadie$_i$ habló de él$_i$ mismo.

I will give an explanation along the lines of Montalbetti for the stressed pronouns. For a further discussion on focused pronouns see Larson & Luján (1990) and Martín (1991). As pointed out by Jaeggli to Montalbetti (1984, p. 128) an overt pronoun improves its chances of being interpreted as a bound variable _if stressed_. A stressed pronoun has a contrastive interpretation too. On the other hand, a stressed anaphor does not have this contrastive use with respect to other individuals, in the case of the emphatic _mismo_ 'self', it cannot be used as a free composite of an anaphor, hence, the alternation pronoun/anaphor does not obtain and the Elsewhere Principle allows us to use a pronoun in these cases.

7. The English speakers that I have asked show the same contrasts that in (5), (6) and (7) with some variation about (5a).

8. What lies behind this proposal is that the governing category of an anaphor is defined by an antecedent, while the governing category of a pronoun is defined by its lexical governor. In some way, we can redefine the BT as in (i):

   (i) A. An anaphor must be antecedent governed.
       B. A pronoun must be free in its lexical governing
          category.

We can notice that the Elsewhere Principle becomes stronger inside a lexical category where even coreference is disallowed.

9. I will assume that the Spanish subject is generated in posverbal position and then optionally moved to a preverbal position. For further discussion on this topic see Kuroda (1986) and Koopman & Sportiche (1987).

10. A focused reading improves the sentence, even when it is still marginal as (i) shows.

   (i) ?Nadie$_i$ dijo que a PEDRO$_j$ e$_i$ lo$_j$ vio$_i$

This contrast can be accounted for by some relativized minimality effect (Rizzi, 1991) if we consider a focused element to be in A'-position and a non focused element in A-position, as we will see below.
   Notice that there is nothing wrong with a preverbal element, either focused or non focused, in an embedded clause as (ii) shows.

   (ii) Nadie dijo que a Pedro/PEDRO   lo vio el doctor.

Nobody said that the doctor saw Peter.

11. Again a [+ focused] interpretation of the preverbal element improves the sentence.

12. I believe that the IO hangs from V', since a pronoun embedded in an IO can be bound by a quantifier in the DO as (i) shows.

> (i) El gobierno restituyó cada niño; a su; madre.
> The government restored every child to his mother.

13. See Lebaux (1990), Belletti and Rizzi (1988), among others for further discussion of the reconstruction analysis. What is relevant for my paper is the similar behavior of SAs and anaphors in these structures.

14. Notice that I do not specify "linked to [t]" as Montalbetti does based on (i).

> (i) Nadie; quiere PRO; creer que él; es inteligente.
> Nobody wants to believe that he is intelligent.
> (Montalbetti 1984, p. 157)

I believe that _él_ has a generic interpretation, and that the whole clause in which it is is a generic statement. Actually, in Martín (1991), I propose that a pronoun cannot occupy a linked position. This analysis is based on the existence of two types of coreferentiality: discourse-bound at D-structure, and sentence-bound at LF/LF'.

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A Note on Binding and Barriers*

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1. Introduction

In the present work, I will be concerned with two interesting asymmetries re-
alized in finite complements v.s. Control complements in Japanese.[1] The one
of them is the difference in the behavior of scrambling: the phrases which
scrambled out of finite complements cannot bind anaphors, whereas the
phrases which scrambled out of Control complements can in Japanese (see
Nemoto 1991). The other asymmetry concerns binding of anaphor *zibin-zisin*:
this anaphor behaves like a 'local distance' anaphor in finite clauses (see
Kuratra 1986) but can be bound long-distantly in Control constructions. Below
I seek possibilities to relate these asymmetries.

2. Asymmetries

2.1 Scrambling. Recently the nature of scrambling has been discussed exten-
sively: Mahajan (1988), Webelhuth (1989), Deprez (1990), Tada (1990), Saito
(1991), Nemoto (1991) to name only a few. Mahajan (1988), for example, ob-
serves that in Hindi, the clause-internally scrambled phrases can bind
anaphors, whereas the long distantly scrambled phrases cannot. As noted in
Saito (1991), this is also the case in Japanese. The examples cited from Saito
(1991) in (1) and (2) illustrates the points.[2] (1b,d) are the cases involving
clause-internal scrambling;[3] (2b) is a case involving long distance scrambling
out of finite complements.[4]

(1)
a.?*otagai$_1$-no   sensei-ga   karera$_1$-o hihansita (koto)
    each other's teacher-nom they-acc criticized
'Each other$_1$'s teacher criticized them$_1$.'

b.?karera$_1$-o [otagai$_1$-no   sensei-ga   t$_1$ hihansita]
          -acc each other's teacher-nom   criticized
'Them$_1$, each other$_1$'s teacher criticized t$_1$.'

c.*Masao-ga otagai$_1$-no   sensei-ni   karera$_1$-o syookaisita (koto)
        -nom each other's teacher-dat they-acc introduced
'Masao introduced to each other$_1$'s teacher them$_1$.'

d. karera$_1$-o [Masao-ga otagai$_1$-no   sensei-ni   t$_1$ syookaisita]
    they-acc   -nom each other's teacher-dat   introduced
'Them$_1$, Masao introduced each other$_1$'s teacher.'

(2)

a.*Masao-ga   otagai$_1$-no sensei-ni [$_{CP}$ Hanako-ga karera$_1$-o
  -nom each other's teacher-to   -nom they-acc
 bihansita   to] itta (koto)
 criticized comp said
'Masao said to each other$_1$'s teacher that Hanako criticized them$_1$.'

b.*Karera$_1$-o [Masao-ga   otagai$_1$-no sensei-ni [$_{CP}$Hanako-ga t$_1$
 they-acc   -nom each other's teacher-to   -nom
 bihansita to] itta (koto)
 criticized comp said
'Them$_1$, Masao said to each other$_1$'s teacher that Hanako
criticized t$_1$'

We analyze the ill-formedness on (1a,c) and (2a) in terms of Condition A:
anaphor *otagai* (each other) is not bound.[5] Then, the well-formedness of (1b,d)
indicates the scrambled phrases can bind anaphors. On the other hand, the
ill-formedness of (2b) indicates that this is not the case for long distance
scrambling. In (2b), although the scrambled phrase c-commands *otagai*, the
grammaticality does not improve.

  Interestingly enough, the situation is different in the cases of long dis-
tance scrambling out of Control complements. Observe (3) and (4). In (3) and
(4), (a) examples are a familiar case of Condition A violation. In (b) examples,
the embedded object has been scrambled to the matrix sentence initial posi-
tion. The well-formedness of these examples indicates that the long distantly
scrambled phrase in (3b) and (4b) can bind the anaphor, as opposed to (2b).

(3)

a.*otagai$_1$-no titioya$_2$-ga   [[PRO$_2$ John to Bob$_1$-o
 each other's father-nom   and -acc
 rikaisiyoo to] kokoromita   (koto)
 understand comp attempted
'Each other$_1$'s father attempted to understand John and Bob$_1$.'

b. John to Bob$_1$-o [otagai$_1$-no titioya$_2$-ga [[PRO$_2$ t$_1$
  and -acc each other's father-nom
 rikaisiyoo to] kokoromita   (koto)
 understand comp attempted
'John and Bob$_1$, each other$_1$'s father attempted to understand t$_1$.'

(4)

a.*Mary-ga   otagai$_1$-no hahaoya$_2$-ni [[PRO$_2$ John to Bob$_1$-o
  -nom each other's mother-dat   and -acc
 rikaisuru yooni] itta (koto)
 understand comp told
'Mary told each other$_1$'s mother to understand John and Bob$_1$.'

b. Bob to John$_1$-o [Mary-ga otagai$_1$-no hahaoya$_2$ni [PRO$_2$ t$_1$
    and   -acc   -nom each other's mother-dat
  rikaisuru yooni] itta (koto)
  understand comp told
'Bob and John$_1$, Mary told each other$_1$'s mother to understand t$_1$.'

2.2. Binding of 'zibun-zisin.' The second asymmetry concerns binding of
zibun-zisin, which is indicated by *self-self* in the translations below. Kurata
(1986), (see also Kitagawa 1986 and Katada 1991) demonstrates that *zibun-zisin* is a local distance anaphor, as opposed to famous *zibun* (self), although
it displays subject orientation. The examples in (5) illustrated the points.

(5)
a.[John$_1$-ga Mary$_2$-ni [Tom$_3$-ga zibun$_1$/*$_2$/$_3$-o hihansita to] itta]
        -nom   -dat   -nom self-acc   criticized comp said
'John$_1$ said to Mary$_2$ that Tom$_3$ criticized self$_1$/*$_2$/$_3$'

b.[John$_1$-ga Mary$_2$-ni [Tom$_3$-ga zibun-zisin*$_1$/*$_2$/$_3$-o ...] ...]
                              self-self-acc
'John$_1$ said to Mary$_2$ that Tom$_3$ criticized self-self*$_1$/*$_2$/$_3$'

(5a) shows that *zibun* can take its antecedent from the higher clause, whereas
(5b) shows that *zibun-zisin* cannot. Therefore, Kurata (1986) concludes that
zibun-zisin is a local distance anaphor.
    However, interestingly enough, *zibun-zisin* in the complement clauses can
be bound by the matrix subject in Control constructions as shown in (6). The
examples in (6) involve object Control. Therefore, the local binder PRO is
controlled by the dative phrase *Mary*. Nevertheless, the matrix subject *John*
can be an antecedent of *zibun-zisin.*

(6)
a. John$_1$-ga Mary-ni [PRO zibun-zisin$_1$-o hihansuru yooni] itta
        -nom   -dat   self-self-acc criticize comp   told
'John$_1$ told Mary to criticize self-self$_1$'

b. John$_1$-ga Mary-ni [PRO zibun-zisin$_1$-o hihansite] moratta
        -nom   -dat   self-self-acc criticize   received
'John$_1$ had Mary criticeze self-self$_1$'

The fact that *zibun-zisin* in this position can be bound by the matrix subject is
particularly interesting, since as shown in (7), a pronoun is also allowed in the
same position.

(7) John$_1$-ga Mary-ni [PRO kare$_1$-o hihansuru yooni] itta
        -nom   -dat   him-acc criticize comp   told
'John told Mary to criticize him'

This fact suggests that as an English equivalent in (8), we must assume the
'SSC effect' by PRO.

(8) John told Mary [PRO to criticize him / *himself]

Hence the possibility of long distance binding of *zibun-zisin* must be explained independently.

3. The Structure of Control Constructions in Japanese

In order to account for the difference between in (2b) and (3b), I argue that Control complements in Japanese contain a fewer barrier than finite complements (see also Nemoto 1991).

Let me show in this section that the notion *barrier* plays a central role to account for the contrast displayed in (1b) and (2b). For ease of exposition, I use the terms A and A-bar for scrambling, although it has been pointed out by Saito (1989, 1991), among others, that the nature of scrambling appears to be different from a typical A-movement such as raising or a typical A-bar movement such as WH movement.[6]

Observe examples in (1) again. (1b) differs from (1a) only in that in (1b) a possible antecedent for anaphor is located in the c-commanding position for the anaphor. The grammaticality difference in (1a) and (1b), then, suggests that (1b), the anaphor is bound. Based on this type of data, Mahajan (1988), among others, argues that clause-internal scrambling can be A-movement, since anaphors must be A-bound.[7] It follows that the ungrammaticality of (2b) indicates that long-distance scrambling cannot be a case of A-movement.

A question naturally arises as to where the scrambled phrases land. In the present work, I adopt Kuroda's (1986) hypothesis that in the languages like Japanese, the subject can stay within VP and the Spec of IP can be a position for a scrambled phrase, assuming that the Spec of IP is an A-position.[8] This is illustrated in (9).

(9)
$[_{IP} X_1 [_{I'} Y\text{-nom} \ldots t_1 \ldots V]]$

Now consider (2b) again. We must consider why the scrambled phrase cannot land at the Spec of Matrix IP and binds the anaphor in (2b), as illustrated in (10).

(10)
$[_{IP} X_1 [_{I'} Y\text{-nom} \ldots [_{CP} [_{IP} [_{I'} Z\text{-nom} \ldots t_1 \ldots V]] V]]$

The ungrammaticality of (2b) suggests that the configuration (10) violates some condition. Let us consider what (10) violates.

It is known that A-movement requires strict locality. There are a number of well-known conditions which exclude illicit A-movement: for example, Condition A of the Binding Theory, the Local Binding Condition (Rizzi 1986, Lasnik 1985), the Uniformity Condition (Chomsky 1986b), the ECP, and the Theta Criterion (Rizzi 1990).

Since scrambling does not involve inherent Case assignment, the Uniformity Condition is irrelevant. In (10), each member of the chain is locally bound by a successive member of the chain; thus, the Local Binding Condition is not violated.[9]

One may claim that Condition A exclude (2b), saying that the NP trace left behind is not bound within its governing category. However, the derivation such as (11) is possible for (2b) as noted by Mahajan (1988).

(11)
$[_{IP}$ X$_1$ $[_{I'}$ Y-nom ... $[_{CP}$ $[_{IP}$ t$_1$' $[_{I'}$ Z-nom ... t$_1$ ... V $]]]]$

Indeed the well-formedness of the example given in (12) shows that long distance scrambling can involve clause-internal A-scrambling.

(12)
?karera$_1$-o [Hanako-ga $[_{CP}$ [t'$_1$ [otagai$_1$-no sensei-ga   t$_1$
 they-acc   -nom   each other's teacher-nom
 hihansita] to] itta
 criticized   comp said
'Them, Hanako said that each other's teacher criticized t$_1$'
                    (Saito class lecture 1989, see also Mahajan 1988)

The difference between (2b) and (12) is that in (12), there is an anaphor in the embedded clause, whereas in (2b), it is outside of the embedded clause [10] The well-formedness of (12), as opposed to (2b), indicates that the anaphor in the embedded clause is bound by the trace left behind in the embedded clause. Therefore, (12) is a piece of support for the intermediate trace in (11). Then, in (11), the initial trace should be bound by this intermediate trace. A question arises as to whether this intermediate trace violates Condition A. Let us next explore the binding status of this trace.

Mahajan (1988) appeals to Condition A to rule out a configuration like (11) by claiming that although the initial trace will be bound by the intermediate trace, the intermediate trace will not be bound within its governing category. Therefore, such example as (2b) is ill-formed due to a Condition A violation. Saito (1991), on the other hand, notes that since in Japanese, as opposed to Hindi, anaphors do not observe 'the NIC effect' (Yang 1983) as shown in (13), the situation is somewhat more complicated. (13) illustrates the lack of the NIC effect in Japanese. The anaphor in the embedded subject can be bound by the matrix subject.

(13)
karera$_1$-ga [[otagai$_1$-ga   tensai da] to] omotteiru (koto)
they-nom   each other-nom genius is   comp thinking
'They$_1$ are thinking that each other$_1$ is a genius.'

Saito's point here is that if the subject, which is located lower than the position of the intermediate trace in (11), can be bound by a clause-external element, then, the trace might have a chance to be bound from the higher clause.

This possibility becomes a strong one given that A-scrambling is possible to the position between the subject and indirect object as shown in (14).

(14)
a.*Masao-ga otagai$_1$-no   sensei-ni   karera$_1$-o syookaisita
        -nom each other's teacher-dat they-acc   introduced
'Masao introduced to each other$_1$'s teacher them$_1$.'

b. Masao-ga [karera$_1$-o [otagai$_1$-no   sensei-ni   t$_1$ syookaisita]]
        -nom they-acc   each other's teacher-dat   introduced
'Masao introduced them$_1$ to each other$_1$'s teacher t$_1$'
                          (Tada 1990, see also Mahajan 1988)

The well-formedness of (14) indicates that there is an A-position between the subject and the indirect object. Let us call it W for ease of exposition. This raises a possibility for the derivation such as (15) for (2b).

(15)
$[_{IP} X_1 [_{VP} Y\text{-nom } [_W t_1'' \mid R\text{-dat} \dots$
$[_{CP} [_{IP} t_1' [_{VP} Z\text{-nom} \dots t_1 \dots V]] V]]$

(13) shows that if Y can bind Z. Then, t″ should be able to bind t′. They are coindexed and t″ c-commands t′. The example in (16) shows that an anaphor in the position of t″ can be actually bound by Y or R;[11] therefore, t″ is in t′s governing category.

(16)
John-to Mary$_1$-ga karera$_2$-ni [[otagai$_{1/2}$-ga | seiseki-ga itiban
      and   -nom they-dat   each other-nom grade-nom best=was
yokatta]] to] itta
            comp said
'John and Mary$_1$ said to them that it was each other$_1$ whose grade
was the best.'

Hence there is no Condition A violation in (15). Consequently, we cannot attribute the ill-formedness of (2b) to Condition A.

Note that there is a barrier between t″ and t′. A-movement cannot involve the Spec of CP (Chomsky 1973, May 1981). Given Rizzi's (1990) theory, this A-movement violates the Theta-Criterion, a chain condition, and is excluded, as desired. Since Rizzi (1990:92) assumes that a chain is partially defined in terms of Chomsky's (1986a) antecedent government (= 19 below), here the notion *barrier* plays an important role.

If we take a 'disjunctive' formulation of ECP, the possibility of lexical government for t′ becomes an issue. However, it is not trivial whether this position is lexically governed. If we assume with Saito (1989) that the upper subject positions in multiple subject construction as (16) and (17) are available for scrambling, we may examine whether this position can be lexically governed against such examples as (17).[12] The examples in (17) suggest that the LF extraction of major subject out of complex NP does not yield an ECP violation.[13] Then, this position can be lexically governed.

(17)
a. John-wa [[dare-ga seiseki-ga yokatta] kurasu]-o otosita no
        -top who-nom grade-nom was good class-acc failed Q
'Who did John fail the class which t received a good grade'

b. Mary-wa [[dare-ga rieki-ga   agaru] sigoto]-o sitai   no
        -top who-nom profit-nom raise job -acc want=to=do Q
'Who does Mary want to do a job which t earns profits'

Conceptually, one may argue as follows. It is well-known since Huang (1982) that in languages like Chinese and Japanese, there is no subject/object asymmetry with respect to extractability. Huang (1982) claims that subjects are lexically governed by INFL in those languages. More recent VP-internal Subject Hypothesis (Kuroda 1986, Kitagawa 1986, Koopman and Sportiche

1988, among others) raises a possibility that the extraction of subject in Chinese/Japanese is from the Spec of VP, and therefore, long extraction is possible (Koopman and Sportiche 1988). Huang (1990), on the other hand, argues that long extraction of subject from the Spec of IP should be possible in Chinese. Let us suppose that this is the case in Japanese too for the sake of argument. More specifically, let us assume that INFL in Japanese is a potential lexical governor. Under Kuroda's (1986) hypothesis, in Japanese INFL need not agree with an element in its specifier position; therefore, its raising to the Spec of IP is not forced, as opposed to English. On the other hand, agreement is not prohibited, and any arguments (subject, direct object, and indirect object) can move to the Spec of IP. In other words, even when an object phrase is scrambled to the Spec of IP, it agrees with INFL. Then, one may claim that the trace of the scrambled phrase is lexically governed by INFL.

If t' in (11) is indeed lexically governed, this example is analogous to (18), a well-known example of 'super-raising' due to Mark Baker.

(18)
*John$_1$ seems [that [it is told t_1 [that [Mary is a genius]]]]

Chomsky (1986a) argues for the condition in (19) to exclude cases of 'super-raising' such as (18). (19) also excludes (2b).

(19) Each link of A-chains must be 0-subjacent.

Therefore, the distribution of A-scrambling in Japanese independently argues for such a condition as (19). Note that no matter which we take between 'theta-criterion' approach or (19), the notion *barrier* plays a crucial role to explain the distribution of A-scrambling in Japanese.

Now observe (3b) and (4b) again. There are cases of 'long-distance' scrambling. I argued for the hypothesis that for the composition of A-scrambling chains, each member of the chain must be subjacent to its predecessor. Given the fact that A-movement is possible out of Control complements, the theory predicts that there is a difference in the number of barriers in Control complements and finite clauses in Japanese. More specifically, if it is assumed that finite complements contain one barrier, it follows that Control complements in Japanese contain no barrier.

4. Binding of 'Zibun-Zisin'

Let us now go back to the asymmetry that we observed in (5) and (6). The issue is why long distance binding of *zibun-zisin* is possible in (6) but not in (5).

4.1. Scrambling and the Binding Possibilities. It is pointed out by Kurata (1986), Kitagawa (1986), and Katada (1991) that scrambling changes the binding possibility as shown in (20).[14]

(20)

a.*John₁-ga Mary-ni [Tom-ga zibun-zisin₁-o hihansita to] itta
       -nom   -dat   -nom self-self-acc criticized comp said
'John₁ said to Mary that Tom criticized self-self₁'

b. John₁-ga Mary-ni [zibun-zisin₁-o [Tom-ga t₁ hihansita
       -nom   -dat self-self-acc   -nom   criticized
   to] itta
   comp said
'John said to Mary that self-self₁, Tom criticized t₁'

Moreover, this is not a peculiar characteristic of Japanese scrambling; the same phenomenon is observed with English topicalization, as shown in (21).

(21)

a. *John thinks that Mary likes himself

b. John thinks that himself, Mary likes t

                                        (Lasnik and Saito in press)

Then, we may consider the possibility of scrambling the anaphor over PRO as illustrated in (22).

(22) John-nom Mary-dat [_cp [zibun-zisin-o [PRO t ...]]]]

This is a phonetically vacuous movement. We must note, however, that in English, topicalization to the infinitive initial position is prohibited as shown in (23).

(23) *John told Mary [a book, to read t]

It is not clear at all why this is the case; it is not clear whether this mysterious constraint holds in Japanese. However, given that scrambling can be A-movement, we may distinguish (22) from (23) in that the former has a possibility to involve A-movement, whereas the latter does not, as pointed out to me by Howard Lasnik (personal communication). Of course we need an extra A-position and must consider what it is.
    On the other hand, one may consider the possibility of (24).

(24)
John-nom Mary-dat [zibun-zisin-acc [_cp PRO ... t ...]]]

There are two possibilities for the scrambling landing sites in (24). The one is a CP adjoined position. The other is a base-generated position in the matrix clause. This possibility is raised given our observation that scrambling out of Control complements can be A-movement. These possibilities crucially depends on the availability of adjunction to CP or a base-generated position, among other things, and it is beyond the scope of this work, however. I will leave this to the forthcoming works.

4.2. LF Movement of Anaphors. Interestingly enough, there is another way to look at (6). If the conclusion that we reached based on the studies on scram-

bling, that is in Japanese, Control complement contain a fewer barrier, is correct, the kind of data in (5) and (6) here can be a support for the approach in which certain phenomena of anaphor bindings are attributed to LF movement.

LF-movement of anaphors, which was originally proposed by Lebeaux (1983), and then Chomsky (1986b), has been entertained by many linguists: Pica (1987), Huang and Tang (1989), Cole, Hermen and Sung (1990), Katada (1991), to name only a few. It seems, however, that the issue is still far away form the settlement, and it is not that I am able to provide with a detailed analysis in this paper. Instead, let me spell out what I mean by the contrast display in (5) and (6) can be support for this hypothesis.

For Japanese anaphors *zibun* (self) and *zibun-zisin* (self-self) Katada (1991) argues for LF raising. She attempts to explain their subject orientation by their adjunction site. That is, she claims that this operations is VP adjunction. Moreover, she assumes *zibun-zisin* has a complex structure, where *zubin* located in the Spec position of the larger NP, and assume that as for *zibun-zisin*, only *zibun* part raises. By doing so, she attempts to attribute the locality of these anaphors to the ECP. Consider (5) again. (25a, b) are LF representations of (5a, b) respectively under Katada's approach.

(25)
a. John-nom [zibun [Mary-dat [$_{CP}$ ... t-acc ...] said]]

b. John-nom [zibun [Mary-dat [$_{CP}$ ... t-zisin-acc ...] said]]

Katada assumes that the trace in (25b) is lexically governed, whereas the trace in (25b) is not. Therefore, she claims, (25b) yields an ECP violation. Here the crucial point is that antecedent government is impossible in (25b). It is generally stipulated that LF raising of anaphors cannot involve the Spec of CP. It follows that *zibun-zisin* in finite complements can be bound only by the embedded subject, as desired.

Now consider (6a) again under Katada's hypothesis. Its LF representation will be illustrated as in (26).

(26) John-nom [zibun [Mary-dat [$_X$ PRO t-zisin-acc ...] told]]

In (26), whatever X is, X does not block antecedent government as indicated the well-formedness of the example given in (27).[15]

(27)
John-ga [karera-o [Mary-ni [PRO otagai-no sensei-ni t
   -nom   they-acc   -dat   e.o.'s teacher-dat
syookai suru yooni] itta
introduce comp   told
'John told Mary to introduce them to each other's teacher.'

Then, in (26), the trace can be antecedent governed. If so, (26), as opposed to (25b), is a well-formed representation. This means that the theory predicts that the matrix subject can bind *zibun-zisin* in Control complements, as desired.

5. Summary

To sum up, in this paper, I suggested some possible directions to account for long-distance binding of 'local' anaphor *zibun-zisin* in Control constructions in light of the hypothesis that A-scrambling out of Control complements is possible in Japanese.

Notes

*I would like to thank Hiroto Hoshi, Yasuo Ishii, Howard Lasnik, and Mamoru Saito for the useful comments and help. All shortcomings are mine.

[1]Interestingly, the same asymmetries are observed in Hindi. See Mahajan (1988).

[2]Saito adds *koto* (the fact that) to some of his Japanese examples to avoid the unnaturalness resulting from the lack of topic in a matrix sentence. I will follow him and add *koto* to some examples. Also, the English translation is to help readers to see rough structure of Japanese, and may not be grammatical sentences.

[3]Mahajan (1988) and Saito (1991) note that there is a slight grammatical difference in (1b) and (1d), which is shown by '?' in the example. See Saito (1991) for discussion. Tada (1990) argues to distinguish the type of scrambling involved in (1b) from that in (1d).

[4]Long distance scrambling out of finite complements is possible in Japanese as shown in the following example.

(i) sono hon-o   [Mary-ga [$_{CP}$ John-ga t katta to] itta]
    that book-acc   -nom   -nom   bought comp said
    'That book, Mary said that John bought t'

[5]For the discussion of anaphoric nature of *otagai*, see Yang (1983) and Kitagawa (1986), among others.

[6]Saito points out that for example, so-called 'A-scrambling' exhibits Condition C type reconstruction effect, where typical A-movement does. He also points out that scrambling in general does not exhibits weak crossover effect, where typical A'-movement does.

[7]Clause-internal scrambling can be also A'-movement.

[8]For the analysis of scrambling under the highly articulated IP structure proposed by Chomsky (1989), see Mahajan (1988), Deprez (1990), and Miyagawa (1991).

[9]However, the LBC appears to be needed to rule out the following example as noted in Deprez (1990).

·(i) * karera$_1$-o [otagai$_1$-ga   t$_1$ aisiteiru] (koto)
      them,   each other-nom   love
      'Them$_1$, each other loves t$_1$'

[10]We consider that the movement from t' to the sentence initial position is an instance of A' scrambling in (12).

[11](16) involves multiple subject constructions. In Japanese, more than one nominative phrase is allowed. See Kuno (1973).

[12]The following example is well-formed.

(i) Mary-wa [NP [dare-o$_1$ [John-ga t$_1$ osieta] gakkoo]-o
         -top   who-acc   -nom   taught   school-acc
    tazuneta no
    visited Q
    'Who did Mary visit the school in which John taught t'

However, using such example as (i), we cannot argue for the hypothesis that the Spec of IP is lexically governed. Saito (1989) argues that scrambling can be undone at LF. If this is the case, LF extraction of WH in (i) can takes place from the initial position.

[13]See Kitagawa (1986:230) for a different observation and conclusion.

[14]We may relate the fact that scrambling changes the binding possibility and the fact that anaphors in Japanese do not observe the 'NIC effect,' if ([3), for example, can have the following structure.

(i) Karera$_1$-ga [CP [otagai$_1$-ga [t$_1$ tensai-da]] to] omotteiru
            -nom   e.o.-nom   genius-is   comp thinking
    'They$_1$ think that each other$_1$ is genius'

Lasnik and Saito (1990) propose to exclude (ii) in terms of the ECP (cf. (21)).

(ii)*John$_1$ thinks [CP that [IP himself [IP t$_1$ is genius]]]

The trace in the subject position is not properly governed: it is not lexically governed; it is not antecedent governed since a proper governor must be X^0. On the other hand, if subject position in Japanese is lexically governed, there should be no ECP violation in (i). However, there is an apparent problem. Saito (1985) notes that subject cannot scramble in Japanese. If this is the case (i) is independently excluded. However, if the fact that subject often cannot scramble in Japanese is due to crossing effect (a possibility also suggested by Saito 1985), (i) can be allowed.

[15]See Nemoto (1991) for some discussion about what X is.

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The Role of the Syllable in Bimoraic Foot Systems:
Evidence from Japanese*

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1. The Issues

What is known about foot structure comes primarily from the study of stress systems.[1]
Arguing from prosodic templates and the accentuation of compounds, Poser (1990) has provided a
different kind of evidence for foot structure in Japanese, a quantity-sensitive language in which
open syllables with a short vowel are light (monomoraic), whereas open syllables with a long
vowel are heavy (bimoraic), as are syllables with a diphthong and closed syllables (which can
only be closed by a nasal or the first half of a geminate consonant). Poser shows that Japanese has
prosodic templates that are satisfied either by a single heavy syllable or by a sequence of two light
syllables, such as the template characterizing the class of well-formed stems to which the hypo-
coristic suffix -*tyan* may be attached:

(1) hanako   hana-tyan   haa-tyan   hat-tyan
     kiyoko   kiyo-tyan   kii-tyan   kit-tyan
     midori   mido-tyan   mii-tyan   mit-tyan

Since each hypocoristic consists of two morae followed by -*tyan*, Poser concludes that a stem to
which -*tyan* is suffixed must be a bimoraic foot.[2] He argues that other prosodic templates and
accentuation in compounds also support bimoraic foot structure in Japanese.

Feet have generally been assumed to dominate syllables in prosodic structure, but the
existence of bimoraic foot templates raises an interesting issue: in a language like Japanese with
bimoraic feet, are syllables represented in prosodic representations? Is a form like *hana-tyan*
represented with syllable structure, as in (2a), or without it, as in (2b)?

(2) a.

Syllable-free representations such as (2b) would facilitate the statement of prosodic templates that
refer to feet as requiring structures of the form (3).

(3)

With syllables in prosodic representations, the template would have to be formulated so as to be
satisfied by both (4a) and (4b).

(4) a.

The issue is how much prosodic representations differ cross-linguistically. Syllables are
clearly needed in the prosodic representations of languages in which feet count syllables. Are
they also needed in the prosodic representations of languages such as Japanese where feet count

only morae?

Another issue concerns light syllables "left over" when strings are organized into bimoraic feet. Are they footed as degenerate feet or are they left unfooted (Kager 1989, Hayes 1991)?

2. Split Syllables: Two Apparent Arguments for Syllable-Free Representations

Is a bimoraic syllable ever split between two feet? If such cases exist, they would argue for syllable-free representations like (2b), which can represent split syllables straightforwardly. How could split syllables be represented in prosodic representations with syllables?
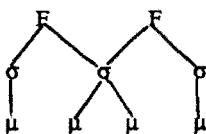
(5) a.   b.
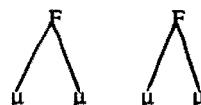
The best approximation would be a representation like (5a), but this fails to represent the fact that the first mora of the medial syllable is in the first foot, the second mora in the second. With a syllable-free representation like (5b), the representation of foot structure is not problematic. Cases where bimoraic syllables are split between two feet would thus provide evidence for syllable-free prosodic representations.

Hayes (1991, 40) conjectures that "rules of foot construction may not split syllables." Japanese, however, presents two types of cases that could be used to argue for split syllables and therefore for syllable-free representations. We consider these arguments now, providing an alternative account of these phenomena in section 6 below.

2.1 Split Syllables Resulting from Prosodic Templates and Vowel Coalescence

The first case of putative split syllables comes from a type of compounding with loan word abbreviations (Itô 1991) in which each member of the compound consists of a single bimoraic foot. Students at International Christian University in Tokyo apply this type of compounding to abbreviations of English words in course names:

(6)   in-rin   'introduction to linguistics'
       in-kuri   'introduction to Christianity'
       in-komi   'introduction to communication'
       in-ran   'introduction to language'
       zyene-edo   zyeneedo   'Gen Ed'

These compounds must conform to a prosodic template that requires each member to consist of one foot (Poser 1990, Itô 1991).

The key example is *zyene-edo*, realized as the trisyllabic *zyeneedo* in casual speech, with a bimoraic second syllable.[3] To conform to a two-foot template, this form must be parsed as [zyene]$_F$ [edo]$_F$. Thus, the second syllable of *zyeneedo* is apparently split between two feet, which would require a syllable-free prosodic structure in which F directly dominates morae.

Another apparent argument for syllable-free prosodic representations can be based on the interaction of the productive phenomenon of loan word abbreviation (Itô 1991) with Jazz Jive, a jazz musicians' argot discussed in section 3. Instead of (7a), the abbreviated form (7b) is commonly used. Jazz Jive cuts (7b) in two and transposes the two halves, mapping them to bimoraic prosodic templates and yielding (7c), with a long vowel in the second syllable.

(7)   a. asuparagasu 'asparagus'
      b. asupara
      c. paraasu

Since this form results from mapping to two one-foot templates, it must be parsed as [para]$_F$ [asu]$_F$, suggesting again that a heavy syllable can be split between two feet, which would require syllable-free prosodic representations.

2.2 Split Syllables and Accent in Noun-Noun Compounds

Another argument against representation of syllables in Japanese prosodic structure comes from a suggestion by Poser (1990) concerning accent in noun-noun compounds in which the second member (N2) has more than two morae.[4] In some cases, N2's accent becomes the compound's accent:

(8) yumé   'dream'   monogátari   'tale'   yumemonogátari
     huyu   'winter'   késiki   'view'   huyugésiki
     yamá   'mountain'   hototógisu   'quail'   yamahototógisu

In some cases, accent goes on the first syllable of N2:

(9) a. tya   'tea'   hasira   'pillar'   tyabásira 'tea stalk'
         kakudai   'expansion'   sangyoo   'industry'   kakudaisángyoo
         tîkin   'chicken'   karee   'curry'   tîkinkáree
     b. té   'hand'   kagamí   'mirror'   tekágami
         hanaurî   'flower-selling' musumé   'girl'   hanaurimúsume
         insutánto 'instant'   koohîi   'coffee'   insutantokóohii
     c. sato   'village'   kokóro   'spirit'   satogókoro 'homesickness'
         dénki   'electricity'   kamisóri   'razor'   denkikámisori

In (9a), N2 is unaccented. In (9b), the final syllable of N2 is accented, while in (9c), its penult is accented. Poser shows how this set of data can be accounted for:

(10) a. The final foot is extrametrical.
     b. The accent of N2 becomes the accent of the compound.
     c. If N2 is unaccented, the first syllable of N2 is accented in the compound.

The key point is that the final foot's extrametricality causes (10) to regard N2 in (9b) and (9c) as unaccented. Thus (10c) applies in (9b) and (9c), accounting for the accent on the first syllable of N2.

In the key cases N2 has an accented heavy (bimoraic) penult with a light (monomoraic) final syllable:

(11) singata   'new model'   zidóosya   'car'   singatazidóosya
     sukín   'skin'   kurîimu   'cream'   sukinkurîimu
     hángaa   'hunger'   sutoráiki   'strike'   hangaasutoráiki
     bizin   'beautiful person'   konkúuru   'contest'   bizinkonkúuru

Poser notes that treating the final bimoraic foot as extrametrical in these cases requires splitting the penultimate syllable between two feet; its second mora is included in the final extrametrical foot, whereas its first (accented) mora, by (10b), becomes the accent of the compound. The accentuation of these noun-noun compounds thus supports splitting the penultimate syllable between two feet, and hence syllable-free prosodic representations.

Despite these apparent arguments for syllable-free prosodic representations, I argue below that a syllable can *not* be split between two feet and that syllables are needed in Japanese prosodic representations. The argument is based on Jazz Jive, to which we now turn.

3. Jazz Jive

Jazz Jive (*zuuzya-go*), a "backwards language" used among Japanese jazz musicians, has recently received attention in the linguistic literature (Tateishi 1989, Poser 1990, Itô 1991, Itô and Mester 1991, Itô, Kitagawa, and Mester, in preparation). In Jazz Jive, nouns are said "backwards," as in (12).

(12)
Standard form	*Jazz Jive*	*Gloss*
koohii	hiikoo	'coffee'
kuuraa	raakuu	'air conditioner'
kusuri	suriku	'medicine'
biiru	ruubi	'beer'
humen	menhu	'(musical) score'
hara	raaha	'stomach'
hi	iihi	'fire/light'

Previous researchers have argued that Jazz Jive forms must conform to prosodic templates. These can be interpreted as:

(13)   Template 1: $F_{\mu\mu}$ $F_{\mu\mu}$
        Template 2: $F_{\mu\mu}$ F_{μ}

The notation "$F_{\mu\mu}$" indicates a bimoraic foot, "F_{μ}" a monomoraic (degenerate) foot. In certain cases where the input word has three morae or less, Template 2 is used instead of Template 1. This is predictable from properties of the input word, although the conditions under which Template 2 is used instead of Template 1 differ somewhat for different speakers.[5] (14) illustrates lengthening to fit the template's first foot, and (15) shows shortening to fit the template's second foot.

(14)
biiru	ruubi	'beer'
hara	raaha	'stomach'
hi	iihi	'fire, light'

(15)
biiru	ruubi	'beer'
maneezyaa	zyaamane	'manager'
makkaasii	siimaka	'McCarthy'

(14-15) show that the Jazz Jive algorithm transposes the input word's melody alone; prosodic structure is not transposed along with the melody.

The algorithm for deriving a Jazz Jive form from an input word consists of three steps:

(16)   a. Cut the input melody in two.
        b. Map the second half of the input melody to the template's first foot.
        c. Map the input melody to the template's second foot.

To satisfy (16a), both "halves" of the input melody that result from the cut must be non-null.

What determines where the cut is made? Tateishi (1989) claims that the cut is made at the highest branching node. Itô, Kitagawa, and Mester (in preparation) propose a morphophonological hierarchy, claiming that the cut is made immediately before the highest-ranking element on this hierarchy that will yield a non-null element to the left of the cut. We need not attempt to choose between these formulations here. These researchers have made what is the key observation for our purposes: in monomorphemic words the cut must be made immediately before the rightmost foot (where this yields a non-null string to the left of the cut).

(17)

Standard form	Jazz Jive	Gloss
kusuri	suriku	'medicine'
piyano	yanopi	'piano'
sakana	kanasa	'fish'
kitune	tuneki	'fox'
kyarameru	merukyara	'caramel'
humen	menhu	'(musical) score'
maneezyaa	zyaamane	'manager'

The rightmost foot consists of two light syllables in *kusuri, piyano, sakana, kitune,* and *kyarameru,* and of a single heavy syllable in *humen* and *maneezyaa.*

If a cut before the final foot does not yield two non-null strings, the cut must be made before the rightmost element of a type smaller than the foot. In the examples in (18), the unit before which the cut is made could be described either as the syllable or as the mora.[6]

(18) hara   raaha   'stomach'
      biiru   ruubi   'beer'

In monosyllabic bimoraic input words, the unit before which the cut is made could be described either as the mora or as the segment. Since the template's first foot is bimoraic, lengthening results:

(19) noi   iino   'Noi' (name)
      tai   iita   'red snapper'
      noo   oono   'Noh (drama)'

In monomoraic input words, where a cut before the final (and only) mora would not cut the melody in two, the cut is made before the final segment:

(20) no   oono   'field'
      hi   iihi   'fire, light'

The algorithm in (16) accounts for the fact that the vowel appears to be "copied" in the Jazz Jive forms in (20). Since the cut is made before the vowel, (16b) maps this vowel to Template 2's first foot, thereby lengthening it. (16c) then maps the entire input melody to Template 2's second foot, resulting in the output forms *oono* and *iihi.* The algorithm in (16) thus accounts both for apparent cases of "copying" (as in (20)) and other Jazz Jive forms that appear to result from melodic transposition.

4. Evidence that Feet Cannot Split Syllables

Can a syllable be split between two feet? Jazz Jive provides the crucial evidence showing that, contrary to initial appearances, this is *not* possible.

The crucial evidence comes from words ending in a heavy syllable followed by a light one. Does the word *sutoobu* 'stove', for example, have the prosodic structure in (21a-21b), with a split syllable, or that in (21c)?

(21)
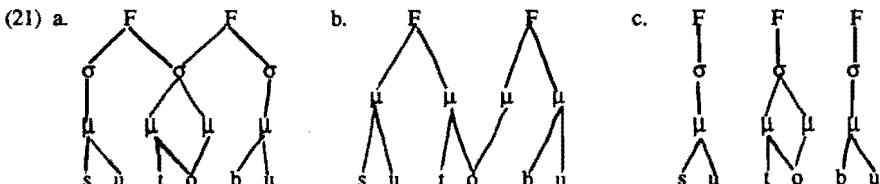
Since the Jazz Jive algorithm cuts the word in two immediately before the final foot, we can use Jazz Jive to test which structure in (21) is correct. The structures in (21a-21b) predict that the middle syllable will be split between two feet, resulting in the Jazz Jive form *obusuto*, which is incorrect. The structure in (21c) claims that the final foot consists of the light syllable *bu*, correctly predicting the Jazz Jive form *buusuto*. The data in (22) shows that a syllable cannot be split between two feet. For words ending in a heavy syllable followed by a light one, the final foot that Jazz Jive maps onto the template's first foot is consistently the final light syllable. In making the cut before the final foot, Jazz Jive does not treat "half" the penult as part of the final foot.

(22)		Standard form	Jazz Jive	Incorrect form	Gloss
	a.	sutoobu	buusuto	*obusuto	'stove'
		rekoodo	dooreko	*odoreko	'record'
		buraito	toobura	*itobura	name of a non-dairy creamer
		huransu	suuhura	*nsuhura	'France'
		toronto	tootoro	*ntotoro	'Toronto'
	b.	sutoraiki	kiisuto	*ikisuto	'strike'
		biiru	ruubi	*irubi	'beer'

In (22a), regardless of whether foot construction is right-to-left or left-to-right, constructing two bimoraic feet would incorrectly split the middle syllable between two feet. The actual structures illuminated by Jazz Jive are different, showing that a syllable cannot be split between two feet. This confirms Hayes' (1991, 40) conjecture that split syllables do not exist.

An advocate of split syllables might attempt to avoid this conclusion by positing a constraint:

(23) Jazz Jive cannot split a syllable.

(23) cannot be maintained, however, because in cutting input words in two Jazz Jive clearly splits syllables in (19-20). I conclude that a syllable cannot be split between two feet.

5. The Heavy Syllable Rule

Why can't feet split syllables? I propose that this is a consequence of a principle of foot construction that holds in all bimoraic foot systems:

(24) Heavy Syllable Rule: Project a foot above each heavy syllable.

The Heavy Syllable Rule (24) ensures that each heavy syllable constitutes a foot, leaving only light syllables unfooted.

Two questions remain. How are the remaining light syllables in a word footed? And how does the Heavy Syllable Rule, relevant for bimoraic foot systems, relate to footing procedures in other types of prosodic systems? (25) is widely assumed to govern footing universally:

(25) Construct feet out of unfooted material, proceeding linearly.

(25) is subject to cross-linguistic variation with respect to its domain, the type of feet constructed (e.g. iambic feet, moraic trochees, syllabic trochees), the direction of foot construction (right-to-left or left-to-right), and the values of a few other parameters that must be stipulated in individual grammars (Hayes 1991). If the Heavy Syllable Rule is followed by (25), we get the right results for Japanese. Footing in bimoraic systems thus results from the combination of the Heavy Syllable Rule with (25), and language-particular stipulations specifying the type of foot constructed (bimoraic) and the direction of foot construction.

How does (25) apply to morae left unfooted by the Heavy Syllable Rule in Japanese? Does it foot all unfooted material, including any stray light syllables (which will thus constitute degenerate feet)? Or does it gather only *pairs* of light syllables into bimoraic feet, leaving stray light

syllables unfooted?[8] While the issue of degenerate feet arises for all words with an odd number of morae, recognition of the Heavy Syllable Rule increases the class of cases at issue. Under a theory without the Heavy Syllable Rule in which heavy syllables can be split between feet, the issue of degenerate feet does not arise for words like *sutoobu* (21). With the Heavy Syllable Rule, it does.

I assume here that words are footed exhaustively. For Japanese this means that stray light syllables will be footed as degenerate feet. This explains why Jazz Jive treats them as feet in (22), as well as their extrametricality with respect to accent in noun-noun compounds, discussed in section 6 below.[9]

(24-25) ensure precisely the kind of foot construction that is needed for Japanese. Crucially, the Heavy Syllable Rule cannot operate unless syllables are included in prosodic representations. The evidence against split syllables, which supports the Heavy Syllable Rule, is thus evidence against syllable-free prosodic representations.

6. The Arguments for Syllable-Free Representations Reconsidered

Given the Heavy Syllable Rule, how can we account for the data that provided evidence for syllable-free representations?

The data in (6-7), where words subject to two-foot morphological templates are realized trisyllabically with a heavy medial syllable, can be accounted for under an assumption consistent with the Heavy Syllable Rule:

(26) Resyllabification entails refooting.

OCP-driven coalescence of two short vowels into a single long vowel with consequent resyllabification results in a heavy medial syllable above which the Heavy Syllable Rule will project a foot. This is consistent both with the morphological templates and with the Heavy Syllable Rule. Of theoretical interest is the fact that the morphological templates must apply in these cases to pre-coalescence representations.

Now consider the argument for split syllables based on accent in noun-noun compounds. N2's accent becomes the compound's accent if N2's accent is *not* in the final foot. Compounds in which N2's accent *is* in the final foot behave like those in which N2 is accentless. This is accounted for by making the final foot extrametrical. The key cases are those in (11), where N2 has a heavy penult and a light ultima and the antepenultimate mora's accent becomes the accent of the compound. As Poser pointed out, treating the last two morae as an extrametrical foot (with the heavy penult split between two feet) yields the right result.

To get this result, however, it is not necessary to split the penultimate syllable between two feet. Under our proposal, the Heavy Syllable Rule will project a foot above the heavy penult. (25) will then foot the rest of the string, making the light ultima a (degenerate) foot, regardless of whether foot construction proceeds left to right or right to left. With this degenerate foot extrametrical, by (10b) the accent in N2's penult becomes the accent of the compound. Since only the first mora of a heavy syllable can be accented, we get the right result regardless of which is extrametrical - the final light syllable or the last two morae. Poser's suggestion that the heavy penult is split between two feet rested on his assumption that *all feet in Japanese are bimoraic*. Once degenerate feet are allowed, a degenerate foot can be extrametrical, which yields the right result in (11).

Thus, the data that appeared in section 2 to provide evidence for split syllables can be accounted for without positing split syllables. There is therefore no impediment to having syllables in prosodic representations and using the Heavy Syllable Rule to prevent split syllables.

This has another consequence. Poser (1990, 103) points out that the evidence for split syllables "poses a problem for advocates of the position that morae are subconstituents of syllables,

since the boundaries of feet, composed of morae, need not coincide with syllable boundaries." In eliminating split syllables, the Heavy Syllable Rule removes this challenge to the claim that morae are constituents of syllables.

7. The Heavy Syllable Rule and Universals of Prosodic Structure

This paper has focused on the issue of whether syllables are represented in prosodic structure in languages such as Japanese that have bimoraic foot systems. The initial arguments for split syllables and hence for syllable-free representations turn out to be ephemeral. Japanese Jazz Jive provides important evidence that a syllable cannot be split between two feet, and hence that syllables play a key role in footing, even in a bimoraic foot system. The Heavy Syllable Rule incorporates this result in linguistic theory.

Interestingly, the Heavy Syllable Rule sheds light on universals of prosodic structure in three domains: footing procedures, prosodic constituency and the makeup of the prosodic hierarchy, and the geometry of prosodic representations.

First, the Heavy Syllable Rule reveals that footing procedures universally take syllables into account, even in languages where feet count only morae.

Second, the Heavy Syllable Rule and the prosodic representations it requires reveal that feet universally consist of syllables, even in languages where feet count morae. This follows from (and therefore supports) the idea that prosodic structure universally represents constituents at each level of a universal prosodic hierarchy.

Third, the Heavy Syllable Rule reveals a universal property of the geometry of prosodic representations. Recall the representational problem illustrated by (5a); where a syllable was split between two feet, the foot membership of certain morae could not be represented unambiguously. With the Heavy Syllable Rule, this problem does not arise. No syllable is dominated by more than one foot, just as no mora is dominated by more than one syllable node. Foot boundaries are also syllable boundaries. The Heavy Syllable Rule ensures prosodic representations that represent constituents at each level of the prosodic hierarchy in a way that yields a proper bracketing of prosodic constituents.

The role of the Heavy Syllable Rule in ensuring such prosodic representations suggests a principle governing their geometry:

(27) The Unique Dominator Constraint

If a prosodic node B is immediately dominated by a node A, then there is no node C (C ≠ A) that immediately dominates B.

The Unique Dominator Constraint could be interpreted as a principle governing prosodic representations that is capable of explaining why the Heavy Syllable Rule exists. Given the Unique Dominator Constraint, there is a striking contrast between melodic units, which can be dominated by more than one prosodic node (as in the representation of long vowels and geminate consonants), and prosodic nodes, which cannot.

These universals of prosodic structure have been illuminated by the investigation of a prosodic system in which syllables initially appeared to play no role. The result has been a reaffirmation of the universal role of the syllable in prosodic structure, illustrating the utility of seeking evidence for the universality of particular theoretical constructs from cases where they are least likely to hold.

Footnotes

I have followed Japanese orthographical conventions in transcribing Japanese words.

1. Cf. Hayes (1991) and the references cited there. Hayes (1982) and Poser (1989) bring other types of evidence to bear on foot structure.

2. -tyan may also be suffixed to a sequence of two bimoraic feet - a point that need not concern us here.

3. The merger of two vowels into a single segment (realized as a long vowel) here and in (7c) is presumably due to the Obligatory Contour Principle (OCP) (Leben 1973, McCarthy 1986).

4. The accentuation of cases where N2 has one or two morae need not concern us here.

5. All speakers seem to use Template 1 if the input word consists of four morae or more, and Template 2 if the input word consists of three light syllables (as in the first four examples in (17)). In other cases where the melody mapped onto the second foot of the template consists of a single light syllable, speakers differ: some use Template 1 (as reported by Tateishi 1989 and Poser 1990) and some use Template 2 (as reported by Itô and Mester 1991). I follow Itô and Mester (1991) in this respect; nothing essential to the argument hinges on this.

6. I follow traditional Japanese grammarians in assuming that the onset consonant and the following vowel together constitute a mora.

7. In addition to these cases where Jazz Jive splits a syllable in making its cut, there are many examples (toobura, suuhura, tootoro, and others) where a syllable is truncated melodically in the mapping to template in (16c).

8. Only the latter alternative is consistent with Kager's (1989) proposal that degenerate feet do not exist.

9. The evidence for degenerate feet in Japanese and against counteranalyses is made explicit in Perlmutter (1992).

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Formal Geminate Integrity:
an OCP Approach

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1 Epenthesis and integrity

The content of morphemes must be able to be rendered well-formed phonologically. A number of operations are available to achieve this end, such as epenthesis. Palestinian Arabic (Abu-Salim 1980) exhibits vowel epenthesis, informally given as:

(1)   Epenthesis rule

$$\emptyset \rightarrow \underset{\mid}{V} \quad / \; C\underline{\hspace{1cm}} C \left\{ \begin{array}{c} C \\ \# \end{array} \right\}$$

Some rule with the general effect of (1) ensures that a vowel /i/ prevents consonant clusters which might arise from a morpheme which specifies only a sequence of consonants.

(2)   Palestinian Arabic epenthesis

Morphemic form	Syllabified form	
ʔakl	ʔakil	'food'
ʔakl-kum	ʔakilkum	'your food'
jisr	jisir	'a bridge'
jisr-kbiir	jisrikbiir	'a big bridge'

Any simplistic use of epenthesis incorrectly inserts epenthetic vowels between two identical consonants — between the two consonants which constitute a geminate. This would produce the incorrect * ʔimim instead of ʔimm 'mother'. Preventing epenthesis between two identical consonants is not the answer, however: epenthesis is quite possible between two segments of the same melody type, provided they are heteromorphemic. Together /fut/ 'enter' and the suffix /t/ '1ST.SG' trigger epenthesis to give futit 'I enter' from

the bare morphemic specification /fut-t/. So we can see that epenthesis splits up nonhomorganic clusters and heteromorphemic geminates, but leaves tautomorphemic geminates intact.

One of the successes of nonlinear phonology is its ability to express the distinction between 'true' (3a) and 'fake' (3b) geminates.[1]

(3)   True and fake geminate

a.   /m/   b.   /t/ /t/

        /\ | |
        x   x   x   x

The Obligatory Contour Principle ('OCP') (Leben 1973; Goldsmith 1976; McCarthy 1979) ensures that all tautomorphemic geminates are true geminates, so the goal of a formal theory of integrity must be to explain why fake geminates but not true geminates can become discontinuous. Only (4b) is allowed; (4a) must be prevented. This is the first formal consideration.

(4)   True and fake geminates under epenthesis by /b/

a.   x   x   ⇒   x/b/x   b.   x   x   ⇒   x /b/ x
        \ /   \ / | | | |
         a   a   a a   a   a
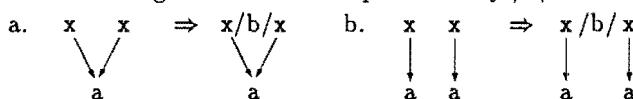
This leads to a second formal consideration. Since fake geminates may become true by assimilation (5a), which is after all the basic innovation of nonlinear phonology, true geminates must not become fake by 'mitosis' (5b). Were sharing and mitosis to be equally applicable, the distinction between true and fake geminates would be undermined, if not made vacuous.

(5)   Sharing and mitosis

a.   x   x   ⇒   x   x   b.   x   x   ⇒   x   x
        | | \ /   \ / | |
        a a   a   a   a a
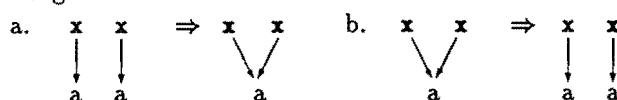
The two aspects of the phonological formalism that will account for geminate integrity are:

- True geminates must not become discontinuous.
- True geminates must not become fake geminates.

Neither of these properties is intrinsic to Autosegmental Phonology, yet both underlie a formal account of what is a core property of nonlinear phonology. In this paper I will show that a declarative phonological theory which shuns multiple tiers and the No Crossing Constraint offers an extremely simple and robust characterisation of this integrity.

2 The prosodic theory of epenthesis

Prosodic accounts of geminate integrity such as Itô (1989) provide a sophisticated view of epenthesis. The operation simply never spplies to geminates: it only applies to save ill-formed clusters. Itô's theory relies on the idea of Prosodic Licensing, which stipulates that 'all segments must be syllabified'. If it is not possible to prosodically license a segment sequence then various strategies (6) are used to come up with an exhaustively syllabified sequence based on the contrastive material.

(6)   • Epenthesis.
     • Degemination.
     • Cluster simplification.
     • Stray erasure/no phonetic interpretation.

Epenthesis, on this view, is an operation which adds vowels or consonants solely to enable a word to syllabify. Prosodic licensing demands that every segment is syllabified and epenthesis provides the means.

Let us see how Itô's theory deals with geminate integrity. Some languages, like Japanese, do not allow consonants in the coda to bear a distinctive place of articulation. Itô's analysis is that place of articulation features ('**PoA**') are banned from the coda.[2] In other words, (7) is ill-formed as it stands.

(7)   Unlicensed **PoA** in the coda

Coda   Onset

$$* \quad x_1 \qquad x_2$$

$$\text{PoA} \quad \text{PoA}$$
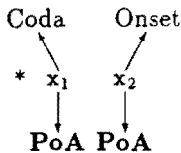
But consonants *do* appear in the coda in Japanese. This can be due to underspecification of **PoA**, but the point of interest here is that given the nonlinear perspective, it can be due to the same, *shared* **PoA** feature being associated both to Onset and Coda (8).

(8)   Geminate **PoA** in the coda licensed by Onset

Coda Onset

$$x_1 \quad x_2$$

$$\text{PoA}$$
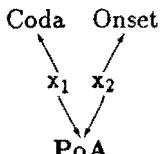
Geminates and homorganic clusters are able to allow their **PoA** to fill a coda *as a side-effect.* Clusters and fake geminates, on the other hand, consist of an unsyllabifiable sequence of segments. They alone must be dealt with, by means of mechanisms like epenthesis. If a vowel slot is epenthesised into (7), then the alternative, well-formed syllabification in (9) becomes available.

(9)
Onset Nuc Onset

x_1 x_e x_2

PoA   PoA
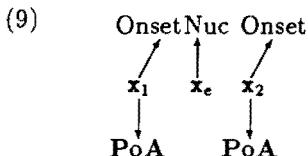
3   The need for a formal account

Itô's approach is flawed because it only deals with integrity in languages which *permit* geminates in the epenthesis context.

Epenthesis is one particular mechanism "by which phonological strings are brought in conformity with Prosodic Licensing" (Itô 1989:220). In Itô's theory geminates are already in conformity, so are never split: they show prosodic integrity as a consequence of *not being subjected* to the rule. But in a language where geminates are *ill-formed*, then Itô can only stipulate that epenthesis is not allowed as an operation on the geminates to render them well-formed. She cannot explain why one of the other mechanisms mentioned above is used instead. Itô, who is aware of this problem, cites the cases of Turkish (Clements & Keyser 1983) and Tangale (Kenstowicz & Kidda 1985) as cases in point.

Turkish uses epenthesis to break up impermissible consonant clusters, but it fails to use epenthesis just in case a geminate is involved. Specifically, word-final geminates are unsyllabifyable, and so Turkish degeminates them. A morphemic form like /devr/ gives rise to the syllabifiable devir 'transfer', by epenthesis, but a form incorporating a geminate like /hakk/ can only be syllabified if it is degeminated to hak 'right'. This ought to be due to the restrictions of integrity. But for Itô, integrity and well-formedness must co-occur. Clearly here she has to fall back on formal integrity. As she says: "it is not clear whether it is possible to maintain that ... [integrity] ... should always follow from syllabification conditions." Itô (1989: 234)

Tangale inserts epenthetic /u/ after C_1 in triconsonantal sequences, so that $C_1C_2C_3 \Rightarrow C_1/u/C_2C_3$. Consider what happens when -no 'my' is suffixed to CC-final words (10).

(10) Tangale epenthesis and degemination

		Morphemic form		*Syllabified form*	
a.		bagd		bagda	'pigeon'
		bagd-no		bagudno	'my pigeon'
b.	i	land		landa	'dress'
	ii	land-no		lanno	'my dress'
	iii		*	lanudno	
	iv		*	landno	
c.	i	moll		molle	'brother'
	ii	moll-no		molno	'my brother'
	iii		*	molulno	
	iv		*	mollno	

In (10a) /u/ is inserted. However, if the first two consonants share place of articulation, such epenthesis does not occur. Instead, in (10b.ii,c.ii) we see cluster simplification ensuring well-formedness. So, although vowel insertion is the operation typically used to ensure well-formedness in Tangale, such epenthesis is ruled out (10b.iii,c.iii) just in case there is gemination or partial gemination in the cluster. The prosodic theory claims there is no epenthesis in such cases because the shared **PoA** renders the sequence well-formed. But we can see from (10b.iv,c.iv) that this is incorrect. The geminate is ill-formed, but it cannot become licensed via epenthesis. Prosodic theories of integrity such as Itô's require an independent account of formal integrity to explain why epenthesis is impossible when true geminates would be ill-formed.

4   Formal integrity in AP

4.1   The No Crossing Constraint approach

The basis of the current AP account of formal integrity originates with an observation of Kaye (personal communication cited by Halle and Vergnaud 1980) and independently Kenstowicz, Bader and Benkeddache (1982). When some segment /i/ is inserted into the true geminate of (11a), the geminate cannot house the epenthetic vowel without resulting in crossing association lines (11b,c).

(11) a. /i/ /m/   b. /i/ /i/ /m/   c. /i/   /m/ /i/

x_1 x_2 x_3 x_1 x_2 x_ℓ x_3 x_1 x_2 x_ℓ x_3

imm   * imim   * imim
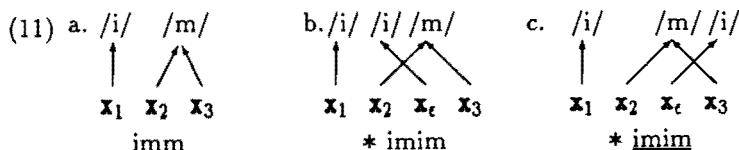
Such configurations are ruled out by the No Crossing Constraint ('NCC') (Goldsmith 1976). The conclusion is that the epenthesis rule is *prevented* from

applying by the NCC. Although this seems a very simple proposition, there are severe difficulties with this approach, which are partly acknowledged by Hayes (1986) and Schein & Steriade (1986). Indeed, Itô's motivation for an account of integrity based wholly on the requirement for full syllabification is partly that a prosodic theory of integrity " avoids the problematic appeal to the No-Crossing Constraint for blocking epenthesis in linked structures" (Itô 1989).

4.2 Two problems for the NCC theory

The problem of mitosis

There is a very obvious problem with the account of formal integrity given above which has not been sufficiently stressed. The autosegmental or 'crossing' solution has no value unless it can be explained why the crossed lines in (11) cannot be broken to accommodate the epenthetic segment. We must assume that the line crossing contradictions in (11b,c) cannot be evaded by turning the true geminate into a fake geminate by mitosis (12).

(12)   /m/ /i/ /m/

         x_1 x_ϵ x_2
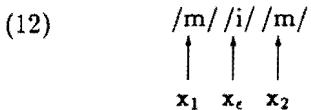
   In AP it is perfectly permissible to non-monotonically delink autosegments in order to produce a well-formed structure from an ill-formed one such as (11b,c). Deletion is an operation available anywhere and everywhere in the phonology. Goldsmith proposes that

> if a rule is formulated to add a single association line...[and line crossing results,] the line that the rule adds remains, but the line that formerly existed is taken to be the offending line, and is automatically erased.   Goldsmith (1990:47)

It is therefore difficult to maintain that an epenthesis rule would be blocked by the ill-formedness of (11b,c) since it would appear that these ill-formed configurations could trigger mitosis as a repair strategy.

   To solve this problem we could assume that mitosis is not available except in a restricted range of cases. Archangeli & Pulleyblank (1986:135) for example, say that mitosis only arises in order to circumvent a line crossing violation caused by a non-manipulable part of the phonology such as plane conflation or the automatic insertion of default values. Unfortunately, this is not sufficient to constrain mitosis, as we are about to see.

Problems arising from discontinuous geminates

The second problem, which interacts with the first, is that discontinuous geminates are permitted as phonological entities in Autosegmental Phonology. The reason this is a problem is that mitosis is permitted — indeed required — to act on discontinuous geminates, and of course the result of epenthesis is *itself* a discontinuous geminate.

4.3   Stipulations required by the NCC approach

Two assumptions are required in order to circumvent these problems, weakening the autosegmental theory of integrity. The first is the 'same-plane' assumption.

One situation which gives rise to discontinuous geminates and thereby to mitosis arises in multiplanar treatments of nonconcatenative morphology systems. In such analyses multiplanar structures are collapsed together into a single plane at some point in the deriviation. This 'plane conflation' is of interest here because a consonantal melody attached to two nonadjacent slots must undergo mitosis when there is an intervening vowel. For example, when the multiplanar (13a) undergoes conflation into (13b), the triply-associated /q/ melody undergoes mitosis. This is to avoid crossed association lines.

(13)   a.   b.
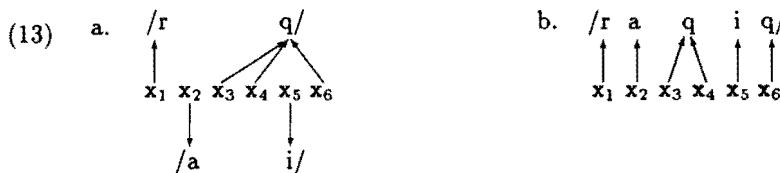
It should be clear by now the assumption that is required if the crossing lines explanation of integrity is to be maintained. First recognised by Steriade (1982) and Kenstowicz, Bader and Benkeddache (1982), it is necessary to stipulate that *an epenthetic segment has its melody on the same plane as the material it is being epenthesised into.* Otherwise (14a) could be turned into (14b) by plane conflation applying automatically.

(14)

a.   b.
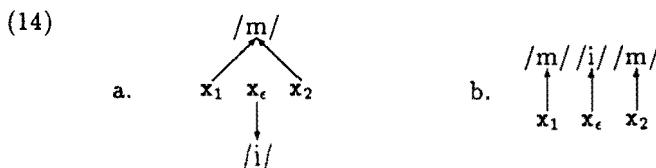
There is nothing ill-formed about epenthesising on a different plane in the wider scheme of operations AP makes use of, which is why it has to be explicitly ruled out.

Consider now the possibility of epenthesising just a segmental slot. This is a natural rule for autosegmental theory, for a language's epenthetic vowel or consonant is usually taken to be maximally underspecified in order to account both for 'different' epenthesis rules all inserting the same vowel and for epenthetic segments taking on characteristics of adjacent segments. It was noticed by Schein & Steriade (1986) that the epenthesis of an empty V-slot into a true geminate is not ruled out by the crossing lines approach. If a slot alone (which has no associations of course) is inserted, no crossed lines can arise.

(15)   /m/

$$x_1 \quad x_\epsilon \quad x_2$$
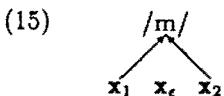
Since (15) is not ill-formed, Goldsmith adopts the second 'empty-slot' stipulation that *empty slots may not be epenthesised*. He recognises that this has the unfortunate consequence that the crossing lines account of integrity "depends on an assumption that is not at all certain — that epenthesis rules insert a particular vowel quality" Goldsmith (1990:79). Indeed, to rely on the insertion of a particular melody is to nullify one of the successes of underspecification theory.

Schein & Steriade (1986) offer a potential solution. The act of specifying default features and values for the slot necessarily introduces crossing lines, so, they claim, their very use will be blocked by these crossing lines. By extension, the epenthesis itself is ruled out.

> the V-insertion process, epenthesis itself, would not be blocked from applying into a geminate sequence: only the later process whereby the V slot acquires segmental specifications would be blocked in the case of split [*i.e.* discontinuous – J.M.S.] geminates, since at that point the crossing lines problem would occur. Schein & Steriade (1986:692, fn 1)

In fact this is incorrect. Archangeli & Pulleyblank for example are quite clear about the power of default rules:

> a rule or process supplied by universal grammar applies obligatorily, producing a result consistent with principles like...the Crossing Constraint.   Archangeli & Pulleyblank (1986:140)

We have already seen that plane conflation triggers mitosis. For A&P this is because it is a universal process. The default filling process is similarly universal. So when default rules give rise to crossing lines it is *not* the case that the default rules are blocked. And so the epenthesis cannot be blocked. Goldsmith's comment above is based on the same assumption.

To maintain an account of integrity based on the NCC we must ban the epenthesis of empty slots, and force epenthesis to be co-planar.

5   The basic structure of AVP

In Attribute Value Phonology (Scobbie 1991a) ('AVP'), phonological representations are conceived as a sequence of attribute-value structures.[3] Sequence is represented only at the root of the feature geometry. This builds on the results of Lomardi (1991) and others which shows that segment-internal sequencing is not required. In AVP, none is permitted. A consequence of this is that the NCC has no purpose and can be abandoned.

SPE (Chomsky & Halle 1967) was linear and had no way to represent the difference between true and fake geminates. The simple type identity in (16a) served for both. Autosegmental Phonology (Goldsmith 1976; 1990) makes use of multiple parallel sequencing, enabling it to additionally express token identity (16b).

(16)   a.   **SPE**
           $[+F]_i[+F]_j \rightarrow$

       b. **AP**
           $i \quad j$ *root tier* $\rightarrow$
           $\vee$
           $+F$ *F tier* $\rightarrow$

In AVP non-linearity is represented as the sharing of structure, not as the temporal overlap of autonomous features. This can be represented either in a graphical notation (17a) or in an equivalent matrix notation more familar from syntax (17b). Recall, only the skeleton is sequential.

(17)   a. AVP graphs
           $i \quad j$ *skeleton* $\rightarrow$
           $F \quad F$ *F attributes*
           $+$

       b. AVP matrices
           $\left[F\boxed{1}+\right]_i \left[F\boxed{1}\right]_j$ *skeleton* $\rightarrow$

In (17), the attribute F at slot i (F_i) dominates its value '+'. Equivalently the '+' is associated to F_i. Association is simply the converse of dominance.

(18) A structure S is associated to a path $\mathcal{P}$ of attributes $F, F', F'' \ldots$ located at point i (notated $\mathcal{P}_i$) if and only if $\mathcal{P}_i$ dominates S.

The structure sharing in (17) is not constrained by the NCC because substrucures are not sequenced relative to each other: they cannot therefore be attached 'out-of-sequence' and no ordering paradoxes of the sort presented by Sagey (1988) arise (Scobbie 1988). As things stand, the ability to share structure is not constrained by linear position of the sharers, so to reduce the expressive power of structure-sharing I have proposed the 'Sharing Constraint' (adapted from Scobbie 1991a:64). Basically (19) demands that only adjacent paths share a value.

(19) Sharing Constraint
If a structure $\mathcal{S}$ is dominated by two paths $\mathcal{P}_i$ and $\mathcal{P}_j$ where $i\preceq^* j$, then for every index n where $i\preceq^* n\preceq^* j$ there is a path $\mathcal{P}_n$ dominating $\mathcal{S}$.

We can compare the effects of the NCC and the Sharing Constraint while constrasting their methods by referring to (20).[4]

(20) AVP and AP representations of bad interleaved dependencies

a. x_1 x_2 x_3 x_4 b. x_1 x_2 x_3 x_4

$\mathcal{P}$

$\boxed{1}$ $\boxed{2}$ F_1 F_2
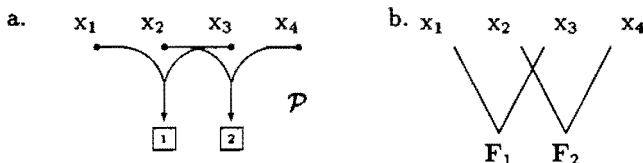
Recall that the structure indicated by the tag $\boxed{1}$ does not 'happen' before or after that indicated by $\boxed{2}$. The structures merely encode information characterising the slots which they are associated to. Only these skeletal slots are in sequence. By contrast, in AP F_1 does indeed occur before F_2 and the NCC is required to control the patterns of this temporal association. In Autosegmental Phonology, (20b) is ill-formed because it includes as a sub-part the representation in (21a). My view is rather that (20a) is ill-formed because it includes the component (21b).

(21) Basic ill-formed structures, in autosegmental notation

a. x_2 x_3 b. x_1 x_2 x_3

F_1 F_2 F_n

Ruled out by NCC   *Ruled out by Sharing Constraint*

Finally note that because AVP is declarative, a nonmonotonic operation like mitosis is impossible. It would be removing information, and derivations in AVP consist solely of the addition of information.[5]

6 AVP's treatment of formal integrity

6.1 The role of the Sharing Constraint

The true geminate in AVP is a sequence of structures which share the value of the attribute MELODY. A true geminate is shown in (22).

(22)   True geminate

$$
\begin{array}{c}
i \quad\; j \\[-2pt]
\diagdown\;\diagup \\[-4pt]
\diagup\diagdown \\[-2pt]
/\overset{\bullet}{\mathrm{m}}/ \qquad \text{MELODY}
\end{array}
$$
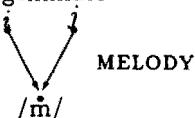
Epenthesis corresponds to adding extra information to the skeleton; information that there is a slot at ϵ where $i \preceq^{*} \epsilon \preceq^{*} j$.[6] The Sharing Constraint imposes the additional condition that the value of MELODY originating from n must be shared with the values of the flanking MELODY attributes.

(23)   True geminate under epenthesis

$$
\begin{array}{c}
i \quad \epsilon \quad j \\
\diagdown \mid \diagup \\
/\overset{\bullet}{\mathrm{m}}/ \qquad \text{MELODY}
\end{array}
$$

This makes it impossible to epenthesise a consonant into a true geminate vowel or a vowel into a true geminate consonant. The Sharing Constraint insists that the new segment has the same melody as the geminate and so it gives us the bulk of an account of integrity for free.

6.2   The index-OCP and degemination

Although epenthesis is a dead-end, we must deal with fact that it is able to apply. Where we had a sequence of two identical structures, now we have *three*. These three structures are unusual in that the epenthetic segment is not *distinct* from the others. In fact it consists exactly of what they have in common. The Obligatory Contour Principle 'OCP' (Leben 1973; Goldsmith 1976; McCarthy 1979) bans such sequences. The OCP is variously expressed, for example: "in a given autosegmental tier, adjacent identical segments are prohibited" (McCarthy 1979:238).

The OCP is AVP is composed of various different parts. One in particular will concern us here, but note that the 'content-OCP' is a default constraint attempting to force all paths (of the same type) to share their values. In addition, the index-OCP prevents multiple slots sharing every aspect of their structure. All other things being equal (24) holds.[7]

(24)   Index OCP

$$
\forall \mathcal{P}ij \qquad
\begin{array}{c}
i \quad\; j \\
\diagdown\;\diagup \\
\bullet
\end{array}
\; \mathcal{P} \qquad \overset{def}{\Longrightarrow} \quad i = j
$$
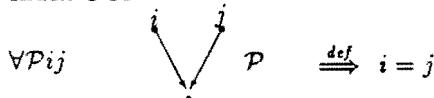
(24) effectively rules out morphemes like /pppppa/ since /pp/ $\rightarrow$ /p/ unless we have reason to believe otherwise, such as their being syllabified

into different syllables. There are not enough syllabic functions available to differentiate all these slots, and epenthesis cannot help (as we have seen) so they collapse together. Now this is just the same as the result of epenthesising into a true geminate, so the OCP will 'degeminate' if the language in question does not allow geminates to syllabify.

(25)   OCP affecting epenthesised geminate/underlying form

$$if\ \bigvee\ \text{MELODY}\ then\ \bigvee\ \text{MELODY}\ where\ i = \epsilon \vee j = \epsilon$$

/m̊/   /m̊/
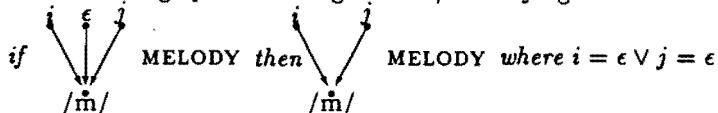
Unless a prosodic role is available, we witness an apparent deletion and degemination. But in fact the effects of deletion rules are being emulated by *adding* the information that $\epsilon = (i \vee j)$. Note that the index-OCP does not need to count x-slots, it collapses *adjacent* structures without specification, by adding information it emulates deletion. If we are dealing with a language that allows geminates, the result of (25) will be syllabified. Otherwise (24) will apply (again) to produce the syllabifiable nongeminate /m/.

7   Conclusion

In AP, integrity is given two analysis — prosodic and formal. The latter is supposed to result from the No Crossing Constraint, but such an account only works given two assumptions which cannot be independently justified:

- Melodic material must be inserted in addition to the skeletal slot.

- Epenthesised melodic material must be on the same plane as the geminate.

These two assumptions conspire to prevent the transformation of true geminates into discontinuous geminates (26) The reason is that discontinuous geminates are well-formed in the theory, and are subjected to mitosis at some point in the derivation. (The dotted association line indicates the possibility of a melody on a different plane.)

(26)   Progression which is a necessary prelude to successful mitosis

m   m

C C   ⇒   C V C

No mechanism is available to save the true geminate from mitosis once it is discontinuous. *Once discontinuous, the true geminate is effectively a fake geminate.* In order to prevent the true geminate becoming discontinuous the two *ad hoc* and counterproductive assumptions discussed above are essential.

The attribute-value approach to phonology outlined above proposes a simple constraint on multiple association: the Sharing Constraint. Since only adjacent roots can share structure, discontinuous geminates are not part of the theory. (All 'discontinuous geminates' really *are* fake!) Now we can explain why the progression in (26) is not possible. We can also see why the discontinuous structures in Autosegmental Phonology must be forced to behave as they do. In addition, AVP is a declarative formalism so no operations like mitosis are permitted. Finally, the OCP rules that just as many slots as can be supported by syllabification and other constraints on well-formedness are permitted, and if spurious slots are postulated, either resulting form epenthesis into a geminate or from 'crazy' underlying forms, they are simplified. These basic aspects of AVP integrate the formal and prosodic aspects of a theory of integrity rather than forcing the theory to have two incompatible parts.

Notes

[1]The value at the arrowhead is associated to the material dominating it. This notation is meant to generalise over the notation of Autosegmental Phonology and of Attribute Value Phonology, in which association in an asymmetric relation.

[2]See Scobbie (1991a) for a discussion of the theoretical problems with Itô's account, and a revised approach to licensing based on implicational constraints, which draws on both Itô (1989) and Goldsmith (1990). The actual details of the prosodic theory are not at issue here: it is my concern to amplify Itô's own comments about the necessity of a formal backup to such theories.

[3]Attribute-value structures are the basic building block of such constraint-based approaches to syntax as Head-Driven Phrase Structure Grammar (Pollard & Sag 1987).

[4]Note that AVP diagrams can use curved or straight arrows indiscriminately to show dominance/association, whereas straight associations are required as a notational convention in AP in order that 'crossed associations' be revealed in the diagrams as crossed lines.

[5]See Scobbie (1991b) for further discussion of the trend in generative phonology away from procedural theories, and of the motivations for a declarative approach to phonology.

[6]$\preceq^*$means transitive precedence. Obviously immediate precedence is not the appropriate relation between slots, otherwise *all* epenthesis would be impossible.

[7](24) means 'all slots i and j are equal by default if all the paths $\mathcal{P}$ from i and j share their values'.

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UNDERLYING REPRESENTATIONS AND PHONETIC IMPLEMENTATION OF YES/NO INTERROGATIVE CONTOURS IN SPANISH

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1.   INTRODUCTION

One of the most noticeable differences between Spanish dialects is intonation. Some well-known lexical, morphological and phonetic features are very important as well, but the single most important feature that permits the instantaneous identification of the geographic and social origin of a speaker of Spanish is intonation. All speakers are aware of this fact and often refer to these differences as *canto* (singing) meaning that people from other regions or dialects "sing" when they talk. Some authors such as Zamora and Guitart (1982) contend that the melodic differences encountered in Spanish for the same kind of sentence-type are purely phonetic since the meaning is not altered.

In this paper we describe the contours of one type of interrogative sentences to illustrate how strikingly different the configurations of yes/no questions may be in different dialects of Spanish. We propose a number of abstract tonal units and a set of rules of phonetic implementation to derive these distinctive and characteristic 'tunes'. On the basis of our analysis, we conclude that the different tonal configurations ultimately depend on the underlying tonal structure.

The dialects we compared for this study are Argentinian (Buenos Aires); Puerto Rican (San Juan); Mexican (Mexico City); Venezuelan (Caracas); and Castillian.[1]

The abstract system of underlying representations we use is based on the Pierrehumbert (1980) theory of the phonology of English intonation. A repertory of *tonemas* (nuclei) is proposed to account for the different contours.

2.   PHONOLOGICAL REPRESENTATIONS

The contours of the intonational phrases are described as strings of L and H tones consisting of:
(i)   An initial boundary tone H% (limited to questions).
(ii)   A sequence of one or more pitch accents
         (H*, L*, L*+H, H*+L, L+H*, H+L*, H*+H, H+H*).
(iii)   A final boundary tone   (H%, L%).

Strictly local rules map the tones into the quantitative values that determine the F0 contour, which we consider to be the phonetic representation of intonation.[2]

3.   THE ISSUE OF IMPLEMENTATION

One problematic issue in intonation that has caused the failure of approaches such as the 'levels' analysis is the lack of equivalence of absolute, numerical data to specific 'phonemic' or phonological representations. Just how high can a tone go and still be labelled 'low'? How high is 'high' and how low is 'low'? And where does 'mid' end and 'high' begin?

The way we have tackled the problem is by establishing an empirical threshold, expressed in Hertz, beyond which a different representation has to be assumed. So, whether a falling contour is represented as H L or H L L, or a rising contour is represented L H or L H H depends on the number of Hz involved and the steepness of the fall or rise. For instance, a fall of about 45 Hz may be the numerical result of a H followed by a L, but if the fall is more than 65 Hz in the same, not emotionally-marked context, an extra L (which may trigger downstep in some environments) has to be assumed.[3]

We were able to work with Hz because we dealt mostly with male speakers which did not differ dramatically in pitch range or tonal baseline; a different approach including semitones would have to be used if we were comparing male and female voices.

Following Pierrehumbert (1980) and Sosa (1991), all rules of phonetic implementation are local and iterative, apply from left to right and assign to each tone bearing unit a quantitative value in Hz according to its phonological nature (H or L, pitch accent or boundary tone). The absolute value of each tone is computed according to nature and value in Hz of the preceding tone. The pitch of syllables not associated with tonal entities is derived by interpolation between the two tones located on either side.

4.   DECLARATIVE VS. INTERROGATIVE PRENUCLEAR
           CONFIGURATION

Intonation is virtually the only feature that distinguishes questions from their corresponding statements in Spanish. Subject-verb inversions are possible, but in spoken language they are restricted to stereotyped or very formal speech. Since the morphology and the syntax are basically unchanged from the form of the declarative, this kind of yes/no interrogatives have been labelled 'declarative questions' (Cruttenden 1986).

However, Spanish has an additional tonal device that distinguishes statements from questions, without relying solely on final nuclear inflections: interrogatives have higher overall pitch than their

declarative counterparts. This peculiarity is perceptible right from the start of a question, making unnecessary any word-order variation.[4]

This higher pitch for questions has also been noted for languages like Danish and Swedish (Hadding and Kennedy 1972), and contrasts with languages such as English and French (Mettas 1971). The difference between a question and a statement in Spanish will therefore not only be the final contour but also the pre-nuclear configuration. In Figure 1 and Figure 2 we contrast a statement and a question as spoken by an Argentinian speaker to illustrate this fact. Underneath the pitch track is the underlying sequence of tones we assume for the particular 'tune', linked to the relevant stressed syllables:
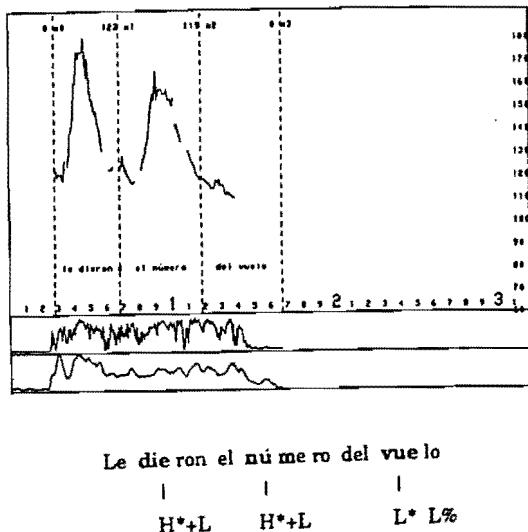
Figure 1: F0 and underlying tones of Argentinian declarative contour.

¿ Le die ron el nú me ro del vue lo ?

H%   H*+L   H*   L+H* H%
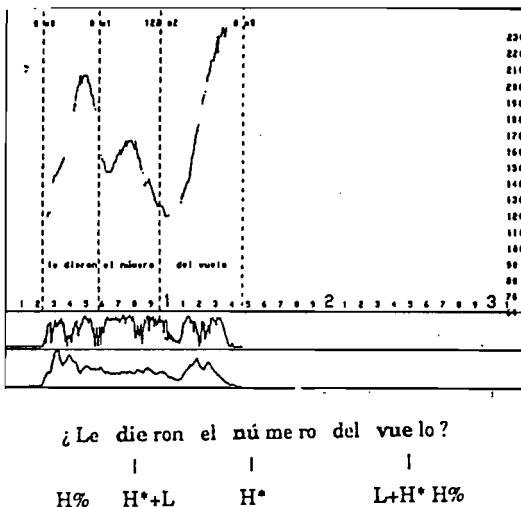
Figure 2: F0 and underlying tones of Argentinian unmarked yes/no
question

The difference is most obvious in the absolute value of the first peak on
the word **dieron** in both contours. In Figure 1 it is about 175 Hz and in
Figure 2 it goes as high as 210 Hz. This 'higher' starting point for
questions is a regular feature of most if not all Spanish dialects.

In order to represent this characteristic, we posit an initial boundary
tone H%, that produces an 'upstep' effect which is apparent from the
first stressed syllable(s) of the question. We believe that this purely local
solution is preferable to an analysis that would propose that Spanish
questions and statements have different registers or pitch range.

Although differences in register and pitch range do occur in Spanish
utterances, they are typically features of 'emotional' or 'expressive'
modes of intonation and do not suggest interrogation. Indeed, a flat,
low-register utterance will convey a feeling of 'depression' while an
increased pitch range and high register will sound 'excited', even when
the basic configuration is the same.

Another alternative to the initial boundary tone H% would be to
attribute this increased height to some 'look-ahead' specification, as
some people have suggested. We believe this solution would not hold
since many interrogative contours showing this H% feature do reach
the baseline before rising again for the final 'high rise' nucleus (see
Figures 2, 3 6, 7 and 9).

4.   FINAL INTERROGATIVE CONTOURS IN SPANISH AND
       THE INVENTORY OF YES/NO QUESTIONS NUCLEI

The other very striking feature of Spanish intonation is just how dissimilar final contours or nuclei in different varieties can be, although they may have the same linguistic and pragmatic value. In Figures 2 to 5 we present pitch tracks of yes/no questions in four dialects, along with the underlying representation we have assigned to each.
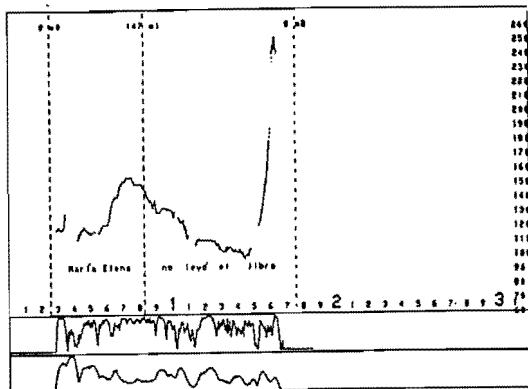
¿ Ma ría E le na no le yó el li bro ?

    H%   H*   L*   L*+H H%

Figure 3:   F0 and underlying tones of Mexican unmarked yes/no
            question.

¿ Le die ron el nú me ro de vue lo ?
 H%   H*+H   H*   H+H* L%
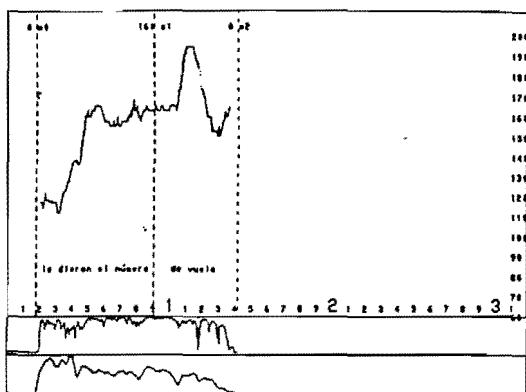
Figure 4: F0 and underlying tones of Venezuelan unmarked yes/no question.

¿ Ma ría E le na no le yó el li bro?
 H%   H*   H*   H* L%
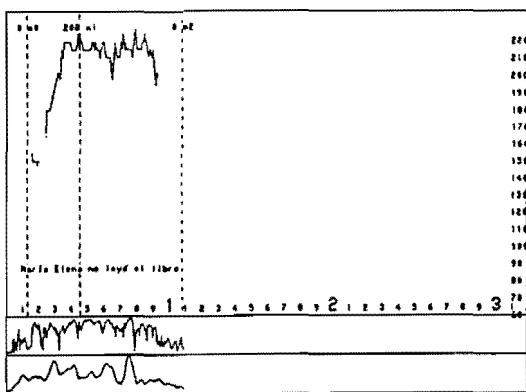
Figure 5: F0 and underlying tones of Puerto Rican *negative* question.

The differences of configuration are obvious, and so are their underlying representations. We have identified four different *tonemas* (nuclei) for unmarked yes/no questions in Spanish, each one characteristic of a particular dialect or group of dialects.[5] These are the following:

A.   L + H* H%   (Argentinian).

B.   L* + H H%   (Mexican)

C.   H + H* L%   (Venezuelan, Puerto Rican)

D.   L*   H%   (Castillian)

In Figures 6 to 9 we represent the basic configurations of the typical contours that are derived from the representations above:
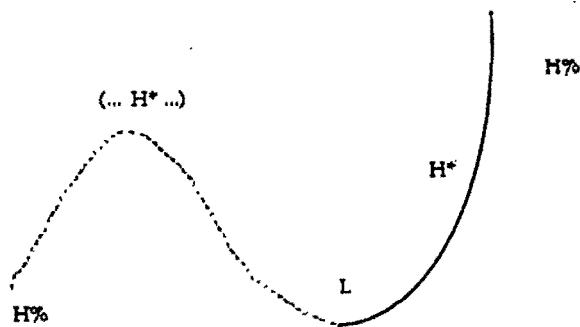
Figure 6:   Configuration and underlying tones of unmarked
Argentinian yes/no questions
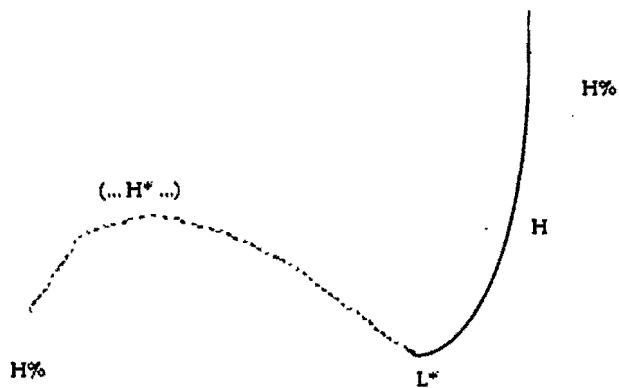
Figure 7: Configuration and underlying tones of unmarked Mexican yes/no questions
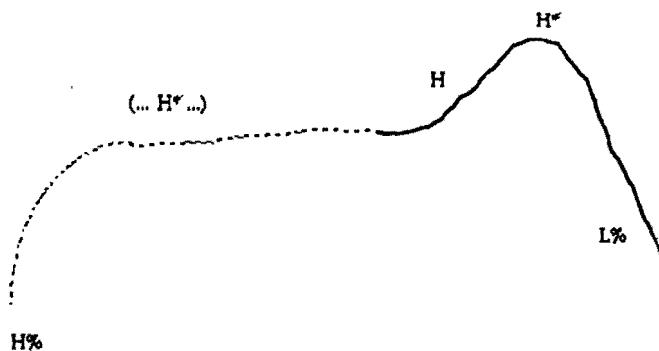
Figure 8: Configuration and underlying tones of unmarked Venezuelan yes/no questions
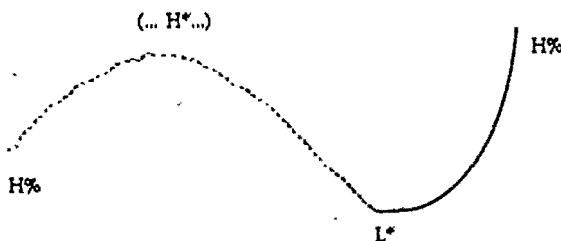
Figure 9:   Configuration and underlying tones of unmarked
Castillian yes/no questions

6.   SOME IMPLICATIONS OF THE ANALYSIS

As can be seen in Figures 4 and 8, we propose the nuclear sequence H+H* L% to account for the "circumflex" shape of this contour, as produced by the Venezuelan speaker. The presence of this pitch accent, as well as the H*+H that we motivate elsewhere seems to be in direct contradiction with the OCP.

The reason for which we include this H+H* is implementational. It accounts for the increased pitch rise associated with this kind of rise-fall contour, which takes place on the nuclear syllable (more than what a single H* pitch accent could do).

We consider simpler to posit a local solution with a pitch accent of that nature rather than attributing this extra pitch elevation to increased range or to differences in phrasing, both restricted to questions and to this particular dialect.

It could be said that pitch accents like H*+H and H+H* do not contradict the OCP because they consist of different kinds of H tones that are adjacent but not identical. In this sense our analysis is similar to the one Myers (1987) has applied to some tonal sequences in Shona.

7. CONCLUSION

As the above pitch tracks and figures show, the 'typical' tunes of yes/no questions for the Spanish dialects under study are quite characteristic and distinct. As we have argued, their contour shapes are derived from the underlying tones that generate the different *tonemas* or nuclei, i.e., different combinations of (final) pitch accents and boundary tones produce different final contours.

This proves that the intonational differences between dialects are not only phonetic but also phonological in nature. Broadly speaking, the 'meaning' and pragmatic value of these yes/no questions is the same in the five dialects, but the 'tunes' are different.

On the other hand, the phonetic implementation rules that assign numerical values to the tones seems to work in identical fashion for all dialects, including the upstep effect triggered by the initial boundary tone H%.

We believe these findings may contribute to the study of prosody-related variation in language, as it provides insights into the systematic structure of the tonal patterns of languages that may have distinctively different intonations in various dialects.

NOTES:

1 All speakers (except for Castillian, for which we did not collect first-hand data) were male, university educated and in their early thirties. They were asked to produce neutral, natural-sounding statements, commands, yes/no questions and wh-questions from a list prepared beforehand.

2 The pitch tracks on which we based the analysis were made on a ATT 6300 with a pitch-extraction software developed by John McCarthy, Dept. of Linguistics, University of Massachusetts, to whom we are most grateful.

3 This approach has allowed us to derive the underlying representation of the Mexican contour in Figure 7 as L*+H H% given the great increase of pitch, instead of just L* H%, as the Castillian in Figure 9, which has been described as reaching the 'mid' level only. This is clearly more than just a notational distinction or 'narrow transcription', since the configuration of this contour in the two dialects is systematically different.

4 Navarro Tomás (1944) stresses how clearly Spanish orthography reflects this fact, as it uses an inverted question mark ¿ at the beginning of every question.

5 We could add an extra nucleus if we include the Puerto Rican H* L%
as in Figure 5, but we don't consider this one an unmarked yes/no
contour. In this dialect, if the question is not a negative one and the
answer can be either yes or no, the contour is similar to the one shown
in Figures 4 and 8.

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A Unified Account of
Psych Verbs in Italian and Quirky Case in Icelandic

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In this paper we will consider psych verbs in
Italian and quirky case in Icelandic. First we will
look at dative experiencers in Italian which can
occur in subject and object position, contrasting
with accusative experiencers which can only appear in
object position.[1] Then we will look at the Belletti
and Rizzi (1988) solution to the Italian data.
Belletti and Rizzi offer a reason for the distinction
in movement behavior between dative and accusative
experiencers in Italian based on the fact that dative
case in Italian is marked by a preposition, whereas
accusative case is not. We will then contrast the
Italian paradigm with data from Icelandic. In
Icelandic both dative and accusative subjects exist.
This provides evidence against the Belletti and Rizzi
solution, since neither accusative nor dative case in
Icelandic is marked by a preposition. We will then
propose an explanation for both the Italian and the
Icelandic facts based on Pesetsky (1990) through the
use of his **Cause** morpheme, crucially noting that
Italian psych verbs with accusative objects are
causative. Then we posit two trees based on the
Pesetsky example: one tree accounts for the Italian
accusative psych constructions and the other accounts
for dative experiencer subjects in both Italian and
Icelandic, and accusative and dative non-experiencer
subjects in Icelandic. These non-experiencer
subjects we propose are the themes of unaccusative
constructions which replicate the pattern of
Icelandic passive constructions.

Let us first consider the Italian data. Below
we see an Italian dative experiencer (a Gianni) in
both subject and object position.

(1) a. *La tua idea piace a Gianni.*
         your idea pleases to Gianni
         'Your idea pleases Gianni.'
         ('Gianni likes your idea.')

    b. *A Gianni piace la tua idea.*
         to Gianni pleases your idea.
         'Your idea pleases Gianni.'
         ('Gianni likes your idea.')

Example (1a) exhibits the dative object and example
(1b) the dative subject. For the Belletti and Rizzi
analysis, it is important to note here that dative
case is marked by the preposition *a*, in "*a Gianni.*"
     As we turn to the Italian accusative examples,
we see that not all arguments in Italian can appear
in subject position. The example below shows overt
accusative case marked on a clitic (*lo*) with the verb
preoccupare "to worry".

> (2)   *Questo lo preoccupa.*
>   this him(acc) worries
>   'This worries him.'

(2) shows that *preoccupare* takes the accusative case,
though the full NP may not overtly show it. (3)
demonstrates how accusative experiencer arguments can
appear in object position (3a), but not in subject
position (3b).

> (3) a.   *Questo preoccupa Gianni.*
>   this worries Gianni(acc)
>   'This worries Gianni.'
>   b. * *Gianni preoccupa questo.*
>   Gianni(acc) worries this
>   'This worries Gianni.'

Example (3b) clearly contrasts with (1b) in that
dative experiencers can be subjects and accusative
experiencers cannot.
     Why do the NPs of *piacere* and *preoccupare* behave
differently? Both are experiencers. Both have
inherent case. (Inherent case is argued for by
Belletti and Rizzi using a Chomsky (1986) structural
analysis.) Belletti and Rizzi argue that the NPs of
these two verbs behave differently because of their
different manifestation of case. Dative case in
Italian is marked by a preposition, whereas
accusative case is not. They state that as "dative
assignment at D-structure involves insertion of the
preposition/Case marker **a** . . . the **a+NP** phrase thus
constructed can move around freely", it will always
be governed by the preposition and will therefore
always receive proper case at S-structure.
"Accusative case, on the other hand, does not involve
insertion of a special preposition/Case marker," and
therefore the accusative NP must remain within the VP
in order to remain properly governed and receive
proper case at S-structure. Belletti and Rizzi then
assert that accusatives must stay objects, whereas

datives may move to subject position. They posit the
following tree.

```
              S
             /\
           NP  VP
               /\
              /  \
             V'   ACC
            /\    DAT
           /  \   EXP
          V   NOM
              TH
```
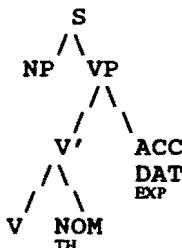
It is important to comment here on the structure of
the tree. The theme has the option of moving.[2] The
dative NP also may move, although it is in the same
position as the accusative argument which cannot
move. This indicates that structure does not play a
role in determining the difference in behavior
between the dative and the accusative NP: both
arguments originate in the same position, yet one may
move and the other may not.
        The Belletti and Rizzi solution seems to predict
that no language should manifest accusative arguments
in subject position, or if a language does, this case
must be marked by a preposition. Although the
occurrence of dative subjects in another language is
not necessarily a problem for Belletti and Rizzi,
their analysis does predict that this case must be
marked by a preposition in order to allow it to move.
As we turn to the Icelandic data (all of which is
taken from Levin (1981) and Sigurðsson (1989)), we
immediately see how the Belletti and Rizzi solution
fails. We have both dative and accusative subjects
in Icelandic, neither of which is marked by a
preposition.
        In viewing the Icelandic data, initially we will
look at non-quirky case examples. The examples below
show nominative subjects and accusative and dative
objects.

(4)   *Ég skrifaði bref.*
         I(nom) wrote a-letter(acc)
(5) a.   *Ég skrifaði henni bref.*
         I(nom) wrote her(dat) a-letter(acc)
    b.   *Ég heilsa honum.*
         I(nom) greet him(dat)

According to Levin, "accusative is the 'normal' case for [most] objects in Icelandic." Example (4) exhibits a construction with regular case: a nominative subject and an accusative object. Example (5a) adds a dative object. (5b) corresponds with (4), showing that some verbs in Icelandic take single dative objects.

The Icelandic examples of real interest involve quirky case. Let us consider the following sentences manifesting dative subjects. As stated above, dative subjects are not necessarily a problem for Belletti and Rizzi, however the Icelandic dative subjects are, in that dative case is not marked by a preposition.

(6)   *Mér líður vel.*
        me(dat) feels well.
        'I am feeling good.'

(7) a. *Mér líkar þeir bílar.*
        me(dat) likes those cars(nom)

    b. *Þeim líkuðu hestarnir.*
        them(dat) liked the-horses(nom)

(8)   *Mér býður við setningafraeði.*
        me(dat) is-nauseated at syntax.

(9) a. *Mér er kalt.*
        me(dat) is cold
        'I am freezing.'

    b. *Mér kolnar*
        me(dat) is-getting-cold

(10)   *Landinu hallar niður að sjó.*
        the-land(dat) slopes down to sea

(11)   *Ykkur var boðið.*
        you(dat) were invited

The above dative subject sentences clearly fall into two classes: psych and non-psych. Examples (6) and (7) are psych, and (8) through (11) are non-psych. The examples given in (8) through (10), we will argue, are unaccusatives. And finally, example (11) is clearly a passive construction.[3]

As we consider the Icelandic accusative subjects, we notice that none is an experiencer.

(12)   *Mig velgrir við setningafraeði.*
        me(acc) is nauseated at syntax

(13)   *Mig kelur.*
        me(acc) is freezing/getting frostbitten
        'I am freezing/getting frostbitten.'

(14)   *Skipið rak á land.*
        the ship(acc) drove to land
        'The ship drifted ashore.'

(15)   *Snjóa leysir á fjallinu.*
         snow(acc) melts on the-mountain

All of the accusative subject constructions (examples
(12) through (15)), as well as many dative subject
sentences (examples (8) through (10)), fall under
Perlmutter's (1978) classification of unaccusatives.
Perlmutter does not deal with this data directly. He
mentions that "the class of predicates determining
initial unaccusative strata is very large." He
posits a large subcategory which he entitles
*Predicates whose initial nuclear term is semantically
a Patient.* This subclass includes *float, slide,
glide,* and *flow,* and therefore implies that *drift* in
(14) would be a member of this class. The class of
inchoatives is a subgroup of this larger subgroup,
which includes *melt* (as in (15)) and *freeze* (as in
(13) and (9)). In looking at the verb types, then,
we notice that all the verbs have the proper
semantics for unaccusativity.[4]
     One salient fact of these unaccusatives is their
idiosyncrasy in regards to case assignment. This is
demonstrated most dramatically by the minimal pairs
in examples (8) and (12) and the near minimal pairs
in examples (9) and (13). Because of the existence
of these examples, we can see that it is impossible
to distinctly separate the accusative subject and the
dative subject sentences by verb classes.[5]
     Due to the lack of case-marking prepositions in
Icelandic, we know the Belletti and Rizzi solution is
not tenable here. We find our solution in Pesetsky
(1990), through use of his **Cause** morpheme. Pesetsky
posits a phonetically null **Cause** morpheme which θ-
marks an NP as the *cause* of a phrase. These **cause**
arguments clearly contrast with NPs that are marked
as the *target* or *subject matter* of their sentences.
     Here, we will quickly review some of the details
regarding Pesetsky's proposal. Let us first consider
the distinction between *cause* versus *target*, shown in
(16) below.

(16) a. *Bill was very angry at the article in
            the* Times.   (TARGET)
     b. *The article in the* Times *angered Bill
            greatly.*   (CAUSE)

In example (16a) the article in the Times is the
target of the sentence, the *target* of Bill's anger,
where in (16b), the article in the Times is the *cause*
of the sentence, the *cause* of Bill's anger. Pesetsky

explains how the truth conditions of the these two
sentences are noticeably distinct. (16a) involves
Bill evaluating the article and finding some facet of
the article itself distasteful. In (16b) Bill may be
mad at the article as well and therefore is not
inconsistent with the meaning in (16a), however (16b)
can be true even if Bill considers the article to be
marvelous, perhaps because it is so eloquently
written, and well researched. If Bill considers the
article to be marvelous, the article can still anger
Bill, because perhaps the article exposes prevalent
irresponsible behavior among teenagers. This teenage
behavior causes Bill to be angry, but he is not
necessarily mad at the article itself.

Now we must consider the distinction between
cause versus *subject matter*:

(17) a. *John worried about the television set.*
(SUBJECT MATTER)
b. *The television set worried John.*
(CAUSE)

The television set is *subject matter* of John's worry
in (17a). In (17b) the television set is the *cause*
of John's worry. These sentences as well are
semantically distinct. When John is experiencing
worry in (17a) he is thinking about the television
set. "Perhaps he is worried that it might catch
fire, or that it is perched too precariously and
might fall." (17b) does not exclude these meanings,
but can also mean that John is worried about
something else, not the television set, but the
television caused him to worry. If John came into
the room and observed his entire family seated in
front of the TV, this might cause him to begin to
worry that his family does not get enough exercise.
Here John is not worrying about the television set,
as he necessarily is in (17a).

This **Cause** morpheme and the Pesetsky trees based
on these θ-roles lead us directly to our solution.
We crucially notice in example (3) that the Italian
accusative experiencers are causative, and therefore
have a very different tree from Italian dative
experiencers, none of which are causative (example
(1)). Although there is only one verb given for each
Italian type, all other Italian verbs with accusative
experiencers are causative: *interessare* "to
interest" and *attirare* "to attract," to name a
couple. Once we have realized this fact about

Italian accusative experiencers, we posit tree 1.,
based on Pesetsky's **Cause** tree.

```
   Tree 1                    Tree 2

      IP                        IP
     /\                        /\
    /  \                      /  \
   NP   I'                   NP   I'
       /\                        /\
      /  \                      /  \
     I    VP                   I    VP
         /\                        /\
        /  \                      /  \
       NP   V'                   V'   DAT ← Psych
      CAUSE /\                   /\   EXP  (Italian
           /  \                 /  \        and
          V⁰   VP              /    \     Icelandic)
          0   /\              /      \
             /  \            V⁰    ACC) ← Passives
     Psych → ACC  V'               DAT     and
     Causative  EXP  |             TH?  Unaccusatives
     (Italian)      V⁰
```
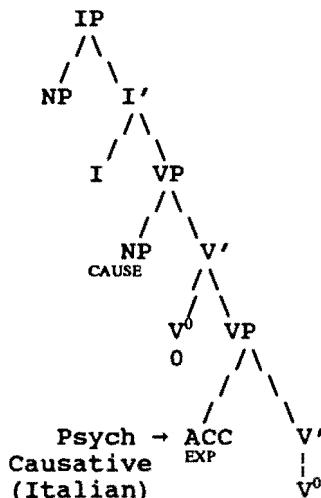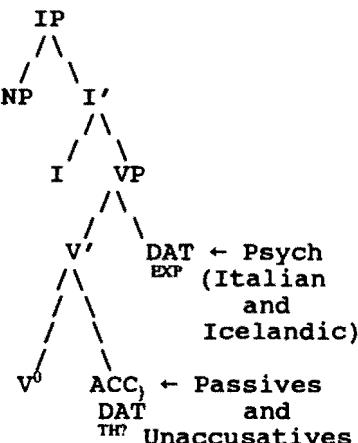
Tree 1. involves no NP movement of the experiencer.
Also, this tree has two VPs. Although there are
currently many proposals for a double VP to solve
different problems (Larson (1988), Spees (1991), and
Hale and Keyser (1990), to name a few), our two VPs,
following Pesetsky, are motivated by conflicting
highest θ-roles. Experiencer must always be at the
top of the VP, and **cause** must always be at the top of
the VP, so when we have both, we have two VPs. Tree
2., which is based on Pesetsky's Target/Subject
Matter tree accounts for dative experiencers in both
Icelandic and Italian, and Icelandic accusative and
dative unaccusative and passive constructions.
     In both trees, the position of all NPs follows
from Baker's (1988) UTAH, which states "Identical
thematic relations between items are represented by
identical structural relations between those items at
the level of D-structure." UTAH causes the vying for
highest θ-roles, mentioned above. Regarding the
experiencers, UTAH prescribes exactly what we see in
both trees: the experiencer is always in SPEC of VP.
As far as case assignment is concerned, the dative
experiencer in tree 2, receives default case.[6,7] The
accusative and dative NPs in the passive and
unaccusative constructions receive their case

directly from the V^0. (This sisterhood position to
the V^0 is perfect for the NP to receive "orders from"
the V^0.) We assume that verbs can subcategorize for
the case of their sisters. This case specification
is necessary because of the idiosyncratic case
assignment we see in this position, as seen in the
minimal pairs, examples (8) and (12).[8]

The main point of this analysis is that the
different S-structures are the result of different
tree structures. We have not explained however why
there is no NP movement of the experiencer in tree 1.
but there is movement of the experiencer and the
theme in tree 2. We must assume that there is some
mechanism which blocks movement in tree 1.
(Certainly nothing forces movement in tree 2., since
we know that movement is optional for some of the NPs
in tree 2.; they can either stay in object position
or move to subject position.) We can speculate that
the mechanism which prevents movement in tree 1 and
allows movement in tree 2 is due to some notion of
locality. In tree 1, the NP would have to move out
of two maximal projections (two VPs) to get to
subject position. In tree 2, any NP only moves out
of one maximal projection. Movement might,
therefore, be blocked in tree 1 by a type of
subjacency.

In conclusion, our solution to the problem of
which NPs may move to subject position is structural
whereas Belletti and Rizzi's solution is
morphological, as it is based on manifestation of
case. The Belletti and Rizzi theory cannot account
for the Icelandic data, whose case marking system
involves no prepositions to govern the NPs, which
would allow these NPs to move to subject position.
We solve the quirky case problem of Icelandic by
making these NPs always sister to the VP for
idiosyncratic case assignment. In comparing the
Belletti and Rizzi trees with our trees, we see that
they have the same position as we for the dative
experiencer, but not for the accusative experiencer.
We assume, due to the causative nature of the
accusative-type psych constructions, accusative
experiencers appear in the SPEC of the lower VP. We
also have a simpler analysis in having the dative
experiencer position be uniquely dative and thereby
receiving case by default. This position, where
Belletti and Rizzi put both accusative and dative
experiencers, is the position where we posit there is
no case alternation; here we have only default dative
case.[9]

By putting NPs which behave differently in the
same position in the tree, Belletti and Rizzi are not
using tree structure to mirror behavior as we do. We
posit that the difference in behavior (i.e., which
NPs can and cannot move to subject position) is based
on a difference in structure. For them, the
structure in their tree mirrors θ-roles, because of
UTAH. Our tree structures embody UTAH as well; we
have simply posited a new θ-role (**cause**), following
Pesetsky. This new θ-role changes the structure and
explains why accusatives do not move in Italian.

Notes

1. There is a third class of Italian psych verbs,
referred to by Belletti and Rizzi as the temere ("to
fear") class, which involves a nominative experiencer.
Because this class does not involve quirky case, I have
not included a discussion of it in this paper.

2. When the theme moves to subject position, it
receives nominative case by INFL. When the theme
remains in object position, Belletti and Rizzi claim it
receives nominative case perhaps due to Platzack's
(1987) Null Subject parameter, in the following manner:
"the INFL node of Null Subject languages [(like
Italian)] can assign nominative case directly to the
right," contrasting with non-Null Subject languages
(like French, which disallows the structure
corresponding to (1b)) which can assign nominative case
only to the left.

3. There is at least one Icelandic verb which appears
to be not an unaccusative, not a psych construction,
not a passive, but an agentive verb: maelist vel "to
speak well", as in the example below.

i.   *Honum maelist vel í kirkjunni.*
          him(dat) spoke well in church

Until we can find more data surrounding the issue, we
will put it aside. However, some of the questions
concerning this verb that must be answered are: Why
does the verb translate as "spoke well"? Would the
subject not be dative if he simply "spoke", or if he
"spoke poorly", or just "spoke averagely"? There is
perhaps a psych meaning to the phrase "spoke well" in
Icelandic, perhaps it means more "he came off well",
along the lines of "he impressed us".

4.   There are a couple of Icelandic verbs which take
accusative subjects that do not have as clear
unaccusative semantics as the examples given in the
body of the paper: grunar "to suspect", and *minnir* "to
remember". These verbs are certainly a problem for the
analysis presented here.   For three reasons we will
leave this issue aside. These examples are very few in
relation to the number that are clearly unaccusative.
Also, perhaps we do not understand well enough the
gloss of these verbs to insure that they cannot be
unaccusatives. Finally, Perlmutter (1978) lists types
of verbs that are unaccusative and types which are not,
but does not classify this type of verb class.

5.   Levin attempts such classification, but obviously
cannot avoid an intersection.   She refers to two
different classes as: "Involuntary motion, change of
state, condition" and "Involuntary movement, change of
state, condition", the former for dative subjects, the
latter for accusatives.

6. If we were to put the temere class on our tree, the
nominative experiencer would originate in the same
position as the dative experiencer, but would not
receive dative default case.   This NP would receive
nominative case assigned by INFL to the subject
position.

7.   The dative experiencer in this position acts like
a subject in that it is external to the V, unlike the
other unaccusative and passive dative subjects.

8.   Since we allow V^0 to dictate which case its object
will take, we predict that minimal pairs of regular
transitive verbs exist in Icelandic where the verbs
have identical meaning, but take an object with
different case. For example, "I eat1 this(acc)" versus
"I eat2 this(dat)", where eat1 and eat2 are different
verbs in Icelandic with the same, or nearly the same,
meaning.   We do not have the data to confirm this
prediction.

9.   The temere nominative experiencer might appear to
be a problem for this default dative case, but it is
not. Only the position will have default case, whereas
nominative case comes through movement.

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Underlying OCP Violations in Lama*
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Lama, a Gur language spoken in Togo, has a widespread process of labial dissimilation, which affects certain sequences of labial consonant followed by rounded vowel. Labial dissimilation can even occur morpheme-internally: underlying sequences of labial fricative plus rounded vowel are realized as *h* plus rounded vowel or as *f* plus unrounded vowel, in free variation. If, as suggested by Yip (1988), all dissimilation rules are motivated by the Obligatory Contour Principle, then OCP violations must be allowed in the underlying representations of morphemes displaying such variation.

The consonant system of Lama is as follows:

(1)   p   t   (d)   c   k   kp
      f   s   h
      m   n   ñ
      w   l   r   y

Orthographic *d* represents a retroflex stop derived from underlying *r* by a strengthening rule (Ourso and Ulrich 1990). The vowels of Lama are:

(2)   i   i̧   ə   ə̧   u   u̧
      e   ȩ   o   o̧
              a   a̧

The underdot indicates a [-ATR] vowel.[1] Schwa is phonologically a high vowel (Ulrich in preparation).

Labial dissimilation affects sequences of labial consonant plus rounded vowel in a variety of morphological contexts, changing *u* to schwa and *o* to *e*. For instance, the infinitive suffix -*u* (3a) becomes schwa after roots ending in *p* (3b) or *m* (3c):

(3) a. cín-û   'to praise'
         praise-inf

     b. mạp-ụ → mắp-ệ̣   'to beat'
         beat-inf

     c. ñạm-ụ → ñạmə → ñậm   'to fear'
         fear-inf

After *m*, the schwa is subsequently deleted by an independently motivated rule of Schwa Deletion (Ourso and Ulrich 1990).[2]

The suffix -*ọ*, which marks noun class 5, undergoes labial dissimilation after a labial consonant, as in (4b):

(4) a. yậl-ộ   'salt'
         salt-NC5

     b. kom-wi-ọ → kómpé   'young kapok tree'[3]
         kapok-dim-NC5

The progressive suffix is -*kụ*. After roots of most shapes, the *k* is deleted, as in (5a). After roots ending in *p*, however, the *k* is retained and the *u* undergoes labial dissimilation, as in (5b):

(5) a. rọn-kụ → rộnû   'is fixing'
         fix-prog

     b. lep-kụ → lékệ̣   'is getting lost'
         get.lost-prog

The *p* is weakened to *w* and subsequently deleted (Ulrich in preparation).[4]

Two borrowings from English exhibit labial dissimilation in the reverse direction, affecting the labial consonant rather than the vowel. These nouns were borrowed into noun class 4, their final *n* reanalyzed as the class 4 suffix:

(6) a. kạrmạf-ñə → kạrmạf-ện   'gramophones'[5]
         gramophone-NC4

     b. kạnkrạf-ñə → kạnkrậf-ện   '(crank) telephones'
         telephone-NC4

Their singulars, like those of most nouns in class 4, are placed in class 3, which is marked by a suffix containing a rounded vowel. The rounded vowel of the suffix

triggers labial dissimilation of the root-final *f*:

(7)   a. ka̧rma̧f-kṳ → ka̧rma̧fṳ → ka̧rma̧hṳ   'gramophone'[6]
         gramophone-NC3

      b. ka̧nkra̧f-kṳ → ka̧nkra̧fṳ → ka̧nkrá̧hṳ 'telephone'
         telephone-NC3

Although labial dissimilation is pervasive in Lama, many sequences of labial consonant plus rounded vowel do surface:

(8)   a. ta̧p-kṳ → tá̧pṳ̂ (*tá̧pə̧̂)   'forest tree'
         forest.tree-NC3

      b. to̧mə-ṳ → tó̧mṳ̂ (*to̧m)   'to dilute'
         dilute-inf

      c. ta̧ma̧-o̧ → tá̧mó̧ (*tá̧mȩ́)   'loins'
         loins-NC5

      d. ho̧pə-kṳ → hó̧pṳ̂ (*ho̧pə)   'is squatting'
         squat-prog

Unlike the root-final *f* in (7), the root-final *p* in (8a) does not undergo labial dissimilation before the class 3 suffix. The words in (8b–d) contain the same suffixes that undergo labial dissimilation in (3c, 4b, 5b), but here a root-final vowel blocks labial dissimilation. The blocking vowel is deleted by a later rule.

    Moreover, all labial consonants except *f* can be followed by a rounded vowel morpheme-internally:

(9)   a. mṳ́-yá̧   'bones' (NC8)
      b. mó̧l   'grunt!'
      c. pú   'respect!'
      d. pó̧ntá̧   'panther' (NC1)
      e. kpo̧sə̧   'bark!'
      f. wṳ́r-ô   'chief' (NC5)
      g. wó-sə̧̂   'rivers' (NC6)

However, there are no surface sequences of *f* followed by a rounded vowel.

    There are, on the other hand, morphemes that display free variation between *hu* and *fə* (10), and others that display free variation between *ho* and *fe* (11):

(10) a. hur-u ~ fər-u   'bag' (NC3)
     b. hutə ~ fətə   'pour out!'
     c. húl-ə̂m ~ fə́l-ə̂m   'irritation' (NC10)
     d. huntər-ə̂m ~ fəntər-ə̂m   'brain' (NC10)

(11) a. hón-də̧́ ~ fén-də̧́   'wife' (NC1)
     b. hond-ǫ̆ ~ fend-ǫ̆   'moon' (NC5)
     c. hom ~ fem   'wake up!'
     d. hól ~ fél   'belch!'

Such morphemes contrast with others exhibiting no variation:

(12) a. hu (*fə)   'grow a boil!'
     b. họm (*fẹm)   'pull!'
     c. afəsə (*ahusə)   'Indian millet' (NC6)
     d. fẹ́də̧́ (*hódə̧́)   'compete with!'
     e. nạhəmpê:r   'hoof' (NC7)
     f. hẹ́r   'cut stomach open!'

Given the absence of surface *fu, *fo, and the existence of labial dissimilation processes affecting both f before rounded vowels and rounded vowels after labial consonants, we can follow Ourso (1989) in deriving hu ~ fə from underlying /fu/ and ho ~ fe from underlying /fo/. The words in (10) have the underlying representations given in (13), while those in (11) have the underlying representations given in (14):

(13) a. /fur-kṵ/   'bag'[7]
     b. /fut/   'pour out!'
     c. /ful-m/   'irritation'
     d. /funtər-m/   'brain'

(14) a. /fom-rə̧/   'wife'
     b. /fonrạ-o/   'moon'
     c. /fom/   'wake up!'
     d. /fol/   'belch!'

These ill-formed underlying representations must undergo one or the other of the labial dissimilation processes, either changing f to h or unrounding the vowel.

Yip (1988) proposes that all dissimilation rules are triggered by the Obligatory Contour Principle:

(15)   Obligatory Contour Principle (McCarthy 1986)
        At the melodic level, adjacent identical elements are prohibited.

This assumption allows the simplification of dissimilation rules by omission of a trigger; rules without a specified trigger apply to forms containing violations of constraints such as the OCP. For example, Yip analyzes labial dissimilation in Cantonese. First, it must be stated that the OCP operates on the [LABIAL] tier in Cantonese. But the statement of a constraint does not in itself predict how violations will be repaired. Yip (1988:84) gives the following rule:

(16)   Labial Dissimilation (Cantonese)
        Domain: Morpheme
        Tier: Labial
        Trigger:
        Change: Delete second

Because the rule lacks an overt trigger, it applies only to repair constraint violations.

The many instances of labial dissimilation in Lama reveal that the OCP is operative on the [LABIAL] tier in this language too. But Lama differs from Cantonese in two respects. First, several different phonological rules are required to effect labial dissimilation in Lama, depending on the identity of the labial consonant and on the morphological environment. The first of two adjacent [LABIAL] specifications is deleted when associated with a fricative before the class 3 suffix. The second of two adjacent [LABIAL] specifications is deleted when associated with the infinitive, progressive, or class 5 suffix. Either of two adjacent tautomorphemic [LABIAL] specifications is deleted when the first is associated with a fricative. In the many other cases, where labial sequences surface, the default process of fusion can be assumed to apply.

Second, Yip follows the common assumption that the OCP holds of underlying forms. However, morpheme-internal labial dissimilation in Lama requires underlying OCP violations. If dissimilation repairs OCP violations, then the input to dissimilation must violate the OCP. Since labial dissimilation takes place within morphemes in Lama, those morphemes must contain underlying OCP violations.[8]

Paradis (1988) discusses two cases of underlying constraint violations. In Gere, sequences of two rounded segments are prohibited. Thus, the initial consonant in (17a) undergoes unrounding:

(17)   a. kwū → kū   'skin'
        b. kwū-i → kwī   'skins'

In (17b) the rounded consonant surfaces before the plural suffix, which triggers deletion of the root vowel. Deletion of the root vowel before the plural suffix incidentally removes the violation of the constraint against sequences of rounded segments, making deliberate repair (by unrounding of the consonant) unnecessary.

Paradis's second example of underlying constraint violations comes from Fula. Noun class is indicated in Fula by a variety of suffixes in conjunction with mutation. In one mutation, the initial consonant of the noun becomes a stop. The regular mutations of word-initial *w*, *y*, and Ø (all of which can occur before any vowel) are *b*, *j*, and Ø, respectively:

(18)   a. /w/:   woj-ere   boj-e   'hare'[9]
        b. /y/:   yim-re   jim-el   'poem'
        c. /Ø/:   af-ɓe   af-o   'elder'

There also exist nouns beginning with *g* in the stop grade and with *w*, *y*, or Ø, depending on the following vowel, in the continuant grade:

(19)   a. /ɣ/:   wor-ɓe   gor-ko   'man'
        b. /ɣ/:   yit-ere   git-e   'eye'
        c. /ɣ/:   abb-ere   gabb-e   'seed'

Paradis analyzes the forms in (19) as containing an underlying ɣ. Fula does not allow ɣ on the surface, so it is delinked (as in the forms in the first column), with spreading from a following non-low vowel. In the forms in the second column, however, ɣ is mutated according to the regular pattern into the stop *g*, which does not violate the constraint. Thus, repair by delinking is unnecessary.

Paradis (1988) proposes that constraint violations have three sources. First, while constraints normally block the application of phonological rules that would create violations, rules can create violations of one constraint if by doing so they remove a violation of another constraint. Second, constraint violations can be created by affixation; morphology does not respect phonological constraints.

Finally, some constraint violations are underlying. It is this last type of violation (Paradis's V-3) that is of interest in the present paper.

The question arises: Under what conditions can underlying constraint violations be posited? The answer is that underlying constraint violations can only be detected when they are variably resolved. If an underlying constraint violation in a particular morpheme were always repaired in the same fashion, it would be unrecoverable. There would be no reason not to posit the repaired, non-violating output as the underlying form of the morpheme.

The source of the crucial variability may be morphological, as in the Gere and Fula examples. Here the offending morpheme can occur in two (or more) morphological environments. Affix A triggers rules that (incidentally) remove the constraint violation (e.g. vowel deletion in Gere, despirantization in Fula). Affix B triggers no such rules, and the constraint violation undergoes the appropriate repair strategy (e.g. delabialization in Gere, delinking and vowel spreading in Fula).[10]

In the case of Lama *fu and *fo sequences, on the other hand, the variability in their resolution derives, not from different morphological environments, but from optionality in the phonological rules. These sequences can be repaired either by delabialization of the consonant or by delabialization of the vowel. Because the variability is purely phonological, underlying constraint violations can be detected even non-peripherally in a morpheme:

(20) a. cafut-ku → cáfə̀t-ú ~ cáhút-ú   'toad' (NC3)
      b. tufule-m → tufəlê-m ~ tuhulê-m   'truth' (NC10)

The underlying constraint violations in Gere and Fula discussed above occur at the edge of a morpheme, where they are subject to phonological rules triggered by other morphemes. The Lama constraint violations in (20), on the other hand, are totally internal to the morpheme. It is only the (perhaps unusual) circumstance of optionality in repair strategy that allows the underlying violations to be variably resolved, and thus to be recoverable.

Notes

[1]The feature [ATR] is irrelevant to the phenomena under discussion in the present paper. References to *u*, for example, should be understood as including both [+ATR] *u* and [-ATR] *ṵ*. For discussion of Lama vowel harmony, see Ourso (1989).

[2]No native roots end in *f* or *kp*, but see below for borrowed *f*-final noun roots. The one known *w*-final root does not appear to undergo labial dissimilation:

(i)   kpẹw-ṵ → kpẹwṵ   'to fasten a belt'

This may be the result of an early fusion process that bleeds labial dissimilation. Alternatively, it may be the result of late assimilation of schwa to a preceding glide.

[3]For the rules of *W*-Strengthening (after *m*) and Vowel Deletion (before a vowel) see Ourso (1989), Ourso and Ulrich (1990).

[4]In the progressive form of roots ending in *m*, the final three segments are lost, with compensatory lengthening, nasalization, and labialization of the root vowel:

(ii)   lem-kṵ → lõ̂:   'is pecking'
        peck-prog

Because the labialization of the root vowel could come from either the *m* or the *u*, it is impossible to determine whether labial dissimilation has occurred in such forms.

[5]For the rules of Schwa Deletion, Schwa Epenthesis, and Depalatalization in the derivation of class 4 nouns, see Ourso and Ulrich (1990).

[6]For the deletion of *k* in the class 3 suffix, see Ourso (1989).

[7]For the rules of *K*-Deletion (13a), Schwa Epenthesis (13b,c,d), Nasal Assimilation (14a), *R*-Strengthening (14a,b), and Vowel Deletion (14b), see Ourso (1989), Ourso and Ulrich (1990).

[8]Note that the existence of underlying constraint violations is independent of the identification of the OCP as the relevant constraint. Whether it is the OCP or not, Lama has a constraint against **fu*, **fo* that holds of surface forms but not of underlying forms.

[9]The relationship between pairs of forms in examples (18) and (19) is variously singular/plural, plain/diminutive, and plural/singular.

[10]Another logically possible situation is that in which a constraint violation is removed by infixation alone, without the application of any phonological rules. Imagine a language with a constraint against labial sequences, and an infix *-in-*. The infix could remove constraint violations by its very presence:

(iii)   a.   fura → hura

           b.   f,in,ura → finura

I am not yet aware of any actual cases of this type.

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REGARDING LABIAL-LABIAL CO-OCCURRENCE
CONSTRAINT IN CANTONESE

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The discussion in this squib centers around the phenomenon of a restriction for the occurrence of labial feature in Cantonese. Cantonese's consonant system is shown in (1):[1]

(1) p p^h t t^h k k^h k^w k^{hw}
     m   n   ŋ
     ts ts^h
     f   s   h
                    l
     w   j

(2) is a generalized vowel system of Cantonese. In Cantonese, each vowel can be either long or short.

(2)   i   y   u
       E   œ   o
              a

The syllable structure of Cantonese can be presented as (3):

(3)

O(nset)   N(ucleus)   R(ime)   C(oda)
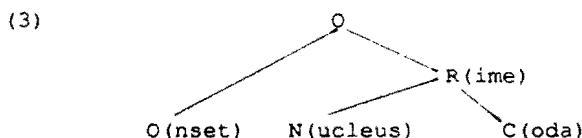
Cantonese has a well-known morpheme structure constraint that prohibits certain combinations of labial elements (See Appendix table). Yip (1988) is the first phonologist to study the phenomenon of labial constraint in Cantonese theoretically.[2] According to her analysis, there are three defferent kinds of labial-labial co-occurrence constraint in Cantonese.

The first kind of constraint holds between the nonadjacent onset and coda of labial consonants, as shown in (4).[3]

```
(4)              onset      -      coda
           *       C        V       C
                   |        |       |
                labial      |    labial     OCP-violation
                   |        |       |
                   p        a       m
```

According to Sagey, the Labial articulator node is activated in both Labial consonants and rounded vowels. So, if OCP is effective in primary feature, namely *Labial-Labial, it seems that we will get case (5a) as follows.

```
(5)   a.         onset      -      coda
           ?       C        V       V
                   |        |       |
                labial      |    labial     OCP-violation
                   |        |       |
                   p        a       u

      b.    ok mau,    ok fau,    ok piu,    ok miu
```

In fact, case (5a) is possible. In Cantonese, there are many such acceptable examples as in (5b). These data can be employed to support three different hypotheses. First, they may support the claim of C-place node vs. V-place node by Clements (1989) because the different phonological behaviours of consonantal labial and vowel labial to OCP prove that consonantal labial and vowel labial belong to different place node. Second, they may support the claim of C-plane vs. V-plane proposed by McCarthy (1981, 1989) because belonging to different planes, /p/ and /u/ will not violate OCP. Third, they may support the claim about the difference between labial feature and round feature proposed by Sagey (1987). The Labial articulator node is activated in both consonants and vowels, but that only the latter are also specified [+round]. Note that Cantonese has both front and back round feature *round-round, instead of Labial feature *Lab-Lab.

But, in Cantonese, there is a second kind of constraint which holds between the onset and the nucleus. Labial consonants may precede back rounded vowels, but not front rounded vowels, as shown in (6a) and (6b) respectively.

```
(6)   a.         onset    nucleus     -
           ok      C         V        C
                   |         |        |
                labial     round      |
                   |         |        |
                   p         u        t
```

```
b.      onset    nucleus    -
    *    C          V        C
         |          |        |
       labial      round     ı
         |          |        |
         p          y        t
```

The difference between back and front rounded vowels in (6) is interesting. One hypothesis may be proposed that only front rounded vowels are assigned for Labial feature and are therefore identifiable as Labial and subject to the prohibition. This hypothesis, however, is not tenable. That is because in Cantonese there is a third kind of constraint which holds between the nucleus and coda. In other words, a rounded vowel (either front or back) followed by a labial consonant is completely impossible, as shown in (7a) and (7b) respectively:

```
(7)  a.       -      nucleus    coda
         *    C          V        C
              |          |        |
              |        round    labial
              |          |        |
              t          y        p


     b.       -      nucleus    coda
         *    C          V        C
              |          |        |
              |        round    labial
              |          |        |
              t          u        p
```

As seen in (7a) and (7b), both front and back rounded vowels must be identifiable as Labial between nucleus and coda. Thus it can be seen that (6a) and (6b) is just a pair of counterexamples. To explain this front round vowel vs. back round vowel phenomenon, Yip (1988) suggests to make use of the kind of syllable-structure building rules in which only front rounded vowels are underlyingly marked Labial. When syllable structure is built, first the prevocalic consonant is marked as an onset, then redundant values of [round] are assigned, including [+round] for the nonlow back vowels. Assigning a value of a terminal feature like [+round] automatically entails assigning the superordinate articulator node, in this case Labial. Then postvocalic consonants are marked as codas. The order is shown in (8):

```
(8)    a.    Create onsets (CO): ok pu, but *py
       b.    Redundancy rules (RR) for [+round] apply
       c.    Create codas (CC): both *up and *yp
```

It should be pointed out that it is very important in the hypothesis (8) proposed by Yip that linear order in phonological representation, redundancy rule for [+round] must be applied after creating onsets and before creating codas. It is only in this way that the contradiction between (6) and (7) can be solved, as seen in (9):

```
(9)   a = (6a)
        [ ] (unspecified for labial)
         |
         u
         |        CO                    RR
  C    V  C ----> C    V    C ----> C    V    C
  |       |       |    |    |       |    |    |
  p       k       p    u    k       p    u    k
  |            [lab]  [ ]                |    |
[lab]          ———————                [lab] [lab]
               no OCP violation
```

```
      b = (7b)
        [ ]
         |
         u
         |        CO               RR               CC
  C    V  C ----> C    V    C ----> C    V    C ----> C    V    C
  |       |       |    |    |       |    |    |       |    |    |
  t       p       t    u    p       t    u    p       t    u    p
             [lab]           [ ]                 [lab]         [lab] [lab]
                                                              ———————
                                                              OCP violation
```
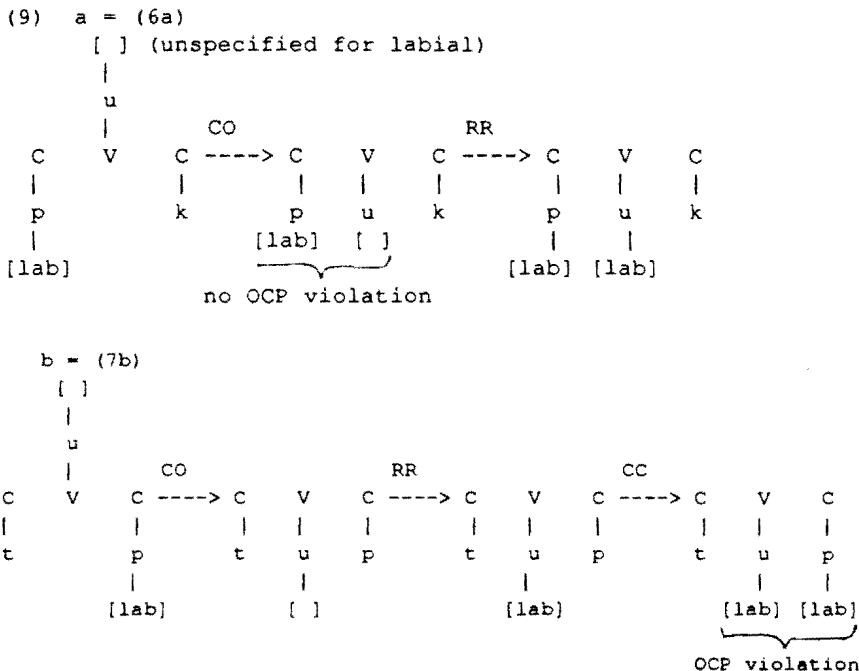
Although Yip's hypothesis can provide for us the explanation to the problem of the back rounded vowel in case (6) and (7), it fails to explain why OCP is not effective case (5), but must be effective in secondary articulatory *kw*. The feature geometry of secondary articulatory *kw* can be presented in several different ways, such as (10a) by Sagey (1986) and (10b) by Clements (1989).

```
(10)  a. (Sagey 1986) kʷ:          b. (Clements 1989) kʷ:

                 o    Rt                       o    Rt
                 |                            / \
                 o    Pl          C-Pl  o    o    V-Pl
                / \                     |    |
        Dor  o     o  Lab      Dor  o        o  Lab
```
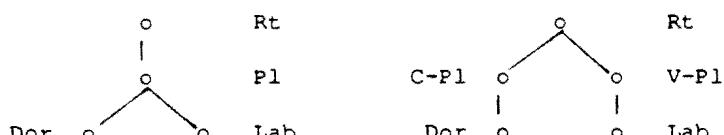
In Cantonese, if the onset is *kw*, OCP will operates no matter whether the coda is *-u* or *-p*, as shown in (11):

```
(11)  a. * kʷau            b. * kʷap
```

Suppose the hypothesis in (8) proposed by Yip is correct, case (11a) and case (5) should have not only the same derivation but also the same result. For instance, supposing Redundancy rules are applied before creating codas, the derivation of (11a) and (5) will be what we can see in (12) respectively:

```
(12)   a = (11a)
               [ ]                 [ ]                 [ ]
                |                   |                   |
          a    u                   u                   u
          |    |  CO                |  RR               |  CC
    C     V    V ----> C    V      V ----> C    V      V ----> C    V    V
    |                  |    |              |    |              |    |    |
    kʷ                 kʷ   a             kʷ   a             kʷ   a    u
   ⌒                   ⌒                  ⌒                  ⌒
  [dor][ ]         [dor][ ]          [dor][lab]         [dor][lab]    [ ]
                                                        ╰─────────╯
                                                       no OCP violation


   b. = (5)
               [ ]                 [ ]                 [ ]
                |                   |                   |
          a    u                   u                   u
          |    |  CO                |  RR               |  CC
    C     V    V ----> C    V      V ----> C    V      V ----> C    V    V
    |                  |    |              |    |              |    |    |
    p                  p    a             p    a             p    a    u
    |                  |                  |                  |         |
  [lab]              [lab]              [lab]              [lab]    [ ]
                                                        ╰─────────╯
                                                       no OCP violation
```
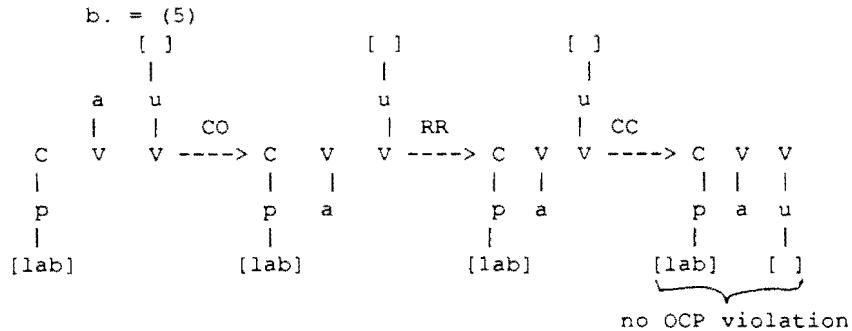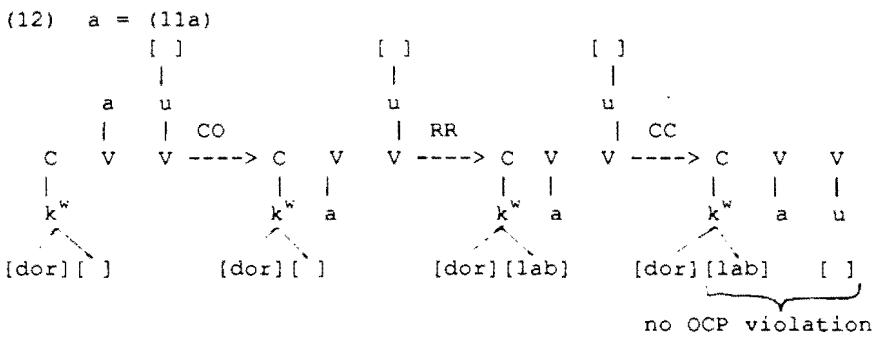
If Redundancy rules are applied after creating codas, the derivation of (11) and (5) should be seen as in (13) respectviely:

```
(13)   a = (11a)
               [ ]                    [ ]
                |                      |
          a     u                     u
          |     |  CO               |  CC                    RR
    C     V     V ----> C     V     V ----> C     V     V -----> C     V     V
    |            |          |          |        |     |     |        |     |     |
    kʷ          kʷ     a         kʷ    a     u      kʷ    a     u
     ╱ ╲           ╱ ╲              ╱ ╲           |        ╱ ╲           |
  [dor][ ]      [dor][ ]        [dor][ ]   [ ]    [dor][lab]  [lab]
                                                          └─────────┘
                                                        OCP violation


           b = (5)
               [ ]                    [ ]
                |                      |
          a     u                     u
          |     |  CO               |  CC                    RR
    C     V     V ----> C     V     V ----> C     V     V ----> C     V     V
    |            |          |          |        |     |        |     |
    p           p     a         p    a     u      p    a     u
    |           |              |        |     |      |        |     |
  [lab]       [lab]          [lab]   [ ]    [lab]  [lab]
                                                     └────────┘
                                                    OCP violation
```
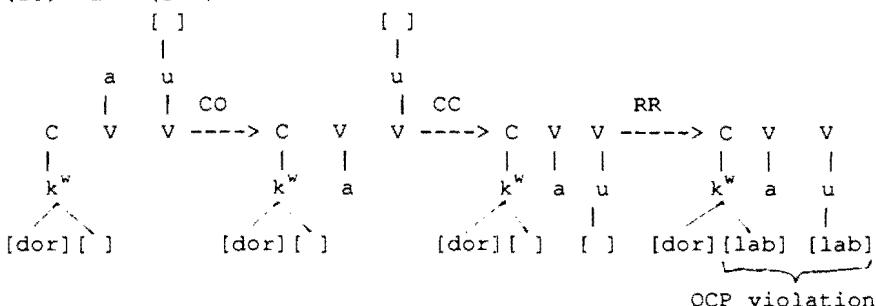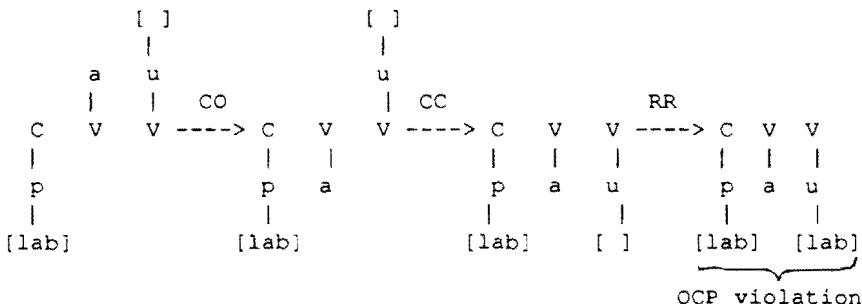
If the derivation in (12) is correct, we will get the result in (14a); if the derivation of (13) is correct, we will get the result in (14b) instead. In Cantonese, however, we have got neither (14a) nor (14b) but (14c).

```
(14)   a.   ok kʷau        vs.   ok pau
       b.   * kʷau         vs.    * pau
       c.   * kʷau (=8a)   vs.   ok pau (=2)
```

Thus it can be seen that the hypothesis in (8) proposed by Yip is not without problem and it needs revising. I think a special stipulation in the order of the Redundancy rule application is needed. That is to say the Redundancy rule should not be applied completely before creating coda, as in (12), nor applied thuroughly after creating coda, as in (13); but be applied either before or after creating coda, all depending upon the property of trigger element. Taking what forms the first element in linear order in OCP of a syllable structure as a trigger element and what forms the second element of OCP as a victim element, we have got a new hypothesis as illustrated in (15):

(15)

> If the trigger element is the primary feature, Redundancy rule
> will be applied after creating onsets and before creating codas;
> and OCP is effective before rule application. If it is the secon-
> dary feature, Redundancy rule should be applied after creating
> codas, and OCP is effective after rule application.

My new hypothesis in (15) can be used to explain all the above mentioned data. Since the trigger element of both case (5) and (6) is the primary feature, Redundancy rule must be applied after creating onsets and before creating codas, and OCP should be effective before rule application. Thus the back rounded vowels will not affect OCP, as seen in (16):

```
(16)   a = (5)
                [ ]                   [ ]                 [lab]
                 |                     |                   |
           a    u                     u                   u
           |    |  CO                 |  RR               |  CC
     C     V    V ----> C     V    V ----> C    V    V ----> C    V    V
     |              |     |          |     |           |     |    |
     p              p     a          p     a           p     a    u
     |              |                |                 |         |
   [lab]          [lab]           [lab]             [lab]    [lab]

                         no OCP violation


       b = (6a)
           [ ]
            |
            u
            |         CO                  RR
     C     V    C ----> C     V    C ----> C     V     C
     |          |       |     |    |       |     |     |
     p          t       p     u    t       p     u     t
     |                  |     |            |     |
   [lab]              [lab] [ ]          [lab] [lab]

                         no OCP violation
```
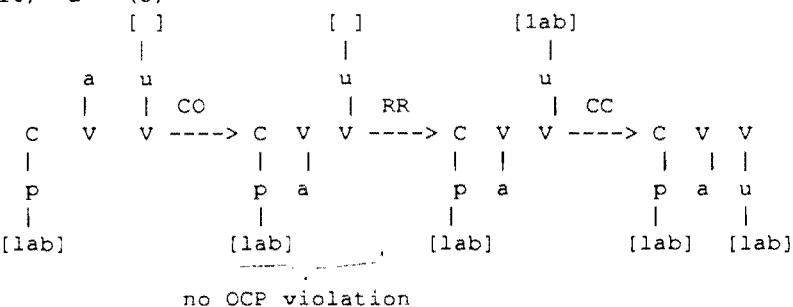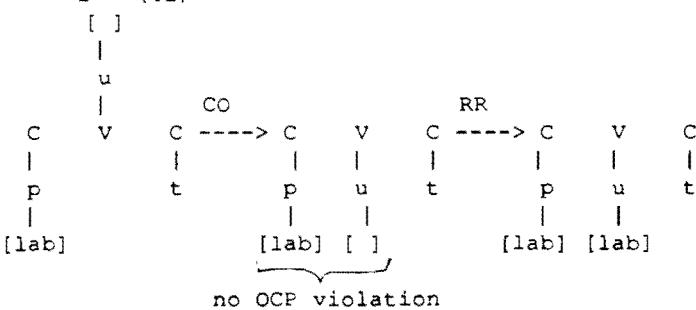
Since the trigger element of both case (7) and (11) is the secondary feature, Redundancy rule must be applied after creating codas, and OCP should be effective after rule application. Thus the back rounded vowels will have OCP operation, as illustrated in (17):

```
(17)  a = (7b)
        [ ]
         |
         u
         |        CO & CC                    RR
    C    V    C ---------> C    V    C ----> C    V    C
    |         |                 |    |            |    |
    k         p            k    u    p       k    u    p
         |                      |    |            |    |
       [lab]                  [ ]  [lab]      [lab] [lab]
                                              `-----,-----'
                                              OCP violation

      b = (11a)
            [ ]
             |
        a    u
        |    |   CO & CC                   RR
    C    V    V ---------> C    V    V ----> C    V    V
    |                           |    |            |    |
    k^w                    k^w  a    u      k^w   a    u
    /                      /              /
  [dor][`]              [dor][`]    [ ]  [dor][lab] [lab]
                                              `-----,-----'
                                              OCP violation
```
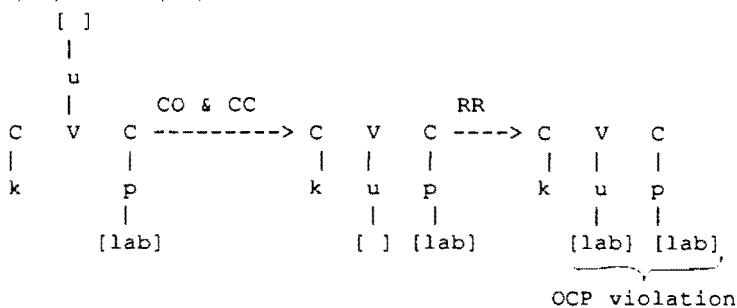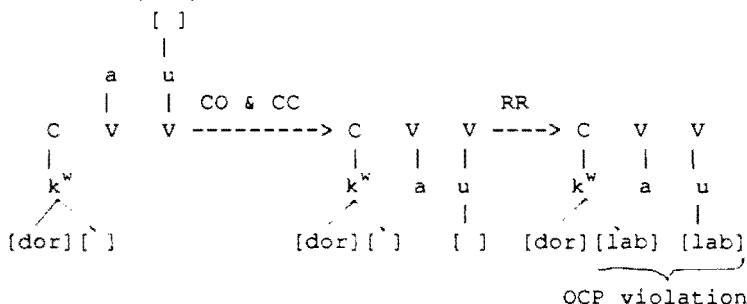
It is worth attention that the hypothesis we proposed in (15) and the concerned discussion raises in fact such theoretical problems: First, redundancy rule ordering with respect to syllabification may depend on the feature geometry of a segment in the previous rule. And second, the feature nodes in different tiers, like primary articulation vs. secondary articulation, may have the different phonological behaviours, as shown either by the difference in the order of rule application or by the difference in the effect of OCP. As for this, we have found supporting evidence not only from Cantonese but also from some other languages. In some languages, if there are two different spreading directions, they are noted operating in different tiers. Sagey (1987) has discussed Warlpiri's labial harmony, as shown in (18a), and round harmony, as shown in (18b).

```
(18) a. ngami  rn  i - k  u - p  u rdangka
              o   o   o   o  o    o   o   Place tier
              |
              σ                       o   o   Primary (labial) tier
              |
             -rd                     +rd  Secondary (round) tier
```

```
b.      k   i   p   i  -  rn   u
        o   o   o   o     o    o        Place tier
            |   |   |          |
            |   |   |          |
            o   o   o          o         Primary (labial) tier
            |    \   | ‥       |
            ǂ     ǂ‥          o
           -rd   -rd         +rd        Secondary (round) tier
```
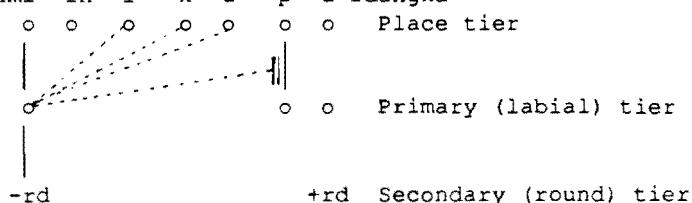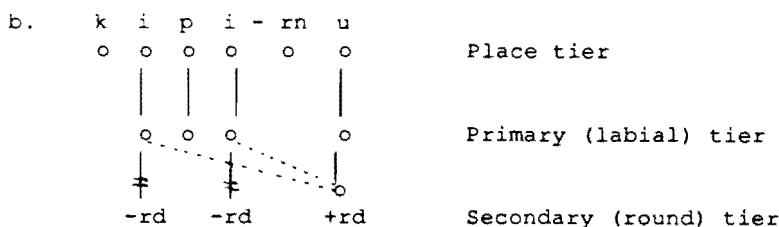
According to Sagey, blocking in (18a) is accounted for by analyzing labial harmony as spreading a labial node which dominates [-round] from left to right. (18b) is not blocked by labial node as spreading a feature [+round] from right to left. Although we hold different views on assigning [-round] to *i* in (18a), we share at least one point in common. That is in Warlpiri, different spreading directions result from difference in feature tiers. In other words, spreading in primary tier is from left to right, but in secondary tier it is just the other way round.

The same situation also can be seen in Yoruba. According to Schleicher (1990), Yoruba's vowel assimilation is from right to left, but nasal assimilation is from left to right, as seen in (19).

```
(19)    itó   +   ewúrɛ   --->   itééwúrɛ
        'thigh'   'goat'          'goat's thigh'
```

Nasal and vowel belong to two different feature tiers. By Clements (1985), nasal is put in manner tier, but by McCarthy it is placed in root tier. However, it is obvious that in Yoruba the spreading directions differ in different tiers. And all of these can serve as the evidence supporting my hypothesis, proposed in (15).

NOTES

[1] All data discussed here are adopted from Gao Hua-nian's *Guang-zhou fang-yan yan-jiu* (STUDY OF CANTONESE, Hongkong, 1980); Dianal Kao's *Structure of the syllable in Cantonese* (Mouton, 1971); and Oi-kan Yue Hashimoto's *Phonology of Cantonese* (Cambridge, 1972).

[2] Lin (1989), Fu (1990), Cheng (1990), and Duanmu (1990) have also discussed the phenomenon of labial constraint in Cantonese, respectively. Although I disagree with their analyses, I wouldn't evaluate theirs here by virtue of the limited space. In this short paper, I only discuss Yip's hypothesis, which is not only the first one to discuss the phenomenon of labial constraint in Cantonese, but also is one of the most important papers with regard to labial constraint.

[3] This kind of structure may occur in loan words, onomatopoeia, and baby talk words. But since most of Chinese linguists do not consider that these words exist in the original structure of Cantonese (See both Yip (1988) and Appendix table), I also ignore them here.

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	p	p'	m	l	t	t'	n	l	ts	ts'	s	j	k	k'	ŋ	kw	k'w	w	h	
ai								lai	tsai	ts'ai	sai									
aŋ								laŋ	tsaŋ	ts'aŋ	saŋ	jaŋ	kaŋ	k'aŋ					baŋ	
an					tan			lan	tsan	ts'an	san	jan								
æy					tæy	t'æy	næy	læy	tsæy	ts'æy	sæy		kæy	k'æy					bæy	
æ					tæ	t'æ													bæ	
ik	pik	p'ik			tik	t'ik			tsik	ts'ik	sik			k'ik						
iŋ	piŋ	p'iŋ	miŋ		tiŋ	t'iŋ		liŋ	tsiŋ	ts'iŋ	siŋ		kiŋ						liŋ	
ii	pii	p'ii	mii	lii	tii		nii	lii			sii		kii	k'ii					hii	
i	pi		mi				ni		tsi	ts'i	si	ji	ki	k'i						
ak	pak	p'ak	mak		tak			lak	tsak	ts'ak	sak				ŋak				lak	
a:k	pa:k	p'a:k	ma:k						tsa:k	ts'a:k		ja:k	ka:k	k'a:k	ŋa:k			wa:k	ha:k	
at	pat	p'at	mat	fat	tat				tsat	ts'at	sat	jat	kat	k'at	ŋat	kwat	k'wat	wat	hat	
a:t	pa:t		ma:t	fa:t	ta:t	t'a:t			tsa:t	ts'a:t	sa:t		ka:t		ŋa:t	kwa:t	k'wa:t	wa:t		
ap							nap	lap	tsap	ts'ap	sap	jap	kap	k'ap					hap	
a:p					ta:p	t'a:p	na:p	la:p	tsa:p	ts'a:p	sa:p		ka:p		ŋa:p				ha:p	
aŋ	pŋ	p'aŋ	maŋ		taŋ	t'aŋ	naŋ		tsaŋ	ts'aŋ	saŋ		kaŋ		ŋaŋ			waŋ	haŋ	
a:ŋ		p'a:ŋ	ma:ŋ					la:ŋ	tsa:ŋ	ts'a:ŋ	sa:ŋ		ka:ŋ		ŋa:ŋ	kwa:ŋ	k'wa:ŋ	wa:ŋ	ha:ŋ	
an	pan	p'an	man	fan	tan	t'an	nan	lan	tsan	ts'an	san	jan	kan	k'an	ŋan	kwan	k'wan	wan	han	
a:n	pa:n	p'a:n	ma:n	fa:n	ta:n	t'a:n	na:n	la:n	tsa:n	ts'a:n	sa:n		ka:n		ŋa:n	kwa:n		wa:n	ha:n	
am					tam	t'am	nam	lam	tsam	ts'am	sam	jam	kam	k'am					ham	
a:m					ta:m	t'a:m	na:m	la:m	tsa:m	ts'a:m	sa:m		ka:m		ŋa:m				ha:m	
au		p'au	mau	fau	tau	t'au	nau	lau	tsau	ts'au	sau	jau	kau	k'au	ŋau				hau	
a:u	pa:u	p'a:u	ma:u				na:u		tsa:u	ts'a:u	sa:u		ka:u	k'a:u	ŋa:u				ha:u	
ai	pai	p'ai	mai	fai	tai	t'ai	nai	lai	tsai	ts'ai	sai	jai	kai	k'ai	ŋai	kwai	k'wai	wai	hai	ai
a:i	pa:i	p'a:i	ma:i	fa:i	ta:i	t'a:i	na:i	la:i	tsa:i	ts'a:i	sa:i	ja:i	ka:i	k'a:i	ŋa:i	kwa:i		wa:i	ha:i	
a	pa	p'a	ma	fa	ta	t'a	na	la	tsa	ts'a	sa	ja	ka	k'a	ŋa	kwa	k'wa	wa	ha	a

	p	p'	m	ɬ	t	t'	n	l	ts	ts'	s	j	k	k'	ŋ	kw	k'w	w	h	
ɐ	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	ɐ
ɛ	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	ɛ
yt	—	—	—	—	tyt	t'yt	—	lyt	tsyt	ts'yt	syt	jyt	—	k'yt	—	—	—	—	hyt	—
ym	—	—	—	—	tym	—	nym	—	tsym	ts'ym	sym	jym	hym	—	—	—	—	—	hym	—
y	—	—	—	—	—	—	—	—	tsy	ts'y	sy	jy	—	—	—	—	—	—	—	—
uk	—	—	muk	fuk	tuk	t'uk	—	luk	tsuk	—	suk	juk	kuk	k'uk	—	—	—	—	huk	—
ut	put	p'ut	mut	fut	—	—	—	—	—	—	—	—	—	—	—	—	—	wut	—	—
uŋ	—	p'uŋ	muŋ	fuŋ	tuŋ	t'uŋ	nuŋ	luŋ	tsuŋ	ts'uŋ	suŋ	juŋ	kuŋ	k'uŋ	—	—	—	—	huŋ	—
un	pun	p'un	mun	fun	—	—	—	—	—	—	—	—	kun	—	—	—	—	wun	—	—
ui	pui	p'ui	mui	fui	—	—	—	—	—	—	—	—	kui	k'ui	—	—	—	wui	—	—
u	—	—	—	fu	—	—	—	—	—	—	—	—	ku	k'u	—	—	—	wu	—	—
ik	pik	—	mik	—	tik	t'ik	nik	lik	tsik	ts'ik	sik	jik	kik	—	—	—	—	—	—	—
it	pit	p'it	mit	—	tit	t'it	—	lit	tsit	ts'it	sit	jit	kit	k'it	—	—	—	—	hit	—
ip	—	—	—	—	tip	t'ip	nip	lip	tsip	ts'ip	—	jip	kip	—	—	—	—	—	hip	—
iŋ	piŋ	p'iŋ	miŋ	fiŋ	tiŋ	t'iŋ	niŋ	liŋ	tsiŋ	ts'iŋ	—	jiŋ	kiŋ	k'iŋ	—	—	—	—	hiŋ	—
in	pin	p'in	min	—	tin	t'in	nin	lin	tsin	ts'in	sin	jin	kin	k'in	—	—	—	—	hin	—
im	—	—	—	—	tim	t'im	nim	lim	tsim	ts'im	sim	jim	kim	k'im	—	—	—	—	him	—
iu	piu	p'iu	miu	—	tiu	t'iu	niu	liu	tsiu	ts'iu	siu	jiu	kiu	k'iu	—	—	—	—	hiu	—
i	—	—	—	—	ti	—	ni	—	tsi	ts'i	si	ji	—	—	—	—	—	—	—	—
ɔk	pɔk	p'ɔk	mɔk	lɔk	tɔk	—	—	lɔk	tsɔk	ts'ɔk	sɔk	—	kɔk	k'ɔk	ŋɔk	kwɔk	k'wɔk	wɔk	hɔk	—
ɔt	—	—	—	—	—	—	—	—	—	—	—	—	kɔt	—	—	—	—	—	hɔt	—
ɔŋ	pɔŋ	p'ɔŋ	mɔŋ	lɔŋ	tɔŋ	t'ɔŋ	nɔŋ	lɔŋ	tsɔŋ	ts'ɔŋ	sɔŋ	—	kɔŋ	k'ɔŋ	ŋɔŋ	kwɔŋ	k'wɔŋ	wɔŋ	hɔŋ	—
ɔn	—	—	—	—	—	—	—	—	—	—	—	—	kɔn	—	—	—	—	—	hɔn	—
ɔu	pɔu	p'ɔu	mɔu	—	tɔu	t'ɔu	nɔu	lɔu	tsɔu	ts'ɔu	sɔu	—	kɔu	—	ŋɔu	—	—	—	hɔu	—
ɔi	—	—	—	—	tɔi	t'ɔi	nɔi	lɔi	tsɔi	ts'ɔi	sɔi	—	kɔi	—	ŋɔi	—	—	—	hɔi	—
ɔ	pɔ	p'ɔ	mɔ	lɔ	tɔ	t'ɔ	nɔ	lɔ	tsɔ	ts'ɔ	sɔ	—	kɔ	—	ŋɔ	kwɔ	—	wɔ	hɔ	—
ak	—	—	—	—	tak	—	—	lak	tsak	ts'ak	sak	jak	kak	k'ak	—	—	—	—	—	—

Count Nouns Used as Mass Nouns in Perfective Sentences in Chinese:
the Study of Verb Category Switch and the 'Imperfective Paradox'*
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I. Introduction

This paper examines the category switch between diadic accomplish-
ment verbs and (diadic) activity verbs from the perspective of quantifica-
tion of the internal argument NP and claims that the function of determin-
ers in this context has implications for a linguistically motivated solution
to the 'imperfective paradox', i.e., to refine Montague's (1974) proposal
by precisely defining Bennett's (1981) so-called mysterious CLOSED
intervals and OPEN intervals in terms of functions of internal argument
NPs' determiners. This analysis not only attempts to account for the
different truth conditions underlying the two categories of verbs and the
category switch, but may also provide insight into the relationship among
quantification, time, and truth conditions in natural languages.
The category switch between accomplishment verbs and activity
verbs are of great interest in the study of verb categorization and the
'imperfective paradox' (Vendler, 1967, Dowty,1979; Vlach,1981;
Parsons,1989). For example, in examining verb classes in terms of time
schemata, Vendler (1967, p. 101-102) finds that *run* acts like an activity
verb (1a) while *run a mile* behaves like an accomplishment verb (1b).

(1) a. John *ran* .
    b. John *ran a mile.*

Vendler writes that *Run* , as an activity verb in (1a) differs from *run a mile*
in (1b) in that the former has a 'climax' while the latter does not in a
stretch of time, but his approach apparently fails to account for the switch.
In Dowty's (1979, p.62) opinion, Vendler's attempt to classify verbs,
once and for all, is misguided because he only takes surface verbs into
account. Some problems arise when verbs take objects. A verb behaves
like an activity verb when it takes mass nouns or indefinite nouns as
objects (2a & 3a), and like an accomplishment verb when it takes those
nouns with determiners (2b &3b), as indicated by the *in*-test and *for*-test:

(2) a. John ate popcorn for / * in an hour.
    b. John ate a bag of popcorn in / * for an hour.
(3) a. John built houses for / * in a month.
    b. john built three houses in / * for a month.

In -time-phrase can only modify an accomplishment verb, whereas *for*-
time-phrase only modifies an activity verb. Dowty's solution to the
problem is along the line of generative semantics: to postulate a single
homogeneous class of predicates -- state verbs plus sentential operators.

DO and BECOME, and connectives so that (2a & 3a) and (2b & 3b) have different underlying structures. DO operator underlies activity verbs and allows *in*-time-phrases, but does not allow *for*-time-phrases. On the other hand, BECOME operator underlies accomplishment verbs and permits *for*-time-phrases, but does not allow *in*-time-phrase. In (2b & 3b), the agent brought the state that a bag of popcorn became empty and the state that three houses became into existence. This seems to account for the differences between the two categories of verbs and the (un)gramati-cality of (2) and (3). Given Dowty's solution, however, it is not clear what distinctive underlying structures can be postulated for (4a, b, c & d), though both of *read* and *write* are accomplishment verbs.

    (4) a. John read a book.
       b. John was reading a book.
       c. John wrote a book.
       d. John was writing a book.

When accomplishment verbs in progressive sentences are concerned, there are two kinds of verbs: one entails the pre-existence of the object (4a & 4b), and the other does (4c & 4d). It is commonly discussed in literature that the second kind of verbs gives rise to what is called the "imperfective paradox" (Dowty, 1979; Parsons, 1989). In a broader sense, verbs like the one in (4b) also involve the 'imperfective paradox'.
    In semantics, the key difference between activity verbs and accom-plishment verbs lies in their differences in truth conditions when they are in progressive forms. Intuitively, we know that (5a) entails that John ran, but (5b) does not entail that John ran a mile. To capture the truth condi-tions of sentences in (5), Montague (1974, p.125) proposes the rule in (6).

    (5) a. John was running.
       b. John was running a mile.
    (6) If ϕ is a sentence of **L** and N an operator of **L**, then $N\phi$ is true
        $i\ \boldsymbol{U}$, if and only if $\langle\ i\ ,\{\ j:j\ \in\ \mathbf{D}A$ and ϕ is true $_{j}\boldsymbol{U}\ \}\ \rangle \in \mathsf{R}_{N}$.

L is a pragmatic language. $\boldsymbol{U}$ is a possible interpretation. i is an interval. j is a context of use. $\mathbf{D}A$ is a domain of A. R_{N} is a $\langle\ \mathbf{D}A, \mathbf{S}\mathbf{D}A\ \rangle$–relation, where $\mathbf{S}\mathbf{D}A$ is the power set of $\mathbf{D}A$. 'Being true $i\ \boldsymbol{U}$ ' means 'being true at an interval under a possible interpretation'. 'Being true $_{j}\boldsymbol{U}$ means' being true in the context of use under a possible interpretation'.
    This rule has problems with both activity verbs (details in Parsons, 1989) and accomplishment verbs. According to Montague's rule, (4d) is true under $\boldsymbol{U}$ iff j is a neighborhood or interval that contains i and throughout which (4c) is true. The paradox is: if the neighborhood or interval contains i', i, ii such that $i' < i < ii$, (4d) is true at i entails that (4c) is true at i' since $i' < i$ and (4c) is true throughout $i' < i < ii$.
    To improve Montague's analysis, Bennett (1981, pp.15) proposed (7)

as the truth condition for progressive sentences in English:

(7) **Jones is leaving** is true at interval of time I if and only if I is
a moment of time, and there exists an interval of time I' such
that I' is an open interval, I is included in I', and Jones is in
the extension of **leave** at I'.

In this analysis, Bennett makes a distinction between an OPEN interval
and a CLOSED interval; the former has no endpoints whereas the latter
has endpoints. Without endpoints, an OPEN interval describes a process
which is going on without ending. With endpoints, a CLOSED interval des-
cribes an event since endpoints indicate the inception and completion of
the activity. Therefore, the fact that (4b) is true does not imply (4a) is true.
As Parsons (1989) comments, an OPEN interval does not culminate so
that Bennett's analysis avoids the imperfective problem. However, there
is a question of how one can tell if an interval is OPEN or CLOSED when
facing it. This question may not be fully answered without appropriate
consideration of the function of the internal argument NP's determiner.

In an analysis of the progressive in English with event semantics,
Parsons (1989) proposes two notions: *culminating* -- 'Cul (e, t)' means
that e is an event that culminates at time t, and *holding* -- 'Hold (e, t)'
means that either e is a state and e's object is in state e at t, or e is an
event which is in development at t. Given Parsons' analysis, (4c) and
(4d) may be represented in (8a) and (8b) respectively :

(8) a. $(\exists t)\{t < \text{now} \& (\exists e)[\text{Writing}(e) \& \text{Subject}(e, \text{John}) \&$
$\text{Object}(e, \text{a book}) \& \text{Cul}(e, t)]\}$

b. $(\exists t)\{t < \text{now} \& (\exists e)[\text{Writing}(e) \& \text{Subject}(e, \text{John}) \&$
$\text{Object}(e, \text{a book}) \& \text{Hold}(e, t)]\}$

The difference between the nonprogressive form (4c) and the progres-
sive form (4d) of accomplishment verbs is a difference between *culmi-
nating* and *holding* in (8). Parsons (1989, pp. 235) claims that the differ-
ence between accomplishment verbs and activity verbs (event verbs and
process verbs in Parsons' terms) lies in that the latter is a series or amal-
gam of events. Thus, process verbs are treated as a special kind of event
verbs. Both the nonprogressive and progressive sentences of activity
verbs are represented by *culminating* and *holding* respectively as in (9).

(9) a. John ran.
$(\exists t)\{t < \text{now} \& (\exists e)[\text{Running}(e) \& \text{Subject}(e, \text{John}) \&$
$\text{Cul}(e, t)]\}$

b. John was running.
$(\exists t)\{t < \text{now} \& (\exists e)[\text{Running}(e) \& \text{Subject}(e, \text{John}) \&$
$\text{Hold}(e, t)]\}$

One problem for Parsons' approach is that given the identical representations of (8b) and of (9b), we can not tell why (9b) entails (9a), while (4d /8b) does not entail (4c/8a). Another problem is with the notions of *culminating* and *holding*. It seems that it is not psychologically real to say that *e* culminates at *t* in nonprogressive sentences with both accomplishment and activity verbs, whereas *e* does not culminate at *t* in progressive sentences with these verbs. Data from both Chinese and English seems to suggest that culminating does exist in progressive sentences of both categories of verbs, even in terms of logical relation.

II. Count Nouns Used as Mass Nouns in Chinese Perfective Sentences

The kind of verb category switch discussed above generally involves the switch from activity verbs to accomplishment verbs. This section will discuss the switch from accomplishment verbs to activity verbs observed in Chinese. A perfective sentence in Chinese is marked by the aspect marker *le*, which follows the verb and precedes the object phrase (Wang, 1981; Lü, 1980), as is illustrated in (10).

(10) a. Zhangsan kan *le*　yi　ben　　　　　　shu.
　　　　Zhangsan read Asp. one M(easure) W(ord).　book
　　　　Zhangsan (has) read a book.
　　b. Zhangsan xie　*le*　yi　feng　xin.
　　　　Zhangsan write Asp. one MW.　letter.
　　　　Zhangsan (has)　wrote(written) a letter.

In a perfective sentence in Chinese, a determiner is usually required for a count noun object, such as *yi ben* and *yi feng* in (10). Determiners in Chinese are of the structure: numeral + measure word. Measure words differ from noun to noun, as is seen in (10) which has *ben* for books and *feng* for letters. It is noticed that bare nouns are also used in perfective sentences in Chinese, as is shown in (11). As the English translations of (11) indicate, the bare nouns in these sentences are ambiguous between a plural reading and a non-plural reading. The bare nouns may have definite (plural or singular) reading in a given context.

(11) a. Zhangsan kan　*le*　　shu.
　　　　Zhangsan read Asp.　book.
　　　　Zhangsan has read some books / a part of a book / the book.
　　b. Zhangsan xie　*le*　　xin.
　　　　Zhangsan write Asp.　letter.
　　　　Zhangsan has written some letters / a part of a letter / the letter.

However, it is the non-plural reading that is of interest here. With the non-plural reading, bare count nouns in perfective sentences behave more like mass nouns than count nouns. Syntactically, such nouns do not have any overt determiners. Semantically, bare count nouns, such as

shu (book) and *xin* (letter), can only have the interpretation of 'a part of' a book or a letter. A typical context where a perfective sentence with a bare count noun as a mass noun is used is when a speaker does not want to lie but wants/has to be vague about the quantity for some reason. For example, when a father has asked a son to read a book or write a composition and when he checks the progress later (12), his son will answer with the sentences in (13) instead of those in (14), if he has not finished any of the assignment.

(12) a. Wo yao ni kan   de   shu ni kan le   ma ?
       I   want you read R(elative) M(arker) book you read Asp. QM.
       Have you read the book that I asked you to read ?
    b. Wo yoa ni xie de wenzhang ni   xie le   ma ?
       I   want you write RM composition you write Asp. Q(uestion)M
       Have you written the composition that I asked you to write ?

(13) a. Wo kan le   shu .
       I   read Asp. book.
       I have read a part of the book / the book.
    b. Wo xie le   wenzhang.
       I write Asp. composition.
       I have written a part of the composition / the composition.

(14) a. Wo kan le   na   ben shu .
       I   read Asp. that MW. book.
       I have read the book.
    b. Wo xie le   na   pian wenzhang.
       I write Asp. that MW. composition.
       I have written the composition.

The translations of (13) and (14) indicate why the son will answer the father questions with (13) instead of (14). Under this scenario, the son's answer in the form of (14) means lying to his father, while his answer in the form of (13) is not a lie. In answering his father with (13), he leaves the burden of interpreting the bare NP to his father. On the other hand, if he answers with (14) and his father finds out the fact, he will be punished for lying. Perfective sentences with bare nouns as mass nouns and with accomplishment verbs behave exactly like sentences with activity verbs with regard to truth conditions.

(15) a. John drank water.
    b. John drank *a glass of* water.

(16) a. Zhangsan kan le shu.
      Zhangsan read Asp. book
      Zhangsan read a part of a book.
    b. Zhangsan kan le   *yi zhang* shu.
      Zhangsan read Asp. one MW.   book
      Zhangsan read a chapter of a book.

(15b) entails (15a), and (16b) entails (16a), but (15a) does not entail (15b) nor does (16a) entail (16b). No matter how little water John drank, it is true that he drank water. It is also true that Zhangsan read (an uncertain part of a) book, no matter how little he read of a book. The conscious choice between a bare noun and a noun with a determiner in Chinese perfective sentences appears to suggest that determiners are intuitively involved in verb category switch and in the relationship among quantification, time and truth conditions.

III. A New Definition of OPEN Intervals and CLOSED Intervals

A comparison of (1a & 2a) and (1b & 2b) indicates that the switch from activity verbs to accomplishment verbs in English involves adding an NP with a determiner -- a mile -- in (1) or adding a determiner to a bare NP -- a bag of -- in (2). On the other hand, a comparison of sentences like (16a) and (16b) shows that the switch from accomplishment verbs to activity verbs in perfective sentences in Chinese involves subtracting a determiner -- yi zhang -- in (16). The direction of switch is completely decided by the adding or subtracting a determiner, namely, from Ø to a bag in (2) in English and from yi zhang to Ø in (16) in Chinese, if we assume that NP is of the structure 'determiner+noun' and mass noun may be of the structure 'Ø+noun' in both English and Chinese (Carlson, 1977; Huang, 1982). The involvement of determiners in the directionality of the switch between accomplishment and activity verbs suggests determiners' role in characterizing these two categories of diadic verbs.

The category switch in (15) clearly demonstrates that the determiner a glass of makes possible the switch from an activity verb to an accomplishment verb, while the null determiner Ø is always present in diadic activity verb phrases. This behavior of Ø is supported by the evidence in Chinese perfective sentences in (16). The evidence appears to suggest a relationship between quantification and time, since the categorization of verbs is viewed in terms of a time schema in Vendler (1967) or in any Aristotelian approach (Parsons, 1989). A natural hypothesis derived from this observation is that determiners may have functions over both nouns and verbs in a time schema that they specify the verb-extension and noun-reference relation as one-one, one-many or one-Ø, where Ø is not empty but underspecified with regard to count.

More specifically, when a determiner specify the count of references of the NP in question, it also specifies the count of the action denoted by the verb. When the count of the action is specified, then the action has clear inception(s) and completion(s). There is a stretch of time between the inception and the completion of the action in question. This stretch of time is a CLOSED interval, since there is a starting point and an ending point in Bennett's terms (1981). When the count of the action denoted by the verb is not specified by a determiner, then the action at least does not have clear completion. Consequently, there is a stretch of time without an endpoint. This unspecific stretch of time is an OPEN interval.

The stretch of time between an inception and a completion specified by a determiner is a CLOSED interval. At the same time, an inception and a completion of the action specified by a determiner constitutes one count of an action. This is the case with an accomplishment verb such as *read* in (4a), which is repeated here as in (17), where the count of both

(17) John read a book.

the reference of the NP and the action denoted by the verb is clearly specified, that is, both are *one*. There is a one-one relation between the count of the action denoted by the verb *read* and the count of reference of the NP *a book* . This is characteristic of accomplishment verbs.

In activity verbs, $\emptyset$ determiner may fail to specify either the count of reference of the NP or the count of the action denoted by the verb (18a & 18b), while other determiners may specify one-one (18c) and one-many (18d) relations between the extension of the verb and the reference(s) of an NP, as is discussed in detail in Zhou (in preparation).

(18) a. Zhangsan kan le shu.
Zhangsan read Asp. book
Zhangsan read *(a part of a) book.
b. John drank water
c. John pushed one book.
d. John pushed two books.

In (18), $\emptyset$ not only fails to specify a count of the reference for a mass noun (18b), but also fails to specify a count of the reference for a count noun (18a), resulting in a count noun being analyzed as a mass noun. This unspecificness of $\emptyset$ determiner also contributes to the category switch from accomplishment verbs to activity verbs, as observed in Dowty (1979, pp.62-63). This is illustrated in (19) with the help of *in*-test and *for*-test.

(19) a. John built *a* house in a month.
b. *John built houses in a month.
c. John built houses for a month.

(19a) with the determiner *a* passes the *in*-test. (19b) with a bare plural noun fails the *in*-test, but (19c) with a bare plural noun passes the *for*-test. This phenomenon is completely predictable by the analysis developed in this paper, since bare plural noun is of the structure: $\emptyset$ + count noun, where $\emptyset$ is unspecific with regard to count.

IV. Generalized Quantifiers and Predicate Properties

Given our definition of OPEN intervals and CLOSED intervals, then quantifier behavior is expected to be different in different intervals of time with different categories of verb phrases. Some evidence for quantifier

behavior with activity verb phrases in OPEN intervals is found in (20).

(20) a. John pushed a part of a book.
b. John pushed a book.

If (20a) is true at an interval *I* , then it entails that (20b) is true at interval *I.*
The proper noun *John* is characterized as a *monotone increasing*
quantifier in Barwise and Cooper (1981, pp.184), which is defined below.

(21) A quantifier Q is *monotone increasing* (mono ↑) if X ∈ Q and
X ≤ Y ≤ E implies Y ∈ Q (i.e. for any set X ∈ Q, Q also contains all
the supersets of X (≤ = 'inclusion' in this paper).).

Notice the property of such predicates. Let X be *pushed a part of a book*
and Y be *pushed a book* and then We find that the part-and-whole rela-
tion in (20) is reflected as a subset-and-superset relation in the predicates.
The predicates made of activity verbs and parts and wholes in (20)
appear to have the property of *monotone increasing,* as shown in (22).

(22) a. λx [John pushed x] (λx = *a part of a book.*)

b. λy [John pushed y] (λy = *a book* .)
(23) If NP VP(verb+part)1, then NP VP (verb+ whole)2 (NP is mon ↑.)
(24) If John pushed a part of a book, then he pushed a book.

Informally, this can be tested by (23) developed in Barwise and Cooper
with a little modification here. (20a)'s entailment of (20b) is valid in (24).
However, we find upon further examination that (20b) also entails
(20a). The validity of this entailment relation can also be tested in (26)
when we reverse the order of the two VPs in (23) as in (25).

(25) If NP VP(verb+whole)2, then NP VP (verb+ part)1 (NP is mon ↓.)
(26) If John pushed a book, then he pushed a part of a book.
(27) A quantifier Q is *monotone decreasing* (mono ↓) if X ∈ Q and
Y ≤ X ≤ E implies Y ∈ Q (i.e. for any set X ∈ Q, Q also contains all
the subsets of X.) (Barwise and Cooper, 1981, p.184).

(26) exactly violates Barwise and Cooper's prediction that the reverse
implication does not hold for a *monotone increasing* quantifier. The NP
John in (26) seems to behave like a *monotone decreasing* quantifier as
defined in (27), which is informally expressed in the test in (25). As ex-
pressed in (25) and (26), X be *pushed a book* and Y be *pushed a part of
a book,* and then we find that the predicates made of activity verbs and
parts and a wholes have the property of *monotone decreasing* in
addition to the property of *monotone increasing,* since there are mutual

entailments between (20a) and (20b), if we assume that *John* is a constant *monotone increasing* quantifier [1].

Next, we look at the properties of predicates made of accomplishment verbs and parts and wholes in relation to the same *monotone increasing* quantifier *John* in a CLOSED interval with the sentences in (28).

(28) a. John read a page / chapter of a book.
λx [John read x]
b. John read a book.
λy [John read y]

It is clear that (28a) does not entail (28b). This can be informally tested with (23) in (29), which shows that there is no valid entailment.

(29) ?If John read a page / chapter of a book, then he read a book.
(30) If John read a book, then he read a page / chapter of a book.

However, we notice that there is a relation that holds between (28b) and (28a), namely, (28b) entails (28a). The validity of this entailment is shown in (30) with the test in (25). This indicates that predicates made of accomplishment verbs and parts and wholes only have the property of *monotone decreasing* in CLOSED intervals, as compared with predicates made of activity verbs and parts and wholes, which have the properties of both *monotone increasing* and *monotone decreasing* in OPEN intervals.

However, if it is assumed that the properties of the predicates made of the two categories of verbs discussed above are the unmarked cases, then natural languages often have marked cases. For example, there are progressives in both Chinese and English. The English *be + verb + ing* form has a counterpart in Chinese, which is *zai + verb*. The progressive marker generally specifies that the interval of time is OPEN, thus causing a determiner's function to default, i.e., not to specify the count of actions denoted by verbs. Another case is that a determiner may specify the inception and completion of the action denoted by an activity verb.

First, predicates in progressive forms of both categories of verbs are examined here. Predicates made of activity verbs and parts and wholes seem to have the same properties in the progressive form (31) as in the corresponding nonprogressive form (20).

(31) a. John was pushing a part of a book.
b. John was pushing a book.

The predicates still have the properties of *monotone decreasing*, since (31b) entails (31a), and of *monotone increasing*, since (31a) entails (31b), and the progressive forms (31a) and (31b) imply (20) [2]. This means that the activity verbs in progressive and the nonprogressive have exactly the same truth conditions, contrary to Parsons' (1989)

'culminating and hold' difference in representation.

Predicates of accomplishment verbs and parts and wholes in the progressive forms in (32) have the same property as the nonprogressive forms in (28). (32c) entails (32b) and (32a), and (32b) entails (32a). This is characteristic of *monotone decreasing.*

    (32) a. John was reading a page of a book.
          b. John was reading a chapter of a book.
          c. John was reading a book.

These predicates in progressive forms do not imply those in the corresponding nonprogressive forms in (28), but they exhibit the property of *decreasing quantification,* which is defined in (33).

    (33) A predicate of the structure 'verb+NP', denoting Q, decreases to a number of predicates of the same structure, X, Y, Z where. $X \leq Y \leq Z \leq Q$, and Q only imply the minimal subset X.

Let Q stands for *reading a book* , Z for *reading a chapter of a book* , Y for *reading a page of a book* , and X for *reading a part of a page of a book,* and then (32) implies (34).

    (34) John read at least a part of a page of a book.
    (35) a. John was reading a book. He read a chapter/page/part of it.
          b. John was reading a book. ? He did not read any part of it.

The progressive sentences of accomplishment verbs also has the property of culmination, which is logically characterized in (33) and psychologically characterized in (34) and (35). The difference is whether the culmination is explicitly specified by a determiner or logically implied.

Moreover, (33) underlies the truth conditions for sentences with Ø determiner in (15a) and (16a). Any predicate with Ø+mass noun as its internal argument NP may denote a minimal subset since Ø does not specify a quantity and a mass noun's extension is decomposable to atoms (Link, 1983).   According to Link, mass nouns have the property of cumulative reference as shown in (36a). *a* and *b* can be the minimal subset of water, i.e. atoms of water, though they need not be.

    (36) a. If *a* is water and *b* is water, then the sum of *a* and *b* is water.
          b. If the sum of *a* and *b* is water, then *a* is water and *b* is water.

On the other hand, mass nouns also have the property of distributive reference (McCawley, 1981) as expressed in (36b). For example, *a glass of water* may be the sum of *a* and *b* . Assuming *a* and *b* are the minimal subset of water denoted by Ø+mass nouns in predicates which also denote minimal sets, we see clearly why (15b) entails (15a) .

The importance of collective, cumulative and distributive references in

verb categorization is also found in cases where an activity verb (37) is ambiguous between an activity (collective) reading (38a) and an accomplishment (cumulative) reading (38b) with completely different truth conditions as represented in interval semantics (details in Zhou).

(37) John pushed two carts.
(38) a. (37) is true at I iff I is an interval of time, and there exists an interval of time I' such that I' is an OPEN interval, I is included in I',and John is in the extension of **pushed two carts** at I'.
   b. (37) is true at I iff I is an interval of time, and there exist intervals of time I' and I'' such that both I' and I'' are CLOSED intervals, $I'' < I' < I$ and John is in the extension of **pushed a cart** x at I'' and of **pushed a cart** y at I' respectively $(x \neq y)$.

The different truth conditions exactly lies in that in a CLOSED interval (38b) the determiner specifies the count of the NP references as well as the count of verb extensions, and thus assigns them a one-one relation, whereas in an OPEN interval the determiner fails to specifies the count of the verb extension, and thus assigns them a one-many relation.

V. Conclusion

Adding a determiner to or subtracting it from an internal argument NP not only causes verb category switch but also dictates the directionality of the switch between activity verbs and accomplishment verbs in both Chinese and English. This observation suggests that determiners have a function over both the internal argument NP and the verb in terms of specifying the count of the reference(s) of the NP and specifying or not specifying the count of the action(s) denoted by the verb, and thus assign them an n-place relation. A linguistically motivated analysis is proposed to redefine Bennett's (1981) so-called mysterious analysis. In this new analysis, a CLOSED interval is defined as an interval within which both the inception and completion of the action(s) denoted by a verb is specified by a determiner, while an OPEN interval is an interval within which at least the completion of the action denoted by the verb is not specified by a determiner. The function of determiners is also seen in the properties of predicates. Predicates made of activity verbs and parts and wholes have the properties of both *monotone increasing* and *monotone decreasing* in OPEN intervals. In contrast , predicates made of accomplishment verbs and parts and wholes only have the property of *monotone decreasing* in both OPEN and CLOSED intervals, and in addition such predicates also have the property of *decreasing quantification* in OPEN intervals. In short, this analysis not only attempts to account for the different truth conditions underlying the two categories of verbs and the category switch, but may also provide insight into the relationship among quantification, time, and truth conditions in natural languages.

Footnotes:

* This paper started as a term paper for a seminar on noun phrases in Spring 1990, and is now being developed into a part of my dissertation in preparation. I would like to thank Barbara Abbott for her helpful comments on drafts of this paper. I am solely responsible for any errors.

[1] The data here seem to raise a problem -- whether a quantifier is *monotone increasing* or *monotone decreasing* depends on whether a predicate is *monotone increasing, monotone decreasing* or both.

[2] The *monotone decreasing* property is more complicated for activity verbs. Mutual entailments hold within the progressive forms, i.e., between (31a) and (31b), but do not hold between progressive forms and non-progressive forms, i.e., between (31a &31b) and (20) relative to I. For example, (20) only implies (31b) (31a) at I', where $I' < I$.

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WH-PHRASES IN-SITU AND
SPECIFICITY EFFECTS IN CHINESE NOUN PHRASES[1]
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Huang (1982) observes that a **wh**-element may appear in a Chinese noun phrase when it is not preceded by a determiner:[2]

(1) **Lisi mai-le** [$_{NP}$ **san   ben   <u>sheide</u>   shu**]?
    Lisi buy ASP   three CL   whose   book
    'Whose three books did Lisi buy?'

But when the **wh**-element is preceded by a determiner, the noun phrase will be ill-formed:

(2)***Lisi mai-le** [$_{NP}$ <u>**na**</u>   **san   ben   <u>sheide</u>   shu**]
    Lisi buy ASP   that three CL   whose   book

The grammatical contrast between (1) and (2) is usually attributed to specificity effects in the sense that **wh**-elements can be raised or extracted from non-specific noun phrases, but not from specific ones. In order to account for such specificity effects, Fiengo and Higginbotham (1981:406) propose the following Specificity Condition at LF to bar free variables within specific noun phrases:

(3)   Specificity Condition
    "*...x_i..., if x_i is free in a specific NP"

Under this Condition, the **wh**-element **sheide** in (1) can be bound from outside NP by the Q(uestion)-marker in COMP, since the noun phrase is nonspecific:[3]

(4) [$_{CP}$ Q_i [$_{IP}$ **Lisi mai-le** [$_{NP}$ **san   ben   sheide$_i$ shu**]]]
              Lisi buy ASP   three CL   whose   book

But the same **wh**-element in (2) cannot be bound from outside NP, because the noun phrase is specific. As **sheide$_i$** is free in this specific noun phrase, the sentence is ruled out:

(5)*[$_{CP}$ Q_i [$_{IP}$ **Lisi mai-le** [$_{NP}$ **na   san   ben   sheide$_i$**
              Lisi buy ASP   that three CL   whose
    shu]]]
    book

Although this semantically-defined Specificity Condition is intuitively plausible, it fails to predict the well-formedness of (6), where the wh-element **sheide**$_i$ is free within the specific noun phrase but bound from outside NP by the Q-marker:[4]

(6) [$_{CP}$ Q$_i$ [$_{IP}$ **Lisi mai-le** [$_{NP}$ **Mali-de san   ben sheide**$_i$
              Lisi buy ASP   Mary's   three CL   whose
    shu]]]
    book
    'Whose three books owned by Mary did Lisi buy?'

In addition, there exist problems with formulating specificity and relating such a condition to general constraints on syntactic movement (cf. Hudson 1989).[5]
    In this paper, I argue that the specificity effect observed in the Chinese noun phrases can be captured by the Generalized Binding theory (Aoun 1985, 1986) and a DP hypothesis of noun phrase (see among others, Abney 1987, Fukui and Speas 1986, Tang 1990).
    It is a well-known fact that English noun phrases require agreement between determiners and head nouns. But Chinese noun phrases do not have such an agreement, as shown by the following contrast:

(7) a. **that book / those three books**
    b. **na   ben shu / na   san   ben shu**
       that CL book   that three CL book

This difference can be treated as a parametric one in the sense that there may exist **AGR** in the English noun phrase, but not in the Chinese noun phrase. This analysis captures a typological difference between English and Chinese regarding the parallelism between sentence and noun phrase; i.e. English has both subject-verb agreement and determiner-noun head agreement, but Chinese has neither of them. In other words, both sentential **AGR** and nominal **AGR** may exist in English, but not in Chinese.[6]
    There is another important difference between English and Chinese noun phrases; i.e. Chinese allows the co-occurrence of possessive and determiner in the same noun phrase, but English does not:

(8) a.*John's those three books**
    b. **Lisi-de na   san   ben   shu**
       Lisi's that three CL   book

Assuming that possessives in the English noun phrase get Case from the nominal **AGR**, on a par with Case assignment to subjects from the sentential **AGR**. The badness of (8a) can then be treated as a violation of the doubly-filled D filter suggested by Abney (1987). This filter prevents the nominal **AGR** from occurring in a D-node that is already occupied by a determiner. That is to say, the presence of **those** in (8a) results in the absence of **AGR** in the same noun phrase. As a consequence, the possessive **John's** cannot get Case in-situ and the co-occurrence of **John's** and **those** is then ruled out by the Case Filter:[7]

(9) a. [$_{DP}$ **John's** [$_{D'}$ [$_D$ **AGR**] [$_{NP}$ **three books**]]]
    b.*[$_{DP}$ **John's** [$_{D'}$ [$_D$ **those**] [$_{NP}$ **three books**]]]

Another possible analysis of (8a) is to treat the determiner **those** as being base-generated in the Spec of DP (Hudson 1989). Under this analysis, **AGR** is the head of DP, which not only assigns Case to the possessive, but also regulates the agreement between NP and determiner in a way directly parallel to the agreement between VP and Spec of IP. Given this analysis, (8a) would be ruled out by the ban against the doubly-filled Spec of DP:

(10) a. [$_{DP}$ **John's** [$_{D'}$ [$_D$ **AGR**] [$_{NP}$ **three books**]]]
     b. [$_{DP}$ **those** [$_{D'}$ [$_D$ **AGR**] [$_{NP}$ **three books**]]]
     c.*[$_{DP}$ **John's those** [$_{D'}$ [$_D$ **AGR**] [$_{NP}$ **three books**]]]
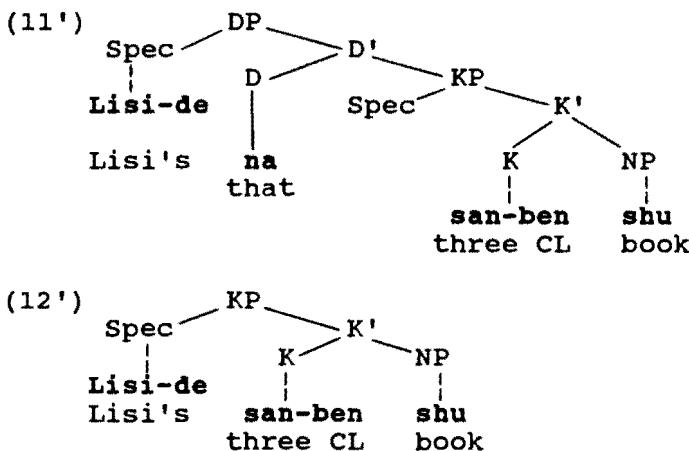
Now the question is how the possessive **Lisi-de** in (8b) gets Case. It cannot get Case from the nominal **AGR**, given that **AGR** is absent in the Chinese noun phrase. It may possibly get Case from the determiner **na**, assuming that the determiner is the head of DP in Chinese. This Case may be treated as a type of "inherent Case" assigned under the Uniformity Condition posited by Chomsky (1985); i.e. the determiner **na** assigns a "possessional θ-role" to **Lisi-de** and Case-marks **Lisi-de** at D-structure:

(11) [$_{DP}$ **Lisi-de** [$_{D'}$ [$_D$ **na**] [$_{NP}$ **san   ben   shu**]]]
     Lisi'   that   three CL   book

If **Lisi-de** in (11) could get Case from the determiner **na** in D, how can we account for the Case assignment in a corresponding noun phrase without a determiner? In other words, how does **Lisi-de** in (12) get its Case?

(12) **Lisi-de san   ben shu**
   Lisi's three CL book
   'Lisi's three books'

Before answering this question, let us refer to the
structures of the noun phrases in (11) and (12), which
should be different under a DP analysis of Chinese noun
phrases (cf. Tang 1990):[8]

(11')
```
           DP
     Spec /    \ D'
      |   D /    \ KP
   Lisi-de     Spec /   \ K'
   Lisi's   na            K /   \ NP
            that           |       |
                        san-ben  shu
                        three CL  book
```

(12')
```
           KP
     Spec /    \ K'
      |   K /    \ NP
   Lisi-de  |       |
   Lisi's san-ben  shu
         three CL  book
```

That is to say, the noun phrase in (11) is a DP, while
the noun phrase in (12) is a KP. The argument for their
difference runs as follows: i) as DP is the maximal
projection of D and determiner is the head of DP in
Chinese, the category of a Chinese noun phrase depends on
the presence or absence of a determiner; ii) if a noun
phrase has a determiner, as in (11), it should be a DP;
if a noun phrase lacks a determiner, as in (12), it can
not be a DP. Thus, the analysis that **Lisi-de** in (11)
gets Case from the determiner **na** still holds. As for the
Case marking in (11), we may say that the classifier **san-
ben** assigns Case to the possessive **Lisi-de** under the
Uniformity Condition.[9]
   If the English possessive in the Spec of DP may get
Case from **AGR** in D and the Chinese possessive in the Spec
of DP may get Case from determiner in D, the natural
hypothesis is to assume that the determiner in Chinese
noun phrases shares the same functional role with **AGR** in
English noun phrases; i.e. they may act as the **SUBJECT** of
noun phrases in the two respective languages. If this
line of reasoning is plausible,then the specificity
effect observed in the Chinese noun phrases can be nicely

captured within the Generalized Binding Theory.

First, let us consider the Chinese noun phrase in (1), whose S-structure and LF representation are given in (13):

(13) a.

```
            KP
       Spec    K'
          K        NP
          |
      san-ben   sheide shu
      three CL  whose  book
```

b. [$_{CP}$ Q$_i$ [$_{IP}$ **Lisi mai-le** [$_{KP}$ [$_{K'}$[$_{K}$ **san-ben**] [$_{NP}$ **sheide$_i$**
        Lisi buy-ASP   three CL   whose
   shu]]]]]
   book

In (13) there is no SUBJECT for the **wh**-element **sheide$_i$** in KP, as no possessive appears in the Spec of KP. So KP is not a governing category for **sheide$_i$**. Although **Lisi** is a SUBJECT in IP, it is not accessible to **sheide$_i$**, because coindexing **Lisi** with **sheide$_i$** would violate Principle C; i.e. **sheide$_i$** would be A-bound by **Lisi**. Since **sheide$_i$** lacks an accessible SUBJECT in both KP and IP, the whole sentence becomes a governing category for **sheide$_i$** (Chomsky 1981, 1985). Hence, **sheide$_i$** is A'-bound within this governing category by **Q$_i$** in COMP, and the well-formedness of (13) is explained.
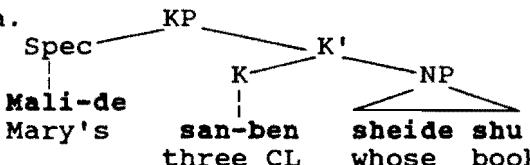
In contrast to (1) or (13), there is an accessible SUBJECT for the **wh**-element **sheide** in (2), i.e. the determiner **na** in D. The S-structure and LF representation of (2) are shown in (14):

(14) a.

```
              *DP
        Spec       D'
             D         KP
             |     Spec     K'
             na        K       NP
                       |
                   san-ben   sheide shu
                   three CL  whose  book
```

b.*[$_{CP}$ Q$_i$ [$_{IP}$ **Lisi mai-le** [$_{DP}$ [$_{D'}$[$_{D}$ **na**] [$_{KP}$ [$_{K'}$
        Lisi buy-ASP   that
   [$_{K}$ **san ben**] [$_{NP}$ **sheide$_i$ shu**]]]]]]]]
      three CL   whose book

Assuming that **D**, being a functional head, is not an A-position, on a par with **INFL** at the sentential level (cf. Aoun 1985). Thus, coindexing the **wh**-element **sheide**$_i$ with the determiner **na** in (14) will not result in a Principle C violation. Since DP in (14) contains **sheide**$_i$, its governor **san-ben** and its accessible SUBJECT **na**, DP is a governing category for **sheide**$_i$. Given that **sheide**$_i$ is not A'-bound within DP, the sentence is ruled out by Principle A. Therefore, the ill-formedness of (14) is also explained.

The above analysis also accounts for the well-formedness of (6) though its noun phrase is specific. The S-structure and LF representation of (6) are shown in (15):

(15) a.

```
                       KP
           Spec              K'
           |          K          NP
         Mali-de      |       sheide shu
          Mary's    san-ben   whose  book
                    three CL
```

b. [$_{CP}$ Q$_i$ [$_{IP}$ Lisi mai-le [$_{KP}$ Mali-de [$_{K'}$[$_K$ san-ben]
          Lisi buy-ASP   Mary's   three CL
[$_{NP}$ sheide$_i$ shu]]]]]]
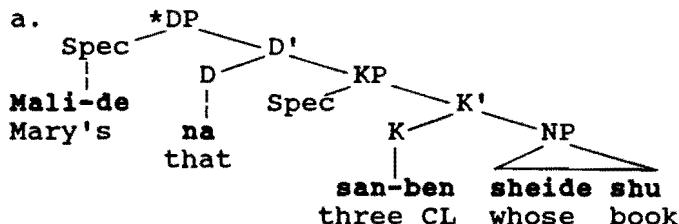   whose   book

(15) has a similar explanation as (13). That is to say, there is no accessible SUBJECT in both KP and IP for the **wh**-element **sheide**$_i$ in (15), because coindexing the KP SUBJECT **Mali-de** or IP SUBJECT **Lisi** with **sheide**$_i$ would violate Principle C (as both **Mali-de** and **Lisi** are in A-position).[10] Therefore, the governing category for **sheide**$_i$ in (15) is the whole sentence, and **sheide**$_i$ is A'-bound by Q$_i$ in COMP.

The above analysis further explains the ill-formedness of the sentence like (16), which is exactly the same as (15), except that the former has a determiner, but the latter does not:

(16) *Lisi mai-le Mali-de na san ben sheide shu
     Lisi buy ASP Mary's that three CL whose book

The S-structure and LF representation of (16) are shown below:

(17) a.

```
            *DP
      Spec      D'
              D     KP
Mali-de       |   Spec    K'
Mary's        na        K     NP
              that       |
                      san-ben  sheide  shu
                      three CL whose  book
```

b.*[_CP Q_i [_IP **Lisi mai-le** [_DP **Mali-de** [_D' [_D **na**]
      Lisi buy-ASP   Mary's   that
[_KP [_K' [_K **san-ben**][_NP **sheide_i shu**]]]]]]]]
    three CL   whose   book

(17) has a similar account as (14). That is to say,
there is an accessible SUBJECT in DP for the **wh**-element
sheide_i in (17), i.e. the determiner **na** in D. Notice
that coindexing the determiner **na** with **sheide_i** in (17)
will not result in a Principle C violation in the sense
that **sheide_i** will not be A-bound by **Mali-de** though **Mali-
de** is in the Spec of DP. This is because AGR is absent
in Chinese noun phrases and we would not expect a
coindexing relation between **na** in D and **Mali-de** in the
Spec of DP. In other words, DP in (17) is a legitimate
governing category for **sheide_i**, as it contains its
governor **san-ben** and accessible SUBJECT **na**. Since
sheide_i is not A'-bound within its DP governing category,
the sentence is then ruled out as a violation of
Principle A.

From the discussion of the Chinese noun phrases
above, we may find that it is determiner in D that
decides the domain in which a **wh**-element in a noun phrase
should be A'-bound. If this is true, we should expect
the similar case at the sentential level, if the
parallelism between DP and IP is taken seriously. As a
matter of fact, this prediction is borne out, as shown by
the grammatical contrast between the following two
sentences (cf. Huang 1982):

(18) a. **Lisi tao shei zui heshi**?
      Lisi marry who most appropriate
     'Whom Lisi should marry is most appropriate?'
  b.***Lisi tao-le shei zui heshi**
      Lisi marry-ASP who most appropriate

Let us first consider (18b), whose LF form is given in
(18b'):

(18b') *[$_{CP}$ Q$_i$ [$_{IP}$ [$_{IP}$ Lisi [$_{I'}$.[$_I$ tao-le][$_{VP}$[$_{V'}$ e shei$_i$]]]]
                Lisi   marry-ASP   whom
      zui heshi]]
      most appropriate

Assuming Huang's (1982) proposal that the aspect marker
le is base-generated in **I**. Then a V-to-I movement is
obligatory in (18b').[11] On a par with **AGR** in the English
IP, the aspect marker **le** appears to be "the most
prominent element" in the Chinese IP in the sense that **le**
may act as **SUBJECT** of IP and assign Case to **Lisi** in the
Spec of IP. Given that **I**, being a functional head, is
not an A-position and no coindexation relation exists
between **le** and **Lisi** (due to the lack of **AGR** in Chinese),
coindexing the **wh**-element **shei**$_i$ with **le** will not violate
Principle C. As a result, **le** is an accessible SUBJECT to
shei$_i$, and IP is its legitimate governing category.
Since **shei**$_i$ is not A'-bound within IP, (18b) is ruled out
by Principle A.
     In contrast with (18b), (18a) does not contain the
aspect marker **le**. Therefore, the matrix subject in (18a)
can be treated as a VP rather than an IP, as there is no
evidence for the V-to-I movement in (18a).[12] The LF form
of (18a) is given below:

(18'a) [$_{CP}$ Q$_i$ [$_{IP}$ [$_{VP}$ Lisi[$_{V'}$.[$_V$ tao][$_{NP}$ shei$_i$]]] zui
               Lisi   marry   whom   most
      heshi]]
      appropriate

By the same argument presented above, there is no
accessible SUBJECT for the **wh**-element **shei**$_i$ in both VP
and matrix IP: i) in VP, coindexing **shei**$_i$ with its
subject **Lisi** would violate Principle C, as **shei**$_i$ would be
A-bound by **Lisi**; ii) in IP, coindexing **shei**$_i$ with the
subject 'Lisi tao shei' would violate the i-within-i
Condition. Hence, the lack of an accessible SUBJECT in
both VP and IP makes the whole sentence a governing
category for **shei**$_i$, and **shei**$_i$ then is A'-bound by Q$_i$ in
COMP.
     Finally, let us take a look at the application of
the above analysis to the specific English noun phrase in
(19), which is similar to (6) or (15):[13]

(19) a. **Who saw John's three pictures of whom?**
     b. [$_{CP}$ Q$_{i/j}$ [$_{IP}$ **who**$_i$ saw [$_{DP}$ **John's** [$_{D'}$ [$_D$ AGR]
         [$_{NP}$ [$_{N'}$ three pictures of whom$_j$]]]]]]]

In (19), DP is not a governing category for **whom**$_j$ for the following two reasons: i) the presence of **AGR** in D leads to the coindexing relation between **AGR** and the possessive **John's** in the Spec of DP, parallel to the coindexing relation between **AGR** in I and subject in the Spec of IP; ii) **AGR** is then not an accessible SUBJECT for **whom**$_j$ because coindexing **AGR** with **whom**$_j$ will result in a Principle C violation: **whom**$_j$ would be A-bound by **John's**, which shares the same index with **AGR**. Since **whom**$_j$ lacks an accessible SUBJECT in DP, the whole sentence becomes its governing category. Hence, **whom**$_j$ is A'-bound by **Q**$_j$ in COMP, and the well-formedness of (19) is explained.

In conclusion, it has been presented in this paper that the specificity effect observed in the Chinese noun phrases can be derived from the Generalized Binding Theory and the DP hypothesis. The distinction between the noun phrases which display specificity effects and those which don't is then reduced to the presence or absence of a determiner within the noun phrases and a structural difference between them.

NOTES

1. I am grateful to Joseph Aoun, Robert Belvin, Hajime Hoji, Audrey Li, Dingxu Shi, Jean-Roger Vergnaud, and Maria-Luisa Zubizarreta for their valuable comments. Naturally, all errors are my own.

2. The following symbols are used in this paper:
    ASP ----- aspect marker
    CL/K ----- classifier, i.e. measure word
    Q ----- question marker

3. In this paper, I assume the Q-marker theory first proposed by Baker (1970) and further developed by Aoun & Li (1990). Aoun & Li argue that in Chinese a **wh**-element in-situ gets coindexed and interpreted with a Q-marker generated at S-structure in COMP, and that the relation between the Q-marker and the **wh**-element in-situ is an operator-bindee relation.

4. The evidence for the specificity of the noun phrase in (6) comes from the fact that it may appear in the subject position of a non-existential sentence ---- a position reserved for specific noun phrases only (Huang 1982:64), as shown below:

i) [Mali-de san   ben   sheide shu] bu jian-le?
    Mali-de three CL   whose book   not see ASP
    'Whose three books owned by Mary disappeared?'
ii) *[san   ben   sheide shu] bu jian-le?
    three CL   whose book   not see ASP

5. According to Hudson (1989), some factors contributing
to specificity (e.g. definiteness of the determiner,
singularity of the noun, degree of modification, count or
noncount nouns, and lexical idiosyncracies of certain
quantifiers) prevent its precise formulation in terms
that would be visible in syntax. Hudson also points out
that the circumvention of Subjacency by extraposing PP
(Chomsky 1977) cannot account for the ill-formedness of
(ib), in which **wh**-movement applies from within an
extraposed phrase:

  i) a. **Who$_i$ did he take picture of x$_i$ yesterday?**
     b.***Who$_i$ did he take a picture yesterday of x$_i$?**

Moreover, extraposition cannot save Subjacency violation
either:

ii)a.***Who$_i$ did he take [a picture of x$_i$ [that you like]]?**
   b.***Who$_i$ did he take [a picture that you like] of x$_i$?**

6. See Huang's (1982) argument for the absence of **AGR** in
the Chinese INFL.

7. This analysis predicts that if **John's** in (8a) can get
Case elsewhere, the resulting noun phrase would be well-
formed. This prediction is borne out; i.e. if we move
John's to the end of the noun phrase and then insert the
Case-marker **of** before it, the noun phrase will become
good, as in **"those three books of John's"**.

8. For the obligatory co-occurrence of numeral and
classifier under the K-node, see Tang's (1990) arguments.

9. One may wonder how **Lisi-de** in (i) gets its Case, as no
determiner occurs right after it:

  (i) **Lisi-de Zhangsan-de san   ben   shu**
      Lisi's Zhangsan's   three CL   book

I have no answer for this question. However, the noun
phrase in (i) must have a structure different from that
of (11'), because no determiner is allowed to occur

between two possessives:

(ii)*Lisi-de na   Zhangsan-de san   ben shu
      Lisi's that Zhangsan's   three CL   book

10. That the Spec of KP is an A-position is evidenced by
the fact that the specifier of KP can function as an A-
binder for a lexical anaphor:

Lisi-de$_i$ san   ben taziji-de$_i$ shu
Lisi's   three CL   himself's   book
'Lisi's three books of his own'

11. In (18b') the verb **tao** is forced to move to the INFL
node, because the aspect marker **le**, which is a bound
morpheme, has to be attached to the verb.

12. This may also have something to do with the facts
that there exist double-subject structures in Chinese,
and that a VP without subject can act as subject, as
exemplified below:

i) **Daxiang bizi chang**
     elephant nose long
    'Elephants have long noses.'
ii) **tao   shei zui heshi?**
     marry whom most appropriate
    'Marrying whom is most appropriate?'

13. The analysis of (19) is based on Hudson's (1989)
original proposal for this type of constructions; $Q_{i/j}$ in
(19b) represents the absorption of two Q-markers in COMP
(cf. Aoun & Li 1990).

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