Proceedings of the

Western Conference On Linguistics

WECOL 2002

VOLUME 14

Held at
University of British Columbia
November 1-3, 2002

DEPARTMENT of LINGUISTICS
CALIFORNIA STATE UNIVERSITY, FRESNO

Proceedings of the thirty-first

Western Conference On Linguistics

Volume Fourteen

WECOL 2002

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ISBN 1-879890-13-5

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Structure And Texture: Toward An Understanding Of Real Languages*

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1 Abstract

This paper is about the tensions between the inner and outer view of R-languages ("real languages"), the language-centered and theory-centered study of languages, the (often foreign) linguist and the (sometimes linguist) native speaker, description and theory, a language as a set of choices and extensions of universal grammar and as a concrete realization in a particular culture and history. The materials for this paper are drawn mostly from First Nations languages, especially those of the Pacific Northwest.

2 Setting: a Central Puzzle

Let's start with two views of language:

I. Languages are "basically" all the same, the differences between them are superficial.
II. Languages are "basically" very different.

These two views have predominated at different times and among different people: view I: Chomsky, 1995; **Pinker,** 1994 – view II: Bloomfield, 1933; **Joos,** 1957: the "Boas tradition." For example, Chomsky has written:

> The primary [task at hand for the Minimalist **Program]** is to show that the apparent richness and diversity of linguistic phenomena is illusory and **epiphenomenal,** the result of interaction of fixed principles under slightly varying conditions." (N. Chomsky, 1995: 8)

One may ask: why is the richness and diversity only "apparent"?

Languages are not all the same. Do contemporary linguistic theories deal adequately with linguistic diversity? Some writers say No (Nichols, 1992; Bach, 1995; Baker, 1988).

Theories of Universal Grammar are calculated to deal with the ways in which languages are similar. But if the Language Faculty is supposed to offer a basis for understanding language acquisition then it must have some room for quite deep and surprising differences among languages.

It used to be that linguists were enjoined to describe each language on its own terms. Now it is often presumed that all languages are basically the same.

Ordinary people who speak one or another of the languages of the world will be surprised to hear that all languages are basically one ("Earthese"), not to say chagrined, especially if they have struggled as adults to learn a new language that is very different from their own.

Linguistic theories have to deal with two questions:

A. How come languages are so different?
B. How come languages are so similar?

The attention paid to these two questions has varied a lot over the years. If you start from the sense that languages are basically very similar, then Question B should be uppermost, if you start from the sense that they are very different then it is Question A that burns. In fact, both questions presuppose that we have some way of characterizing differences and similarities among languages as well as some expectations about what is expected in the way of variation. In my opinion, neither presupposition is met at present, a view expressed by Johanna Nichols:

> ....standard historical method ... has no theory of diversity and no way of scientifically describing diversity. Hence, diversity has no theoretical status in historical linguistics (or, for that matter, in synchronic linguistics). (Nichols, 1992: 5)

Here, I want to emphasize that languages can be pretty different, and that linguistic theories that do not accommodate these differences are not adequate.

The main questions of this talk:

i. How different or similar are languages anyhow?
ii. Where are the differences and similarities in languages?
iii. Can the two views be reconciled?

We need to ask the question: What do we mean by "language" anyway?"

Kinds of language:
Chomsky introduced a distinction between two senses of language:

E-languages
(Think: Extensional language.)

I-language
(Think: Ideal or Intensional language.)

We might add:

R-languages
(Think: Real language, Bach 1995, Bach 2001.) I mean by this a language in the sense that a speaker "has" a language with all its special quirkiness, in a cultural context, and in many of its aspects present in consciousness (more on this toward the end of the essay).

These questions are not just theoretically or academically relevant. They have a practical, ethical, and political resonance as well, especially in the context of First Nations languages, and the crisis of minority and dominated languages in the face of continuing linguistic imperialism.

3 Some Ways of Difference

The Pacific Northwest is **often** cited as a prime example for areal linguistics, a **"Sprachbund,"** where related and unrelated languages share many substantive characteristics. In this, the main section of this paper, I will sketch some ways in which some First Nations languages of British Columbia are similar and different, drawing on a few other languages of the world for contrast and comparisons.

3.1 Sounds

3.1.1 Inventory

Front and back velar (uvular) sounds contrast in many languages of British Columbia:

Smalgyaxian (Tsimshianic): Coast **Tsimshian,** Nisga'a, **Gitxsan.**

Wakashan: Nuuchahnulth, Makah, **Kwak^{w}'ala, Heiltsuk, Ooweky'ala, Haisla, Henaaksiala** Salishan
NaDene: Tlingit

The contrast is represented in various ways in the practical orthographies of the languages:

x ***vs*** **x̄** **x̲**

c ***vs*** x

k ***vs*** q (**k̲**)

g ***vs*** 4 (**g̲**)

Structurally, these languages all differ **from** English. Phonetically, English also has **front** and back velar sounds:

> keep ***vs*** cool have a predictable difference in pronunciation of "k" sound **(front *vs*** back)

Structural change: Coast **Tsimshian** x becomes i so in the spelling "x" means back x **(x̲)**

3.1.2 Phonetic realization of structural ***difference***

Northern Wakashan:

Haisla/Henaaksiala and **Smalgyaxian** have palatalized **front** sounds: k **,** g = ky, gy.

Southern Wakashan **(Ahousat)** does not palatalize.

But: palatalization gone in rounded versions: k^w, g^w in N. Wakashan

compare: **Haisla:** g^wia 'wake someone up' or **g̃ʷix̄em** 'bread, flour'

Compare labialized palatals in Gyong (Nigeria): [dy^wu gy^wu], **Ngamambo** (Cameroon).

3.1.3 Contextual variants

Northern Wakashan: Kwak^w'ala, **Haisla,** Henaaksiala **unround** before *u* sounds, but not **Ooweky'ala:**

Haisla: gux^w [gyux^w] ***vs*** **Ooweky'ala:** g^{w}uk^w 'house'

3.1.4 Words

The exuberant use of lexical suffixes is an areal feature shared by Wakashan, Salishan, **Chemakuan (Quileute), etc. e.g.:**

(Haisla) X̄a'islak'ala `**Haisla** language[1]:

x̄a' =is-(e)la **-[k]!al** -a

downstream/downchannel -' on beach' **-**' to live' **-**' **sound/language** completive'

(Details on the formal structure of **Haisla** words can be found in **Bach 2001a.)**

Here **-[k]'ala** is a typical lexical **suffix** (sometimes referred to as "semantic suffixes"). It is typically used to make words for speaking a particular language or for the language itself. We might think of an English analogue like the suffix **-ese,** but the meaning of **-[k]'ala** is considerably broader as the following comparisons show:

1. English **-ese** in **Burmese (Burma),** Chinese, Japanese like **Haisla -[k]'al(a)** ? Compare:

   Q^{w}'emksiwak'ala 'English' etc. BUT:

   q'al'ala 'sound of footsteps' from **√q'alh-** 'walk' + **-[k]'al(a)** 'sound of X': English *walkese, ***footstepese** Here are some other typical examples of derivational **affixes** or processes with meanings that seem to be quite common in various languages of the area:
2. going after X, gathering X, hunting X
   Smalgyaxian: xhoon 'going **after fish/salmon (*hoon*)'**

   Haisla: mamiy̓a 'going after fish, salmon (mia)'
3. **-[g]ila:** 'to make, get, become X, something in the form of X ' guk^{w}ila 'build house

   (guk^{w}**-), X̄esduak^{w}ila** 'go to the **Kitlope** area',

   beg^{w}enemgila 'figure of a person' (in story, made by putting cloak onto a digging stick).
4. sick with, **hurting,** dying of...
   `Haisla: **-sdana**

   'l̓exāu'bisdana 'catch a cold'

   'aziq'esdana 'having a nightmare' **('eziq'** 'bug, ghost')
   pualisdana 'really hungry'
5. called X:

   Haisla: Emmon-kelasunug^{w}a: 'my name is **Emmon'**
   also: **-tla, Kwakw'ala: -xtla**

   Ahousat: **-(č)ła :suffix** with this meaning only used with referential root **√'u-**
6. Other characteristics that differentiate various languages in Pacific Northwest: some have suffixes only, some have prefixes and suffixes, some have compounding, some have no compounding (Wakashan, Eskimo-Aleut), some have elaborate systems of reduplication and root extensions, some not.
7. Comparisons with other languages:
   English **-itis** as in tendinitis, sinusitis and similar **affixes** have the sorts of meanings that might be found with lexical suffixes in Northwest languages. An important difference is this: in English, the vocabulary is divided into **learned/Greco-Latinate** vs native English. Compare also Japanese: **Yamato *vs*** Sino-Japanese

8. Are these processes examples of Incorporation? (Baker, 1988)
   Complex words derived from syntactic structures or syntax-like lexical-conceptual structures.
   going X-ing (fishing, etc.), meat-eating, baby-sit,..
   I think not, in such analyses polysynthetic languages (in the classical sense) are assimilated to isolating languages.
   Why not do the opposite? English compounds might be looked at as reductions of free forms to affixes.
9. Against incorporation:
   (i) Wakashan has no compounds except for these supposedly incorporated complex words.
   (ii) Wakashan (at least): lexical suffixes semantically not arguments (objects, etc) but adjuncts: Haisla =ilh does not mean 'house' but 'in house, inside' etc. Hence the analysis as Head movement from and aregument position is not appropriate. In any event, the topic of how to deal with these lexical affixes obviously requires a fuller discussion.

3.1.5 Sentences

Languages of the area show a variety of syntactic characteristics:

Verb-Final: Tlingit, Haida:
Verb-Initial: Smalgyaxian (Tsimshian), Wakashan, Salishan, Chemakuan;
free word order: Alaskan Yup'ik Eskimo
But again: details vary a lot: compare Smalgyaxian (Tsimshianic) with Wakashan:

1. Haisla: Verb - Subject - Object - Oblique
2. Coast Tsimshian: Ergative - Absolutive, with variation; preverbal elements, placement of agreement markers: Ergative suffixed to preverb, or prefixed to verb.
3. Do all languages use the same syntactic categories: Verbs - Nouns - Adjectives?? Some Northwest languages (Wakashan, Salishan) have been at the center of discussion of this point, since they have been claimed not to have a lexical distinction between nouns and verbs. (Bach, 1968, forthcoming; Demirdache and Matthewson, 1995; Jacobsen, 1979). If all languages have the same syntactic categories: why should we take the Indo-European set as "unmarked / null-hypothesis"?

3.1.6 Meanings

1. What *can* be translated and what can't.
Example: words like Haisla nuyem, Smalgyax: adawx 'story, tradition, law, ...'
2. Universal and parochial semantics (Stein, 1981). Linguists often assume that the basic structure of meanings must be the same in all languages. This may be

true at the most abstract level, but at the level of R-language: it seems likely that:

3. A real language encodes and helps shape a culture. The availability of particular words and meanings is a definite part of a language as it presents itself to a user of the language. Cultural change brings language change at least at this level. In the full sense of "meaning," including not denotations, but connotations, associations, and so on, different languages have different resources and limitations. Linguists believe that all languages are equivalent in their expressive potential, this does not mean that they are equally expressive of particular content at a particular moment. Hence, you can always explain but you can't always translate.

3.1.7 Style

1. How many nominals in a sentence? It seems that in some NW languages, the use of more than one nominal phrase as a core argument – subject, object – is highly marked at best, and possibly outright ungrammatical.

2. Narrative markers: clumsily translate as 'And then..., and then...' Literal translations of texts often lead to unnatural sentences and sequences of sentences in the translation.

3.1.8 Global parameters?

The idea here is that language diversity can best be captured by positing "parameters" that govern the language as a whole. But it often seems that within a language different corners of the language work in different ways with repect to such posited parameters. More on this below.

4 Cherishing Difference: Structure and Texture

Creators of natural languages choose from a universal palette and create their own special way of talking and being in language.

A good theory of Universal Grammar is supposed to help explain how kids acquire their particular languages. Such a theory must have room for the diversity of Parochial Grammars. The actual diversity we find cannot, in my opinion, be solely attributed to global parameters, in the sense of setting properties for a language as a whole. Finally, there must be a place in this picture for linguistic creativity at the level of grammar creation.

Evidence for this creativity lies both in the retention of special characteristics of a language or language group over time and in the (sometimes quite rapid) changes of languages (Thomason, 2001).

Differences among languages as perceived and used by real *speakers* have to do both with the basic structures of the language and with the texture of the language as used among groups of people and in particular contexts.

4.1 Languages as Poems

When we talk about "the language of Shakespeare" or the like, what are we talking about? We don't just mean his dialect or even idiolect – his individual variety of the English of the time. We mean rather something like his individual style. What is style? It is the particular choices that an individual makes and exploits within a common language, and even ways in which the writer – or speaker – stretches the limits of the language. This is not just a matter of "high language" or Literature.

Likewise: individual languages, "real languages," show individual characteristics as well, in the choices that they make within and even in the ways that they stretch the limits of Universal Grammar.

Notes

* This paper is dedicated to the memory of the late Hilda Smith of Rivers Inlet and Port Hardy. Thanks to many teachers, coworkers, and helpers from C'imauc'a (Kitamaat Village), Ahousat, Kitsumkalum, Odanak, and elsewhere. Mistakes are my own.

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The Paradox of Asserting Clarity

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1. The Dilemma

Standard wisdom (Stalnaker 1979:325, van der Sandt 1992:367, etc.) holds that assertions are felicitous only if they add new information to the common ground. After all, what use could it be to claim that a proposition is true if it is already accepted as true? In this paper we suggest that this question is not rhetorical. Our answer is that some sentences can have side effects besides adding information to the common ground, and that sometimes it is worth asserting a sentence entirely for the sake of its side-effects.

To motivate our claim, consider a variation on Partee's marble example:

(1) a. Exactly two out of three marbles are on the table.
b. One marble is not on the table.
c. It's under the couch.

(1b) is entailed by (1a); it adds no new information about the situation under discussion. However, it causes the creation of a discourse referent for the missing marble, which allows the pronominal reference in (1c). Without (1b) it would be infelicitous to use the pronoun in (1c). Thus, as pointed out in Beaver (2002:172), it is possible to assert a sentence purely for the sake of its side-effects, here, building a discourse referent to facilitate anaphora.

This paper presents a case-study of the semantics of clear, which we take to be a Discourse Adjective following Taranto (2002a, 2002b). The central example we consider is given in (2).

(2) It is clear that Mary is a doctor.

Intuitively, for (2) to be true, the discourse participants must each possess all the knowledge they need to conclude that Mary is a doctor before (2) is uttered. If either is not already convinced that Mary is a doctor, then the proposition isn't

clear at all. But if it is already evident that Mary is a doctor, then asserting (2) adds no new information to the common ground, suggesting the puzzle in (3).

(3) Lemma 1: If (2) is true, it adds no new information to the context, so why bother to assert it?

To begin, note that it is not appropriate to utter (2) if the fact that Mary is a doctor has just been asserted. Thus the discourse in (4) is distinctly odd.

(4) a. I just learned that Mary is a doctor.
b. #Clearly, Mary is a doctor.

Whatever uttering (4b) is supposed to accomplish, it can't be done immediately after uttering **(4a).** For (4b) to be felicitous, the fact that Mary is a doctor cannot be part of the common ground. As soon as Mary's doctorhood is in the common ground, as would be the case immediately after an utterance of **(4a),** it becomes impossible to assert that it is clear that she is a doctor. This suggests that perhaps an utterance of (2) adds new information after all, namely the information that Mary must be a doctor. But this gives us a second puzzle:

(5) Lemma 2: Assume (2) entails Mary is a doctor. If the speaker has decided that Mary is a doctor on the basis of information that the hearer also has, then (2) only adds information if the speaker assumes that the hearer has not come to the same conclusion- in which case it is not in fact clear that Mary is a doctor, otherwise the hearer would have realized it on her own.

The second lemma might be rephrased as "how can (2) be uttered without assuming the hearer is an **idiot?" Perhaps** it can only be used in situations in which the hearer has all the evidence he needs to realize that Mary is a doctor, but fails to take that last logical step. Consider the propositions in (6).

(6) a. Mary is holding a stethoscope.
b. Mary is wearing a lab coat.
c. Mary knows lots of Latin morphology.

Assume the propositions in (6) are true, and that they are in the common ground by virtue of having just been uttered by B. At this point **A** replies with her version of (3): **"Clearly,** you dolt, Mary is a doctor."

Resolving our dilemma requires developing a specific model of context update, and elaborating that model in order to handle vagueness.

2. Context update

An initial attempt to resolve Lemma 1 will serve to introduce the approach to context update we pursue.

(7) The Missing Entailment Hypothesis (to be rejected): Assume the facts in (7) along with other information in the context entail that Mary is a doctor. The reason (4) can add new information is that it is possible for a context to entail a proposition without that proposition being part of the context.

We adopt an extension of Stalnaker's theory of context update. According to Stalnaker (1979), as developed by Heim (1982) and used by Beaver (2002), the common ground is a set of possible worlds, namely, the set of all possible ways the world might be. When a sentence is asserted, the common ground is updated by removing from it all of the worlds in which the sentence is not true. For instance, assume that as far as the hearer knows it may or may not be raining. Then the common ground, shown schematically in (8), will contain some worlds in which it is raining and some worlds in which it is not raining. An utterance of (9) adds information, which causes the context to shrink. The new information reduces the variety of ways the world might be, as shown in (10).

(8) Context 1: Raining Not Raining

(9) It's raining.

(10) Context 2 = Context 1 after update with the information in (9) = $\{w_1, w_2\}$

Given this model of context update, we restate the generalization in (1) as (11).

(11) Asserting a sentence must have a non-trivial context update effect: if C is the initial common ground, and C + S is the common ground after updating C with an utterance of S, then (C + S) $\subset$ C: the updated context must be a proper subset of the initial context.

In this model the missing-entailment theory cannot be stated, since it is not possible to add a proposition without adding all of its entailments. To see why, assume that being a bachelor entails being a man, that is, (12a) entails (12b).

(12) a. Pat is a bachelor.
b. Pat is a man.

Now consider asserting (12a) in a situation in which the hearer does not know either Pat's gender or Pat's marital status:

(13) **Initial** Context C:

	Pat is a man	Pat is a woman
Pat is married	(w_1, w_2	w_3, w_4,
Pat is not married	w_5, w_6,	w_7, w_8)

After an utterance of (12a), only worlds in which Pat is an unmarried man, namely, worlds w_5 and w_6, survive update. The updated context is strictly smaller than the initial context, so asserting (12a) has added new information.

Nowconsider an assertion of (12b) following (12a). This does not eliminate any worlds, since all of the worlds in which Pat might have been a woman were already eliminated after the utterance of (12a). Thus asserting (12b) following an assertion of (12a) violates (11). The analysis correctly predicts that it would be infelicitous to utter (12a) immediately followed by (12b): ***#Pat is a bachelor, and Pat is also a man.*** Thus, in general, the Stalnakerian model guarantees that when the information expressed by a sentence is added to a context, the information corresponding to all of the entailments of that sentence are also added. Since we are committed to the Stalnakerian model, we must reject the missing entailment hypothesis.

Since people are not always consistent (i.e., they are capable of simultaneously believing a proposition and denying its consequences), we might conclude that contexts can be similarly inconsistent. This would mean that, in this respect, the Stalnaker model of context update is inaccurate, and this is a flaw in the model. But another alternative that we should consider first is that the facts in (6) do not actually entail that Mary is a doctor. This alternative respects the fact that there are a number of possibilities for how the world might be, and that these possibilities are ordered in terms of their plausibility:

(14) **Possible** explanations for the evidence suggesting Mary is a doctor, from most likely to least likely:
- w_9 = Mary is a doctor.
- w_{10} = Mary is a doctor, though she learned her Latin in high school.
- w_{11} = Mary is not a doctor, she's getting ready for a Halloween party.
- w_{12} = The stethoscope is Mary's brother's, but Mary is a doctor too.
- w_{13} = Mary is not a doctor, but the CIA wants us to believe that she is.

Each scenario in (14) corresponds to one way the world might be, and nothing in the sentences in (6) rules out any of these possibilities. Because in some of these'worlds Mary isn't a doctor, update with (3) will eliminate those worlds in

which Mary isn't a doctor. However, asserting ***Mary is a doctor*** will achieve the same result:

(15) $\{ w_0, w_{10}, w_{11}, w_{12}, w_{13} \} + \textit{Mary is a doctor} = \{ w_0, w_{10}, w_{13} \}$

We are now faced with the following question: why not just assert that Mary is a doctor? Why ever assert it is ***clear*** that Mary is a doctor? We claim that a speaker might be reluctant to assert that Mary is a doctor precisely because Mary might not be a doctor. There are other possibilities that are still live, and we know from Grice that it would be uncooperative to claim that Mary is a doctor without being absolutely sure.

If this is on the right track, (2) might be used to signal that a speaker doesn't have enough information to flatly assert that Mary is a doctor. That is, clarity is asserted only in contexts in which there is some lingering uncertainty that the complement is in fact true. But if this is right, it is extremely peculiar, since it means that we have reconstructed our original paradox, only in reverse:

(16) The reconstructed paradox: It is ***clear that p*** is asserted only in situations in which it is in fact not clear that p!

We believe the key to resolving this paradox lies in characterizing how the grammar deals with degrees of probability. The appropriateness of asserting clarity depends on degrees of probability of different explanations for the facts.

Situations in which the applicability of a predicate depends on degrees are well known in the literature of vagueness (Fine 1975, Williamson 1994, Kennedy 1997). We will argue, however, that ***clear*** is not an ordinary vague predicate.

3. Vagueness

Vagueness is about where to draw the line between having or not having a property. A predicate like ***tall*** is vague because in a given situation, it often isn't clear exactly how tall you need to be to count as tall. Assume that in any given discourse situation there is a standard for how tall a person needs to be in order to count as tall. Following Barker (2002), we write this as:

(17) $\mathbf{d}(c)([\![tall]\!])$

Here d is a delineation function (Lewis 1970) which takes a situation ***c*** and an adjective meaning and returns the vague standard for that adjective in the given situation. Then we can characterize the truth conditions of (18a) as (18b).

(18) a. Bill is tall.
b. The maximal degree to which Bill is tall is at least as great as $\mathbf{d}(c)([\![tall]\!])$.

(18a) can be used either descriptively or metalinguistically (Kyburg and Morreau 2000, Barker 2002). The simplest way is descriptively. Assume a situation c in which the standard for human tallness is exactly six feet. In c, the delineation function applied to the adjective tall returns the vague standard of 6 feet, as in (19).

(19) $\mathbf{d}(c)([\![tall]\!]) = 6'0''$

The dialogue in (20) illustrates the descriptive use of a vague adjective.

(20) a. What is Bill like?
b. Bill is tall.
c. The maximal degree to which Bill is tall is at least as great as 6'0''.

Relying on our knowledge about the local standard for tallness, the interlocutors have learned a lower bound on Bill's height. The assertion of Bill is tall has added descriptive information about the way the world is.

To illustrate the metalinguistic use, imagine a speaker and hearer both know a lot about Bill, including the exact degree to which Bill is tall, which is 6' 1''. In contrast with our previous scenario, however, the standard for human tallness is more obscure. The interlocutors have their individual ideas of how tall one has to be to count as tall, but they don't know if their individual standards coincide with their interlocutor's standard. They might proceed as in (21). .

(21) a. What counts as tall around here?
b. Well, see Bill over there? Bill is tall.
c. The maximal degree to which Bill is tall is at least $\mathbf{d}(c)([\![tall]\!])$
d. $\mathbf{d}(c)([\![tall]\!]) \leq 6'\,1''$

In this situation, an assertion of Bill is tall provides no new information about Bill, since the discourse participants knew exactly how tall Bill was to begin with. They do however gain information about the prevailing standard for tallness: it must be less than Bill's height.

We claim that when a speaker asserts and a hearer accepts a claim that Bill is tall, they reach a tacit agreement about the contextually relevant constraint on tallness. That is, they take a concrete step towards synchronizing their

individual standards for tallness, and they can rely on this in future discourse. This is a metalinguistic, rather than a descriptive use.

These two aspects of meaning can be easily modeled building on Stalnaker's *(1998)* notion of context update. We need only adopt his natural assumption that during a conversation, some things are certain about the world: a conversation is taking place, the speaker is speaking, the hearer is being addressed, and so on. Thus, every possible world in the initial context will be a world in which the conversation underway is taking place. Following this, we conclude that one way in which worlds may vary is in the value of the delineation function for the version of the conversation in that world. Uses of sentences involving vague predicates are not necessarily purely descriptive or purely metalinguistic– they are usually a mixture of both. That is, discourse improves mutual knowledge both concerning the world under discussion as well as concerning the nature of the discourse itself. This is not surprising, of course, since the discourse itself is part of the world, and therefore a legitimate target for reducing ignorance.

4. Analysis of *clear*

Besides raw intuition, the vagueness of ***clear*** is easy to prove, since it is possible to explicitly talk about the degree to which a proposition is clear.

*(22)*a. It is becoming clear that Mary is a doctor.
b. It is reasonably clear that Mary is a doctor.
c. It is very clear that Mary is a doctor.
d. It is painfully clear that Mary is a doctor.

Our preliminary analysis of ***clear*** is provided in *(23)*.

*(23)**It is clear that p*** is true just in case the maximal degree to which p is likely to be true is at least as great as **d(*c*)([*clear*])** [to be revised in **(25)**].

This analysis explains the connection between likelihood and clarity, and specifies the respect in which asserting clarity is similar to asserting the applicability of a vague predicate. However, it cannot be right. The problem is that in Stalnaker's model, propositions don't have probabilities. For any given possible world, either Mary is a doctor in that world or she isn't. This means that for any given world ***c***, either the probability that Mary is a doctor is *1* or it is 0. Whatever the standard of clarity is, worlds in which the probability is *1* will survive update according to **(23)**, and worlds in which the probability is 0 will not. But this is exactly the update effect of asserting ***Mary*** is ***a doctor:*** only those worlds in which Mary is a doctor will survive. Thus, the analysis in *(23)*

amounts to claiming that the meaning of It *is* clear that Mary *is* a doctor is identical to Mary *is* a doctor, which was shown above to be incorrect.

We believe the problem is solved by building on the observation that likelihood is a judgment made by some sentient creature who is contemplating p. If likelihood plays a role in assertions of clarity, we must figure out who is judging likelihood. An important clue comes from comparing a simple assertion of clarity to one in which the experiencer is overt:

(24) a. It is clear that Mary is a doctor.
b. It is clear to me that Mary is a doctor.
c. (Surely) It is clear to you that Mary is a doctor.

The claim in (24a) is stronger than either of the claims in (24b) and (24c). In all cases, the speaker is committed to believing that Mary is a doctor, but (24b) allows the possibility that the hearer may not share that belief. With an implicit experiencer, as in (24a), there is a strong intuition that the experiencers of clarity must include at least the speaker and the listener (See Bhatt and Izvorski 1998 for arguments that (24a) has an implicit argument).

We approximate the meaning of (24a) as the conjunction of (24b) and (24c): if it is clear that Mary is a doctor, then it is clear to the discourse participants that Mary is a doctor. We refine our analysis of clear as in (25).

(25) It *is* clear to x that p is true in a world c just in case the maximal degree to which x judges that p is likely to be true is at least as great as $\mathbf{d}(c)([\![clear]\!])$.

The revision considers judgments of likelihood at each world. That is, for any possible world c, how likely does the counterpart of x consider p to be? For instance, imagine that x is Gina Taranto, and c is a world in which the CIA is supremely devious and competent. They want Gina to think that Mary is a doctor, even though she is not, and they are so successful that Gina believes in c that Mary is a doctor. That is, the CIA conspiracy is effective, and this causes Gina to believe something that isn't true. In this situation, it is clear to Gina that Mary is a doctor, even though Mary isn't a doctor.

It is helpful to compare asserting clarity to asserting necessity, which is similar to asserting clarity, but which does not (directly) depend on belief. Compare (2) to a similar sentence with epistemic must:

(26) Mary must be a doctor.

Both are guesses typically made on the basis of partial, indirect evidence. One key difference is that ***must*** does not implicate the existence of a **so-called** "judging experiencer", that is, a mind that judges what is abnormal versus what is expected. As a result, a speaker can assert (26) on the basis of private knowledge. In contrast, (2) requires that the hearer have access to all of the evidence necessary to come to the desired conclusion. Thus, any adequate analysis of clear must account for the public status of the evidence that provides the basis for the judgment.

A second, more subtle difference is that because ***must*** depends on what is normal or likely, there will always remain the possibility that something unlikely or abnormal happened and the conclusion doesn't follow. This is why assertions of must are so often followed by requests for confirmation, as in (27).

(27) It ***must*** be a ***UFO*** or alien spacecraft, right?

Evidently, ***must*** does not commit the hearer to accept the designated proposition, or at least not very strongly, and the right of the hearer to doubt persists even if the hearer does not explicitly object. In contrast, once clarity has been asserted, failing to object immediately and firmly commits the hearer to accepting the truth of the relevant proposition. That is, if a speaker asserts ***it is*** clear ***that Mary is*** a doctor, and her hearer allows that assertion to go unchallenged, then the speaker is entitled to assume that the hearer believes that Mary is a doctor.

We propose that this difference between ***must*** and clear follows from the following fact: the truth conditions for ***must*** depend on examining worlds and their modal neighbors, and determining whether the proposition in question is true at those worlds. In other words, whether ***must*** holds depends on truth, while ***clarity*** depends directly on belief, and only indirectly on truth.

This claim is embodied in the analysis given in **(25),** provided we assume that **d(*c*)([*clear*])** returns the degree of likelihood required for someone to believe a proposition is true. That is, (25) recognizes that belief is a gradient attitude, and behaves just like any other vague predicate. For instance, the degree to which one believes Darwin is right may differ from the degree to which he believes an astrologer's claim that retrograde motion of Mercury hinders communication.

In practical terms, this means that when a speaker asserts **(28),** the only worlds to survive update are those at which the speaker believes Mary is a doctor.

(28) It is clear to me that Mary is a doctor.

The surviving worlds will include every situation in which there is sufficient evidence to persuade the speaker that Mary is a doctor. Excluded worlds may include worlds in which the speaker knows Mary is on her way to a Halloween party, if this introduces enough uncertainty to reduce belief in her doctorhood to below the threshold specified by the delineation function for that world.

In particular, worlds may survive in which Mary is not a doctor, as long as the speaker believes Mary is a doctor in that world. In contrast with Beaver (2002), our claim is that clarity does not entail the proposition of which it is predicated. On our analysis the dialogue in (29) involves contradiction and repair, while the dialogue in (30) does not.

(29) A: Mary is a doctor.
B: Actually, Mary isn't a doctor. I asked her, and she revealed she's a CIA operative pretending to be a doctor.

(30) A: It is clear to me that Mary is a doctor.
B: Actually, Mary's not a doctor. I asked her, and she proved she's not.

In (29), we learn from B's contribution that **A** spoke falsely when **A** asserted that Mary was a doctor. In (30), however, B's statement does not contradict **A:** it remains true that it was clear to A that Mary was a doctor, so **A** spoke truly.

If asserting personal clarity does not entail that the proposition in question is true, how can we account for the fact that asserting simple clarity seems to entail the truth of the complement proposition? We suggest that the truth of the proposition is not in fact entailed. Rather, it is an illusion due to the implications that the assertion has for the state of the discourse. The chain of reasoning provided in (31) leads to the conclusion in (32).

(31) a. In the absence of an overt experiencer, the entities doing the believing default to both the speaker and the hearer.
b. The semantics of personal clarity guarantee that every world in the updated context will be a world in which the experiencer believes the truth of the proposition.
c. The result is that all of the discourse participants believe the truth of the proposition in every world in the updated context

(32) Therefore, asserting *it* is clear that p does not entail p, but guarantees the discourse participants are justified in behaving as if p is true.

This is another very peculiar situation. In terms of descriptive versus metalinguistic update, the update is entirely metalinguistic. To be more specific,

we have learned nothing new bearing on whether Mary is a doctor, since the only new information concerns the beliefs of the discourse participants. In particular, (33) lists some of the things that at least one of the discourse participants may not have known before asserting clarity that they would know after the assertion:

(33) a. The speaker believes that Mary is a doctor.
b. The hearer believes that Mary is a doctor.
c. The speaker knows that the hearer believes that Mary is a doctor.
d. The hearer knows that the speaker believes that Mary is a doctor.
[etc.]

(33a-b) are directly entailed by the proposed semantics of clarity. **(33b)** and **(33c)** (and the rest of the infinite regress) follow from the fact that the discourse participants assume that the other discourse participants agree to accept any assertion that goes unchallenged.

Importantly, the new information has nothing to do (at least not directly) with whether Mary is a doctor; its only effect involves the state of the discourse. Asserting clarity is about the judgment of the discourse participants, not about what is the case in the part of the world under discussion. Thus, asserting clarity synchronizes the common ground: it forces the speaker and the hearer to acknowledge that they are in a position to treat a proposition as if it were a fact.

5. Conclusions

Our analysis resolves our earlier paradoxes. Regarding Lemma 1 (if asserting clarity adds no new information about the situation under discussion, what use is it to assert it?), we claim that asserting clarity does add useful information about the state of the discourse– information about the attitude of the discourse participants towards the proposition in question.

Regarding Lemma 2 (if it is self-evident that Mary is a doctor, then isn't asserting clarity tantamount to suggesting that the hearer is an idiot?), we conclude that a speaker does not need to assume her hearer doesn't believe Mary is a doctor. It is sufficient for the speaker to assume the hearer may not know that the speaker also believes that Mary is a doctor.

Finally, regarding the reconstructed paradox (that it is clear *that* p is asserted only in situations in which it is in fact not clear that p), we conclude that asserting clarity does not require asserting perfect clarity: by recognizing the role of vagueness, we realize that asserting clarity means that the proposition is merely clear enough– in particular, clear enough to proceed as if it were true.

This understanding of the semantics of *clear* deepens the understanding of how context update works. In particular *clear* provides an example of a predicate whose meaning requires that the discourse model contain a model of itself. This is what we take to be Stalnaker's (1998) claim, though our implementation may go beyond what he explicitly advocated.

Furthermore, the case of clarity shows that there are expressions whose only update effect has to do with the state of the discourse, not the facts under discussion. This result is anticipated in recent work. Kyburg and Morreau (2002) show that some uses of vague expressions have the sole effect of negotiating vague standards. Additionally, Barker (2002) argues that there are constructions whose only discourse update effect is to, negotiate vague standards. Asserting clarity is a much simpler and more direct case in which the only update effect is metalinguistic: asserting clarity provides information about the discourse and the discourse participants, and not about the facts under discussion.

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Templatic Architecture

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Templates are prosodic configurations serving some specific morphological function. Does this function derive from properties of the prosodic configuration, from properties of the template (as a grammatical primitive), or from something else?

In this paper, we endorse a bare phrase structure analysis of templates, strictly separating the derivation of syllabic constituents **(i.e.,** prosody) from the derivation of morpho-syntactic features **(i.e.,** syntax). Both are driven by a single generative engine, consisting of two operations: Merge and Label, both defined in simple mathematical terms. The morphological role of prosodic configurations, as described by templates, is a consequence of interpretation: objects in prosodic structure are mapped on sets of morpho-syntactic features **(i.e.,** syntactic heads). We outline this proposal in section 1.

Our account redefines the questions to be asked by a theory of **non-**concatenative morphology. Since both prosodic and syntactic structure is fully compositional, the question is no longer whether morphological processes are concatenative or not: non-compositional structures simply cannot be generated. The question to be addressed now is how prosodic and syntactic derivations converge in a given language, such that a structure-preserving mapping between the two domains is possible. If convergence is perfect, we observe templatic morphology. In section 2, we illustrate the mechanisms of our proposal with some classes of German verbs.

1. On Templates

1.1. Phonology

We assume the general fiamework of Government Phonology (Kaye, **Lowenstamm** & Vergnaud 1985, **1990),** in which the melodic content of a phonological string is represented in the **form** of autosegmental elements. Since we are not concerned with melody in this article, we will informally talk of segments throughout. As for the representation of prosodic structure, we adopt

the *CV model* (Lowenstamm 1996), the main assumptions of which are given in (1).

(1) Conditions on syllabic constituents
- a. There are only two syllabic constituents, ***onset*** and ***nucleus.***
- b. Syllabic constituents do not branch.
- c. Onset and nucleus strictly alternate.

Since neither onsets, nor nuclei branch, there is a one-to-one correspondence between syllabic constituents and skeletal positions. Therefore, it is not necessary to separate timing units and syllabic constituents. The representations in (2a) are replaced by the simpler structures in (2b).

(2)

		Onset	***Nucleus***
a.	constituent level:	O	N
		|	|
	skeletal level:	x	x
		|	|
	segmental level:	b	a
b.	skeletal level:	C	V
		|	|
	segmental level	b	a

Under (1), there is only one syllabic type, a non-branching onset followed by a non-branching nucleus: CV. CV is the minimal unit at the skeletal level, C- and V-positions cannot be manipulated in isolation.

Of course, some patterns diverge from consonant-vowel sequences on the surface. They are represented as recursions of CV units that involve silent C- or V-positions. Long vowels and geminates are represented as in (3a) and (3b) respectively; (3c) gives an example of a syllable with a "branching onset" and (3d) shows how a "closed syllable" is represented.

(3) a. Long vowel: a:

C V C V

\ /

a

b. Geminate: bb

C V C V

\ /

b

c. Branching onset: bra

d. Closed syllable: bar

C V C V

| | |

b a r

The syllabic types in **(3c)** and (3d) have the same underlying structure: CVCV. The superficial differences between these types derive from the way segments are associated to the skeletal level, in **(3c,d)** the choice of the V-position to be spelled out'

The CV model allows straightforward generalizations over morphologically related words **(Lowenstamm** 1996). Consider as an example two verbal forms of the root $\sqrt{drb}$ 'to hit' in Classical Arabic **(4).**[2]

Under standard assumptions, the perfective stem ***darab*** and the imperfective stem ***drib*** have different syllabic structures. Therefore, one **form** can only be derived from the other by means of resyllabification. In the CV framework, no such operation is necessary. The only relevant distinction is that the V-position separating the first and second radical is spelled out in the perfective, and silent in the imperfective.

(4) a. Perf. 3ms: ***darab-a***

C	V	C	V	C	V
|	|	|	|	|	
d	a	r	a	b	

b. Imperf. 3ms: ***ya-drib-u***

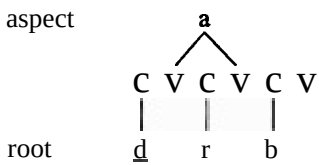
C	V	C	V	C	V
|		|	|	|	
d		r	i	b	

In the CV model, the distinctions traditionally encoded in supra-skeletal syllabic structures are reduced to the distribution of empty V-positions. Where a classical syllabic model postulates the existence of two types of timing units, syllabic constituents and skeletal positions, the CV model requires only one of them, skeletal positions. It is therefore the null hypothesis. The postulation of any additional timing unit, like morae, syllables, etc., is a costly departure from the null hypothesis - to be avoided, unless required by substantial empirical facts.

1.2. From the CV skeleton to syntactic heads

In order to represent the generalization that both the root and the vowel melody are morphemes, it is assumed since **McCarthy** (1979, 1981) that root consonants and vowel melody are represented on separate tiers, as in (5) for the perfective stem ***darab.*** Melody elements are associated to the C and V slots according to the principles of **autosegmental** theory.

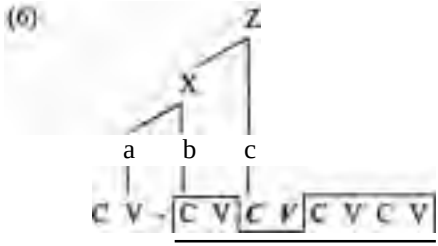
(5)



(5) derives the independence of root and affix by separating vowels and consonants. If (5) is tenable, then templates are simply one form of concatenation, a highly welcome result.

Lowenstamm (2001) takes such considerations further. On his assumptions, a template is composed of prosodic primitives, *i.e.* CV units, some of which may project morpho-syntactic nodes, as depicted in (6).[3]

(6)



The morphological theory underlying (6) differs fundamentally from previous ones. First, like McCarthy's (1979) structure, it offers the tools to account for a range of apparently non-concatenative markers in a fully compositional way. Second, it does so without stipulating additional theoretical apparatus: every primitive in Lowenstamm's (2001) account is firmly motivated in either phonology, or syntax. Finally and most importantly, the viability of this account opens the perspective to state a theory on the phonology-syntax interface that does not depend on late access to the lexicon. Implicit in (6) is the assumption that (complex) syntactic heads enter the derivation with all their features present, as it is assumed in standard minimalist theories like Chomsky (1995), but not, in many morphological theories (cf. Halle & Marantz 1993; Bobaljik 2001).

1.3. Label, Merge, and *Interpret*

(6) does not specify the operation that transforms a prosodic string into morpho-syntactic nodes. We claim such a direct transformation does not exist at all. Prosodic and syntactic structure is built separately in parallel, related only by means of *interpretation.* We will now propose a simplified mathematical formalism that derives both prosodic and syntactic structure, and then turn to the mapping that facilitates interpretation.

1.3.1. Headedness in prosody and beyond

Defining the prosodic structure of the template means identifying its head. The operation that defines headedness can be informally construed as an integration that takes as input an existing representation and delivers the head as output. This operation gets rid of information that does not correspond to the head.

Since constituents are identified by their head, we call the head label, and the integration delivering the head labeling (cf. Chomsky 2001). In the following, we present the labeling operation in very elementary mathematical terms, which are just sufficient for our purposes.

Take a phonological string CVCVCV, *i.e.,* a string of three adjacent CV units. This string can be formalized as a function of three variables x, y, z, taking their values in finite domains X, Y, Z:

(7) $f_3(x, y, z) = f(x)\, g(y)\, h(z)$

The function f_3 is given and defines the initial structure. It is written in a factored form, and indeed, only factored (or additive) forms are considered here. By definition, the labeling operation consists in integrating the initial function, supposed to describe the initial structure, f_3 in (8), according to a given coordinate, say z:

(8) $$f_2(x, y) = \int_{z \in Z} f_3(x, y, z)\, dz,$$

with $\int_{x \in X} f(x)\, dx$, $\int_{y \in Y} g(y)\, dy$, $\int_{z \in Z} h(z)\, dz \neq 0$.

For example, if we choose $f_3(x, y, z) = xyz$, we get:

(9) $$f_2(x, y) = \int_{z \in Z} f_3(x, y, z)\, dz = xy \int_{z \in Z} z\, dz = C\, xy$$

For $0 < C < \infty$, this application can be seen as the projection Π from $E(R^3)$, the set of functions f_3 -> $E(R^2)$, the set of functions f_2.

For simplicity, the equations in (8)-(9) are expressed for continuous variables and functions. However, the formalism can easily be applied to discrete sets by summing over a finite set instead of integrating, to read:

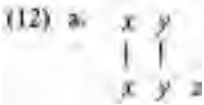
(10) $$f_2(x, y) = \sum_{z \in Z} f_3(x, y, z) = f(x)\, g(y) \sum_{z \in Z} h(z) = C\, f(x)\, g(y)$$

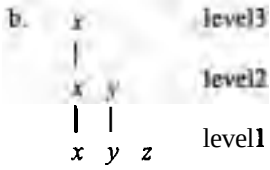
C is a constant that does not depend on x, y. It has only numerical relevance. The labeling operation gets rid of the information contained in the z-axis; it replaces it by a constant. (10) yields the structure in (12a). We now sum according to y and get:

(11) $f_1(x) = \sum_{y \in Y} f_2(x, y) = D\,f(x)$

An appropriate choice of integrating devices can be made such that all constants are equal to 1, delivering the Inclusiveness Condition: no new entities are introduced during derivations.[4]

(10) delivers the structure in (12a); together with (11), we get (12b).

(12) a. 

b. 

We have built the structures in (12) bottom-up, from level 1 to level 2, and from level 2 to level 3, by summing according to one axis. Now we want to check if this operation is structure preserving with respect to the operation Merge, which assembles objects to form constituents (cf. Chomsky 1995).

We define Merge as $\mu_1 : \mu_1(x,y) = xy$. For $f_3(x, y, z) = \mu_1(x,y)$ z, (10) yields

$\mu_2(x, y) = \sum_{z \in Z} xyz = K\,xy$, and this is Merge again.

The operation μ_2 that associates components at level 2 has the same properties as the one that associates components at level 1: $\mu_2 = K\mu_1$ where K is a constant. Informally speaking, the operation μ_2 that merges the 2 CV units at the output level has the same properties as the one that merges the 3 CV units at the input level, μ_1. Labeling is thus structure preserving with respect to *Merge*.

1.3.2. Mapping into syntax

Metaphorically speaking, summing according to one variable filters out parts of an existing representation, and thereby defines headedness. Sum is thus narrowly constrained to a given domain, in the present case phonology. However, language crucially establishes relations between different domains: expressions in one domain have an interpretation in another domain.

We represent Interpretation as a linear mapping, which is defined as follows:

(13) Let V, U be linear spaces over the same field K. A mapping I: V → U is a linear mapping, or a homomorphism over linear spaces if
$\forall u, w \in V, I(u + w) = I(u) + I(w), \forall k \in K, \forall v \in V, I(kv) = kI(v)$

Put informally, a linear mapping is structure preserving in the sense that addition and multiplication maintain their properties in the final space. Under

the assumption made above that ***Merge*** can be formalized as a product, ***Interpretation I*** is structure preserving with respect to ***Merge.*** Notice that the final space of **I** is not a sub-structure of, but distinct from the original space.

1.4. Full and partial interpretation

Take a tri-radical root, associated to a phonological string $CV_1CV_2CV_3$, structured by (10) and (11) as in **(12b),** yielding (14).

(14)

CV_1	Π_2
CV_1CV_2	Π_1
$CV_1CV_2CV_3$	terminal level

The structure in (14) allows three applications of the ***interpretation*** mapping, at the terminal level, at Π_1, and at Π_2. In principle, a tri-radical stem can thus encode three sets of **morpho-syntactic** features.

Tri-radical stems do not always encode that many features. Regular stems in the well known Indo-European languages usually encode just two sets, conceptual and categorial features. This means that ***interpretation*** is optional: some elements in the initial space **are** not mapped to the final space.

Assume our tri-radical root in (14) is realized as a verb, and that its syntactic context includes the heads V, v and Infl.' The two options we will be concerned with below **are** ***interpretation*** of all prosodic levels, ***i.e.,*** perfect convergence between prosodic and syntactic structure, as depicted in **(15a),** and partial interpretation, ***i.e.,*** imperfect convergence, as depicted in **(15b)**.

(15)

a. full interpretation		b. ***partial interpretation***	
→ templatic inflection		***→ affixal inflection***	
C V_1	~> I	C V_1	~> v
C V_1 C V_2	~> v	C V_1 C V_2	~>
C V_1 C V_2 C V_3	~> V	C V_1 C V_2 C V_3	~> V

2. Why German Causatives Are *Weak*

To illustrate how this proposal generates new predictions, let us go through one example in some detail. Standard German (SG) has a class of verbs that inflect by means of stem vowel alternation. Those verbs have been called ***strong verbs*** by **Grimm** (1819).

SG strong verbs exhibit various, interacting stem-vowel alternations. Causativization illustrates this interaction most clearly: stems that inflect by stem-vowel alternation **(*i.e.*,** are ***strong)*** in their base form require a tense **affix**

(*i.e.*, are ***weak***), once the verb is causativized by stem-vowel alternation. That is, **causativization** blocks alternation for tense.

21. Alternations

2.1.1. Causativization versus tense

Take the strong verb ***springen*** 'to jump' in **(16a).** The corresponding causative verb ***sprengen*** 'to blow up' in **(16b)** is weak: its past tense vowel is identical with its present tense vowel, and tense is marked by the suffix ***-te.***

(16) a. strong verb:

infinitive	*past 3sg*	*gloss*
springen	sprang	*jump*
past tense ablaut		

b. causativized verb:

infinitive	*past 3sg*	*gloss*
sprengen	spreng-te	*blow up*
no ablaut		

Causativization by vowel alternation is an unproductive rule affecting, among other classes, a subset of strong verbs. Several melodic realizations of the alternation can be observed, some of which are given in ***(17).***

(17) a. strong verb:

infinitive	*gloss*	*stem V*
sitzen	*sit*	I
dringen	*penetrate*	I
fallen	*fall*	A
fahren	*drive*	A
fliessen	*flow*	I

b. causativized verb:

infinitive	*gloss*	*stem V*
setzen	*put*	A.I
drängen	*push*	A.I
fällen	*fell*	A.I
führen	*lead*	U.I
einflössen	*fill sb with sth*	A.U.I

Causativized verbs are weak: they do not show any vowel alternation between present stem and past stem, tense is expressed by the suffix ***-te.***

(18)

present 3sg	*past 3sg*	*gloss*
setzt	setzte	*put*
drängt	drängte	*push*
fällt	fällte	*fell*
führt	führte	*lead*
flößt ein	flößte ein	*fill sb with sth*

2.1.2. Tense and mood

Alternations with distinct morphological function do not altogether exclude each other. Strong stems form their conditional **(or *past subjunctive)*** by an alternation on the basis of the past tense vowel, as exemplified in (19): the element I is added to the vocalization of the past indicative.

(19)	*inf.*	*past 3sg*	*cond. 3sg*	*gloss*
	h<u>e</u>b-en	h<u>o</u>b	h<u>ö</u>b-e	*lift*
	A.I	A.U	A.U.I	

In sum, past tense marking by vowel alternation seems to be compatible with mood-marking by vowel alternation, but incompatible with causativization by vowel alternation. On any account known to us, incompatibilities of this kind must be treated as a coincidence and therefore, a mystery.

2.2. Analysis

In the framework sketched here, a given alternation, or indeed any melodic element, cannot be a marker of a morpho-syntactic category itself. Melodic elements are just what they are at face value: melodic elements.

The question our framework forces us to ask is whether a given entity in prosodic structure can be mapped on an entity in syntactic structure. Correspondingly, we are lead to ask a second question: Are the morpho-syntactic features we want to encode by distinct alternations on a single site members of a single set of features? In other words, do all alternations hosted by a given prosodic entity encode features of a single syntactic head?

Our prediction is that any single prosodic entity may not host alternations that attempt to encode features of distinct syntactic heads. This prediction is directly borne out by the data: ***conditional*** is arguably a feature of the tense node (cf. Iatridou 2000). Therefore, alternations encoding mood and tense are expected to coincide at a single site.

(20)

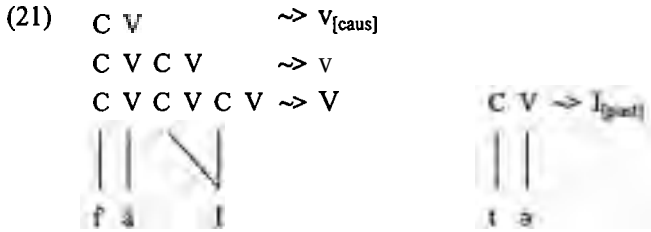
C V ~> $I_{[past,cond]}$

C V C V ~> v

C V C V C V ~> V

By contrast, the causativization alternation encodes an argument structural property that is standardly related to the syntactic head v. Once a given prosodic entity is mapped on v, it cannot be mapped on I. Thus the incompatibility.

(21)



3. Conclusion

To summarize, we have proposed a theory of the syntax-morphology interaction that aims at following minimalist guidelines. It strictly separates derivations in different domains, thereby reducing computational burden. It also limits itself to minimal assumptions regarding derivational technology, defining operations in simple, mathematical terms. After having illustrated the mechanisms of this theory with a simple example from German, there remains one substantial empirical challenge: the investigation of the more complex templatic systems in Afro-Asiatic languages, under the new perspective.

Notes

[1] The spell-out of empty vocalic positions is governed by the local environment under conditions defined in the *Empty Category Principle,* cf. Kaye, Lowenstamm & Vergnaud (1990). Lowenstamm (1996,1998) for details.

[2] Underlining indicates emphatic articulation.

[3] Root consonants attach to boxed positions; a is a categorial affix, c an inflectional affix, X and Z are syntactic heads.

[4] Notice that inverting (10) and (I I) is, in general, very difficult, hinting at a radical version of Chomsky's Phase Impenetrability Condition.

[5] We use the generic label 'Infl' for an inflectional head, without commitment to specific assumptions regarding its feature content.

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On the Nature of Syntactic Intervention

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1 Introduction

The present paper is concerned with the nature of locality in syntax. The locality principle which has gained importance in recent years, and which we will be concerned with, is Rizzi's 1990 Relativized Minimality principle (1).

(1) $\alpha > \beta > \gamma$

Relativized Minimality says that in a situation like (1) β blocks the establishment of a syntactic relation between α and γ if β c-commands γ (and is c-commanded by α) and is of the same type as α and γ.

Whereas the c-command requirement does not appear to be problematic, the characterization of what determines whether two elements are of the same type is still a matter of debate. Originally, Rizzi 1990 took the relevant types to be head, A-, and A-bar. But with the advent of the minimalist program the three-way distinction that Rizzi relied on is no longer available. Instead more fine-grained features must be sought. However, as soon as finer featural distinctions are made, one runs the risk of failing to properly constrain syntactic relations. As is well-known, the class of interveners (β) is often very general, and not point-by-point identical to α/γ. Consider (2).

(2) *who$_i$ did you say that [*to Sue*]$_j$ Bill introduced t_i t_j

Here a topic ***(to Sue)*** blocks the creation of a [+wh]-chain. Both topics and wh-phrases count as A-bar elements, but featurally, they are distinct ([+topic] vs. [+wh/+focus]). A detailed featural characterization would incorrectly rule (2) in if it required featural identity as the cause of intervention.

On the basis of facts like (2) Rizzi 2001a argues that intervention should be defined in terms of feature classes (see also Starke 2001). The syntactician's task then is define the relevant classes of features. The main goal of our project is shed light on this very issue.

Our starting point is Chomsky's 1995 suggestion that the Minimal Link Condition (i.e., Relativized Minimality) be part of the definition of movement.

Rizzi (2001a:101) argues against Chomsky's proposal on the basis of examples like (2). Chomsky's claim indeed appears to be too selective, as Move/Attract is defined in very precise featural terms. Once Minimality is made part of Move, the class of interveners is defined too narrowly (e.g., [+topic] elements are not expected to interfere in the establishment of a [+wh/focus] dependency). As a result, Chomsky (2000:123) refined his view by introducing the notion of ***defective intervention.***

Defective Intervention is best illustrated by means of the following paradigm from Icelandic (the data are taken from Boeckx 2000, where the agreement facts are discussed at length). As is well-known, Quirky subjects fail to trigger agreement on the finite verb (3), despite the fact that they behave for all other purposes as *bona fide* subjects.

(3) Stelpunum var hjálpað
The girls.Dat.pl.fem was.3sg helped.Neuter.sg
'The girls were helped'

Yet, the presence of a Quirky element inside the internal domain of the agreeing verbal element at the point of Spell-Out blocks the establishment of an agreement relation between the verb and a nominative element (4), which is otherwise possible (5).

(4) Mér fannst/*fundust henni leiðast þeir
Me.Dat seemed.3sg/3pl her.Dat bore they.Nom
'I thought she was bored with them'
(5) Mér *virðist/virðast þeir vera skemmtilegir
Me.Dat seem.3sg/3pl they.Nom be interesting
'It seems to me that they are interesting'

For Chomsky, the Quirky element ***henni*** in (4) is a defective intervener. It blocks an agreement relation even though it itself lacks the relevant property to trigger agreement in (the Quirky element's Φ-features are said to be 'inactive'). Understood this way, defective intervention may be represented as in (6).

(6) α *a* *a*
| | |
Probe inactive F Goal

However, the representation in (6) raises a host of questions. Note that defective intervention is defined in terms of (non-)activity of a feature, which may reasonably be characterized as a feature value (+/-). This goes against the grain of Chomsky's claim that featural relation like identity is defined in terms of feature, not feature value (Chomsky 2000:124). The problem gets worse for a

representation like (6) if we follow Uriagereka's (2000:2) proposal that "(…) de-activation of [a] feature [be understood] as feature deletion." If this suggestion is adopted, (6) is to be replaced by (7).

(7) α ø α

Clearly, no one expects intervention in a situation like (7) as the intervener lacks the relevant feature. However, prior to discarding the notion of defective intervention, one may want to address the following potential objection to our reasoning. Chomsky ties the inactivity of the quirky element's Φ-features in the Icelandic example motivating defective intervention to the lack of structural Case. So inactivity of a feature F in this case is linked to the absence of a feature F'. If so, by taking α to correspond to Φ-features and β to the structural Case feature, one may posit a configuration like (8) for Icelandic example (4). (We enclose the [-β] in brackets as its presence depends on one's position regarding Uriagereka's proposal stated above.)

(8) αβ α(-β) αβ

But for (8) to be a representation of intervention one must prevent the establishment of a β-relation by requiring that α and β be treated as an inseparable bundle for syntactic purposes. However, there is compelling evidence against such a requirement. For instance, accusative Case can be checked without triggering agreement on the verb. Likewise number agreement can take place in the absence of person agreement (e.g., past participle agreement in Romance), etc. So it is not at all clear how (8) constitutes an improvement over (6).

In Boeckx and Jeong 2002 we show that a schema like (8) obtains in many cases, but crucially without giving rise to intervention at all (see also Starke 2001). The only valid representation of intervention appears in (9) (what we dub 'Direct Intervention' for exposition purposes), where three relevant elements are specified (positively) for a given feature F.

(9) α α α

Due to severe space limitations, we only present one argument for defective intervention, which we then reanalyze and reduce to (9). For a full-blown discussion, see our 2002 paper.

2 A potential argument for Defective Intervention

In this section we offer data from Japanese that appear to provide rather strong evidence for the concept of defective intervention.

The process of object honorification in Japanese (10) provides a very clear case of what it would mean for an intervener to be defective.

(10) Taro-ga Tanaka sensei-o o-tasuke-si-taltasuke-ta
Taro-Nom Prof.Tanaka-Acc help-OH-past/help-past
'Taro helped Prof. Tanaka'

Since Shibatani 1977 subject honorification has been treated as an instance of (abstract) subject verb agreement. By parity of reasoning we take object honorification to be an instance of object-verb agreement.

In the first modem study of object honorification, Harada (1976:530) proposes the following rule called Object Honorific Marking:

(11) Mark the predicate as [Object Honorification] when an SSS (a person who is socially superior to the speaker) is included in
(a) the indirect object, if the predicate is ditransitive, or
(b) the direct object, if the predicate is transitive.

The relevant examples appear in (12)-(13). In (12), the verb is transitive, and it agrees with the direct object in honorification. In (13), we have a ditransitive predicate, and the verb agrees in honorification with the indirect object.

(12) Taro-ga Tanaka sensei-o o-tasuke-si-ta
Taro-Nom Prof.Tanaka-Acc help-OH-past
'Taro helped Prof. Tanaka'
(13) Hanako-ga Tanaka Sensei-ni Mary-o go-syookai-si-ta
Hanako-Nom Prof. Tanaka-Dat Mary-Acc introduce-OH-past
'Hanako introduced Mary to Prof. Tanaka'

However, Boeckx and Niinuma (in press) observe that (11) has to be refined in light of cases like (14). The predicate is ditransitive, as in (13), but this time the NP bearing the relevant feature to trigger honorification functions as the direct object. In such a case, object honorification (i.e., agreement between the verb and the direct object) is impossible. What this amounts to is that the honorific marker in a ditransitive predicate can only associate with the indirect object, not the direct object.

(14) *Hanako-ga Mary-ni Tanaka Sensei-o go-syookai-si-ta
Hanako-Nom Mary-Dat Prof. Tanaka-Acc introduce-OH-past
'Hanako introduced Prof. Tanaka to Mary'

Boeckx and Niinuma (in press) argue that (14) constitutes a case of defective intervention. That intervention is indeed defective comes from the fact that the indirect object itself cannot trigger honorific agreement (it fails to refer to a socially superior person, hence lacks the relevant feature), but nevertheless prevents the direct object (which has the relevant feature) from agreeing with the verb.

Since switching the surface order of the direct object and of the indirect object does not affect honorification marking (see (15)), Boeckx and Niinuma claim that it must be the case that honorific agreement takes place prior to word order permutation.

(15) *Hanako-ga Tanaka Sensei-o Mary-ni go-syookai-si-ta
Hanako-Nom Prof. Tanaka-Acc Mary-Dat introduce-OH-past
'Hanako introduced Prof. Tanaka to Mary'

They take this to mean that agreement takes place under Chomsky's derivational version of Agree, which applies as soon as the Probe (in this case, v) is introduced into the derivation. To capture the relevant defective intervention effect, they take the dative element to c-command the accusative element. If the reverse were a possible base order, the accusative element would have a chance of being closer to the functional head triggering agreement (say, v), and there would be no defective intervention. The relevant structure is provided in (16).

(16) $[_{vP}$ v $[_{VP}$ IO $[_{v'}$ DO V]]]
|___X___| Agree

Analyzed in this light Japanese object honorification is virtually identical to the Icelandic case that Chomsky took to motivate Defective Intervention: an element β blocks the establishment of an Agree relation between α and γ, even though β lacks the crucial property to enter into an Agree relation with α, as schematized in (17).

(17) α β γ
v IO DO
| | |
+hon –hon +hon → Defective Intervention

3 No Defective Intervention

Consider now an argument against Defective Intervention, coming from the well-known asymmetry in amount wh-phrase extraction in French. As discussed

extensively in Obenauer 1984 and Rizzi 1990, French allows wh-extraction of the whole 'combien'-phrase across a quantificational adverb like 'beaucoup' (a lot) (18), but prohibits the extraction of the 'combien' portion in such a context (19). ((20) illustrates the fact that extraction of the 'combien' portion is independently attested.)

(18) combien de livres a-t-il beaucoup lu
how-many of books has-he a lot read
'how many books did he read a lot?'
(19) *combien a-t-il beaucoup lu de livres
(20) combien a-t-il lu de livres

(19) is the easiest case to represent. It may be reasonable to posit a schema like (21), where the target of movement and the adverb both possess a quantificational feature of sorts (say, Q). In such a case it is not surprising to see an intervention effect.

(21) C ADV combien ([de NP])
| | |
+Q +Q +Q

The example in (18) requires an additional piece of information to be generated (under any theory, as far as we can tell). As has been recently observed by Obenauer 1994 and Rizzi 2001b movement of the whole 'combien de NP'-phrase yields a specific, more D-linked-like reading that is absent from a bare 'combien' extraction. Rizzi goes even as far as saying that the whole 'combien de NP' phrase raises not to FocusP (the normal landing site for wh-movement), but to a higher TopicP (see Grohmann 1998,2000 on wh-phrases as topics). We believe that Rizzi's intuition is correct, but instead of appealing to a Topic feature (which would be odd for a wh-feature), we would like to make use of Φ-features to characterize presuppositional readings of wh-phrases (the idea being that Q-features further encode the wh-phrase into context). Thus we obtain a representation like (22).

(22) C ADV combien de NP
| | |
+Q+Φ +Q +Q+Φ

Assuming Direct Intervention, (22) correctly rules (18) in (adverbs lacking Φ-features generally). By contrast, Defective Intervention, as shown in (23), incorrectly predicts the sentence to be ungrammatical (the presence of a Q-feature on the adverb is enough to trigger intervention).

(23) α β γ
C ADV combien de NP
| | |
+Q +Q +Q
+Φ -Φ +Φ → Defective Intervention

The combien-extraction facts in French thus offer an argument against Defective Intervention.

4 Revisiting the evidence

Let us take stock. So far we have obtained conflicting results. The case discussed in section 2 correspond schematically to (24), or, if features are privative (monovalent), to (25).

(24) +α+β +α-β +α+β
(25) +α+β +α +α+β

In this cases, such configurations yield deviance. Surprisingly, the very same configurations were shown to yield a grammatical result in section 3.

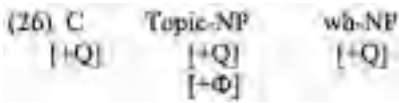
For reasons outlined already in section 1 'Defective Intervention' does not appear to be an optimal concept, relying as it does on a value/feature of a feature. Therefore we would like to explore the possibility of dispensing with it by revisiting the evidence gathered in section 2. Specifically, we would like to argue that a different feature from the one used above can be appealed to, which will have the effect of triggering an instance of Direct Intervention.

Reconsider the Japanese object honorification case. From the perspective of the [honorific] feature, a sentence like (14) indeed offers a case of defective intervention. But the argument for defective intervention disappears once we claim that honorification is a specific value of a more general [person] feature (think of the many languages like French who use a special form of the 2nd person to mark honorification). Recall now that values do not matter in syntax, only features do. Once [person] is taken into account, the dative element in (14) is a 'direct' intervener: it may not have the appropriate value for honorification, but it certainly does have a [person] feature, which causes intervention.

Two more cases need to be discussed here before defective intervention can be said to be dispensable: the Icelandic facts that served as the original evidence for Defective Intervention, and the Topic-island exemplified in (2). They too must be made compatible with Direct Intervention.

Let us start with the Topic island. On the face of it, the example does not lend itself to Direct Intervention, as Topicalized and Focused elements do not obviously share any feature. But if we regard them both as quantificational

elements (forming operator-variable chains), possessing a [+Q] feature, then (2) may be represented as in (26).



From this perspective, [wh] and [topic] would be values of a [Q]-feature. The feature structure of A-bar elements have been less studied than that of A-elements, and offering a full-blown justification for (26) goes well beyond this short paper. What we just did is show a way of making (2) compatible with Direct Intervention. In light of the theoretical and empirical worries raised here against Defective Intervention, the hypothesized structure in (26) certainly gains in validity.

Finally, Icelandic cases like (4) argue for Defective Intervention only if Intervention is defined at the level of actual valuation (in which case Quirky elements are inactive), but at the level of Match, the very first suboperation in the establishment of a Probe-Goal relation (Chomsky 2000; Boeckx 2001), Quirky elements are as active as any other NP, and certainly possess the relevant @-features. So all we need to enforce is the computation of locality (Minimality) right at the level of Match, the very first step in an Agree-relation so as to avoid recourse to Defective Intervention. This makes sense if locality (Minimality) is part of the Agree operation. Since the latter applies as soon as possible, it is plausible to claim that the former also applies as soon as possible. In this case, it means that Minirnality is computed at the very first level of Agree: Match. It may be said that defining Minimality at the level of Match, as opposed to that of actual valuation, makes locality more representational, since Match is a more 'passive' step than Valuation. Though correct, this conclusion does not force upon us the idea that syntax is representational. It simply means that syntax makes use of the representations that are generated in the course of the derivation as inputs for further operations.

5 Conclusion

The central question in this brief note has been whether intervention effects should hold when the putative intervener is 'defective.' Contrary to Chomsky 2000, and despite the apparent evidence we adduced in favor of his position in section 2, we have concluded that only interveners that fully match the Probe and Goal featurally should block Agree. Apparent cases of Defective Intervention have been reanalyzed in a way consistent with our position. Needless to say, many more cases must be examined before this conclusion can be endorsed (see Boeckx and Jeong 2002).

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Focus Movement and Ellipsis in Italian

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1 Introduction

A focused constituent in Italian occupies naturally a low position in the clause. However, it can also move to a left-peripheral position. The latter position is restricted to focus expressing contrast, as the exchanges below show:

(1) a. Che cosa ha vinto Gianni?
'What did Gianni win?'
b. ?? [La **medaglia**]$_F$ ha vinto, Gianni.
the medal has won Gianni
'It is the medal that Gianni won'

(2) a. La **coppa,** l'ha vinta Gianni.
'As for the cup, Gianni won it'
b. No, [la **medaglia**]$_F$ ha vinto Gianni.
'No, it is the medal that Gianni won'

The difference between (1) and (2) led many linguists (Rizzi 1997, Belletti forthcoming, among others) to distinguish between two types of focus in Italian: 'information' focus and 'contrastive' focus.

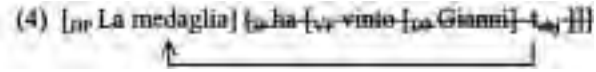
In this paper I shall to bring some evidence that there are no syntactic[1] differences between the two foci, by showing that also focus carrying new information can move to the left (par. 2). In particular, I will show that the marginality of (1a) is not due to differences between the two foci, but to contextual factors that condition the occurrence of ellipsis (par. 3).

2 Movement

Rather than ungrammatical, sentence (Ib) sounds heavy, redundant. A short answer with the focused item alone is much better, as illustrated below:

(3) a. **Che** cosa ha **vinto Gianni?**
'What did **Gianni** win?'
b. **[La medaglia]$_F$.**
'The medal'

I propose that the answer in (3b) derives **from** (lb). The focused constituent moves to the left and than deletion of the non-focused part of the sentence applies (a case of 'bare-argument ellipsis'), as shown by the following representation:



If the focused constituent remained in **situ,** it would be embedded in a larger constituent containing also the non-focused part, and ellipsis would be forced to apply to a chunk of that constituent:

Therefore, in these sentences movement is the first necessary step in order for ellipsis to apply.

A proposal similar to the one just made is that of Alonso-Ovalle and **Guerzoni** (forthcoming), within their analysis of n-words in Italian.

They propose that Italian n-words behave like **NPIs,** but are different **from** other **NPIs** because they cany a negative feature that must be checked. When an n-word stays in post-verbal position, the negative feature is checked by the above negation that binds it:

(6) Non ho visto **nessuno.**
(I) not have seen nobody
'I didn't see anyone'

When the n-word stays in preverbal position, **feature-checking** takes place via movement to the specifier of a Focus head.[2] There, the n-word is licensed by an abstract negation. This is not implausible, since negation and focalization have many properties in common. **FocP** is conceived as a head hosting several features of the same 'family', such as focus and polarity.

In (7b) below, the same movement for checking purposes takes place, and then 'bare argument ellipsis' applies **(cf.8).**

(7) a. Chi hai **visto?**
'Who did Mary see?'
b. **[Nessuno]$_F$.**
'Nobody'

(8) [$_{FocP}$ Nessuno$_i$ [$_{Foc}$ ø $_{+neg}$ [$_{IP}$ ho visto t_i]]]
nobody (I) have seen

In this way Alonso-Ovalle and Guerzoni give a unified account for post-verbal, preverbal and isolated n-words?

3 Ellipsis

3.1 Subject omission

Up to now, I have shown that movement of information focus is possible.

Nevertheless, I have not explained yet why a sentence like (1b) is marginal. Marginality seems to be related to lack of ellipsis, which would be possible, since the focused constituent has moved out of the non-focused constituent. Why though should ellipsis be necessary in order to make the sentence fully acceptable?

Before giving an explanation to that, consider a different phenomenon, that is pre-verbal subject omission. Lambrecht (1994) observes that the occurrence of a subject pronoun in a coordinate clause in English depends on the information structure of the two clauses. His examples are the following (underscoring indicates words bearing stress):

(9) John married rosa, but didn't really love her.

(10) a. Who married Rosa?
b. John married her, but he didn't really love her.
b.' *? John married her, but didn't really love her.

In (9), where the subject of the first clause, John, is not focused, the omission of he in the second clause is possible; in (10), where John is focused, the pronoun cannot be omitted.

Lambrecht says that the contrast between (9) and (10) is explained "if we make the functionally reasonable assumption that for an argument to appear in phonologically null form in English the referent of the argument must have been established as a topic in previous discourse" (Lambrecht 1994:136).

This does not hold only for English, though. Grimshaw and Samek-Lodovici (1998) make analogous observations for Italian subjects. They say that null subjects in Italian occur whenever they have a topic as antecedent.

To prove that, they consider passives. A preverbal subject is a topic, a *by*-phrase is not; therefore, the prediction is that a passive sentence does not license a null subject. This is born out by the examples below:

(11) a. Questa **mattina,** la mostra **e' stata visitata** da **Gianni$_i$.**
this morning the exhibition was visited by John
'This morning, the exhibition **was** visited by John'
b. **Piu'** tardi, ***e$_i$ / egli$_i$ / lui$_i$** ha visitato l'universita'.
more late (he) / he has visited the university
'Later on, he visited the university'

(12) a. **Questa mattina, Gianni$_i$** ha visitato la mostra.
'This morning, John visited the exhibition'
b. Piu' tardi, **e$_i$ / ?egli$_i$ / ??lui$_i$** ha visitato l'universita'.

In other words, Lambrecht (1994) and Grimshaw and **Samek-Lodovici** (1998) observe that the absence of a preverbal subject in a sentence depends on the presence of an antecedent for that subject with the same discourse status. Assuming that preverbal subjects have topic properties (cf. **Strawson 1964),** the antecedent must be a topic as well.

3.2 Ellipsis of background material

I would like to make a generalization regarding not just subjects, but background material in general, that is similar to that made by Lambrecht (1994) and by **Grimshaw** and **Samek-Lodovici** (1998). Under the assumption that ellipsis is an instance of **anaphora,** and therefore that elided material must have an antecedent (see Williams **1997),** I argue that:

(13) Ellipsis of background material in a sentence applies if the elided material has an antecedent with the same discourse status.

Such a generalization is meant to explain why the short answer in (3b) is preferable than the full answer in (lb).

To see how, consider wh-question-answer pairs. I assume that the wh-phrase of a question, which corresponds to the focused constituent in the answer, is always the focus of the question. In other words, a wh-question and its answer have corresponding foci. Since I assume that there can be only one focus per sentence in Italian[4], then in a whquestion also the background part will correspond to that of the answer. Therefore, the background part of the answer can always be omitted, because it has an antecedent in the question with the same discourse status.[5]

(14) a. [Che **cosa**]$_F$ ha **vinto** Gianni?
'What did Gianni win?'
b. [La **medaglia**]$_F$ **ha vinto Gianni.**
'The medal'

Consider now contrastive exchanges. The informational partition of a contrasting sentence can be either the same or different from that of the preceding sentence. If the background part of the contrasting sentence has no antecedent in the preceding sentence, then ellipsis is not allowed, as it is shown in (2), repeated below as (15).

(15) a. La coppa, l'ha vinta [Gianni]$_F$.
'As for the cup, Gianni won it'
b. No, [la medaglia]$_F$ *(ha vinto Gianni).
'No, the medal'

Nevertheless, it is possible that the background part of a contrasting sentence has an antecedent; in this case, given (13), ellipsis applies, like it happens in question-answer pairs:

(16) a. Gianni ha vinto [la coppa]$_F$.
'Gianni won the cup'
b. No, [la medaglia]$_F$ (?ha vinto Gianni).

The difference between (15) and (16) holds also between examples (17) and (18), where it is the subject, rather than the object, that is focused.

(17) a. Paolo ha vinto [la coppa]$_F$.
'Paolo won the cup'
b. No, [Gianni]$_F$ *(ha vinto la coppa).
'No, Gianni won the cup'

(18) a. La coppa, l'ha vinta [Paolo]$_F$.
'As for the cup, Paolo won it'
b. No, [Gianni]$_F$ (?ha vinto la coppa).
'No, Gianni won the cup'

When the elided predicate is the verb alone, in Q-A pairs and in contrastive contexts behaving like Q-A pairs the contrast between sentences with ellipsis and sentences without ellipsis is smoother, but it still remains. This can be seen in the following examples, where the first person subject has been dropped: [6]

(19) a. [Che cosa]$_F$ hai vinto alla gara?
'What did you win at the race?'
b. [La maglietta]$_F$ (?ho vinto).
the T-shirt (I) have won

'I won the T-shirt'

(20) a. [La felpa]$_F$ hai vinto, vero?
'It is the sweatshirt that you won, right?'
b. No, [la maglietta]$_F$ (?ho vinto).
'It was the *T-shirt* that I won'

However, when the contrastive context is one in which the predicate is the only focus of the first clause, and has a background status in the second clause, the contrast between clauses with ellipsis and clauses without ellipsis is quite strong:

(21) a. Non hai vinto la medaglia, ma la felpa, almeno, [l'hai vinta]$_F$.
'You didn't win the medal, but at least you *won* the sweatshirt'
'You *won* the sweatshirt, didn't you?'
b. No, [la maglietta]$_F$ *(ho vinto).
'No, it was the T-shirt that I won'

In conclusion, the idea that only a contrastive focus can move to the left is just an illusion, namely, it depends on the fact that, while in contrastive contexts it *can* be the case that the best option is the one where the sentence is fully pronounced (cf. 15, 17, 21); in question-answer pairs, on the contrary, the option with ellipsis is always the preferred one (cf. 14, 19). Since information focus is always exemplified by the answer to a whquestion, then it will never be visible in high position, but always in isolation, so the impression is that it never moves to the left.

3.2.1 English

English data support the idea that conditions on ellipsis are related to discourse factors. Consider the sentences with focused subjects in (22)-(24). Most of my informants gave judgements that pattern with the corresponding Italian ones. They prefer to elide in question-answer pairs and when the contrasting sentence and the previous one have corresponding information structures, and not to elide when the two sentences have non-corresponding information structures:

(22) a. [Who]$_F$ won the medal?
b. [John]$_F$ did / *won the medal.

(23) a. As for Peter, he won [the medal]$_F$.
b. No, [John]$_F$ did / *won the medal.

(24) a. As for the medal, [Peter]$_F$ won it.
b. No, [John]$_F$ *did / won the medal.

The only difference between English and Italian is that English short answers require the auxiliary do.

In fact, ellipsis concerns the VP in English, while the IP in Italian. Such a difference is discussed by **Donati** (2000). **Donati's** examples in (25) are similar to the ones that we are concerned with here. In the Italian example in **(25a),** she accounts for ellipsis in a similar way as I account for ellipsis in (4). She says that the focused subject moves to a position higher than the IP **(FocP,** in **Donati's** proposal) and then deletion of the IP applies, like it is represented in **(26).**

(25) a. Bill mangia, e Paolo anche.
b. Bill eats, and Paul does, too

(26) [$_{FocP}$ Bill [$_{IP}$ t mangia [$_{VP}$ t t]]] e [$_{FocP}$ Paolo [~~$_{IP}$ t] mangia [$_{VP}$ t t~~]]]

As for the English counterpart in **(25b), Donati** observes that in this language the verb does not rise to I, so the focused subject is not in the same constituent as the verb, and this exempts it form rising higher. This explains why in English it is not necessary to elide the entire IP, but just the VP.

(27) [[$_{IP}$ Bill [$_{VP}$ t eats]] [and [$_{IP}$ Paul [$_{VP}$ t eats]]]]

The same account is valid for the elided sentences in (22)-(24) above:

(28) [$_{IP}$ John [$_{VP}$ t won [$_{DP}$ the medal]]]

Consider now focused objects. Also in this case, according to most of my **informants,** English and Italian do ellipsis under the same conditions:

(29) a. [What]$_F$ did John win?
b. [The **medal**]$_F$.
c. ?? It was [the medal]$_F$ that he won.
d. * [The medal]$_F$ he won

(30) a. John won [the cup]$_F$.
b. No, [the medal]$_F$.
c. ?? No, it was [the medal]$_F$ that he won.
d. * No, [the medal]$_F$ he won.

(31) a. [John]$_F$ won the cup.
b.?? No, [the medal]$_F$.
c. No, it was [the medal]$_F$ that he won.

d. * No, [the medal]$_F$ he won.

In this case, English behaves like Italian also with respect to the syntax. Neither language allows ellipsis without movement of the focused constituent to the left. In fact, in both language the focused object is embedded within the constituent that has to be deleted, namely the IP.

(32) a. [$_{DP}$ La medaglia] [$_{IP}$ [$_{I'}$ ho [$_{VP}$ vinto t]]].
b. [$_{DP}$ The medal] [$_{IP}$ he [$_{VP}$ won t]].

This explains why in English the elided sentences in **(29b), (30b), (31b)** are not accompanied by the auxiliary ***do***. What remains unexplained, though, is why a sentence with focus movement ***without*** ellipsis is never allowed in English, but a cleft must replace it (cf. **29c,d, 30c,d, 31c,d).**

Summarizing, although the syntax of English is different from that of Italian, the pragmatic effects determining the presence or absence of background material are the same in both languages.

3.3 Information focus movement without ellipsis

I have shown that information focus movement is possible in Italian and that its apparent absence is due to the fact that contexts like Q-A pairs always trigger ellipsis of background material in the answer, so that movement of the focused constituent is never visible.

In order to see this more clearly, we should find a context for focus carrying new information that does not provide an antecedent for background material. I believe that the following sentences occur in such a context:

(33) Sai, l'ho scoperto: [uno studente]$_F$ aveva rubato quel libro.
know-2sg cl-acc have1sg found out a student had stolen that book
'You know, I found it out: it was a student who stole that book'

(34) Ora ricordo: [tuo padre]$_F$ ho visto sabato scorso.
now (I) remember your father (I) have seen Saturday last
'Now I remember: it was your father that I saw last Saturday'

Both sentences are pronounced 'out-of-the-blue', This is clear in **(33),** for instance, which begins with ***Sai...***'You know...'. Although they are in out-of-the-blue contexts, these sentences do not have broad focus, but narrow focus on ***uno studente*** 'a student' and on ***tuo padre*** 'your father' respectively. It is important to notice that these foci are not used to contrast or correct anything, but they simply carry new information.

Consider for example (33). The speaker's background information is that someone stole a book. We can imagine that the speaker has in mind a previous

conversation where the fact that she saw someone was under discussion. However, since the sentence is pronounced out-of-the-blue, no antecedent is present at the moment of the utterance for the background part of (33). Given the generalization proposed in **(13),** the prediction is that ellipsis does not apply, and in fact it doesn't.

3.4 Answers to d-linked whquestions

The proposal made in this paper allows me to account for certain Italian data that E. Kiss (1998) presents in order to bring evidence of the existence of two semantically different foci in Italian.

8. Kiss (1998) proposes a general distinction across languages between two types of focus that she calls 'identificational focus' and 'information focus'. She says that the main semantic difference between the two foci is that the former expresses 'exhaustive identification', while the latter merely expresses non-presupposed information. Although she mainly bases her analysis on data from Hungarian and English, she suggests.that the distinction holds also for Italian. She says that contrastive focus corresponds to identificational focus in that language. She claims that in Italian an identificational focus is both exhaustive and contrastive, and this means that

> The use of an identificational focus is possible only if the domain of identification is a closed set of individuals known to the participants of the discourse **(É.** Kiss **1998: 268).**

As a consequence, a question with a discourse-linked wh-phrase (see Pesetsky 1987) will require an answer with an identificational focus, because a d-linked wh-phrase requires the speaker to select an individual from a closed set of known candidates. Her examples are the following:[7]

(35) a. Chi ha **rotto** il vaso?
who has broken the vase
'Who broke the vase?'
b. Il vaso, l'ha **rotto** ***Maria.***
'Maria broke the vase'
c. # MARIA ha **rotto** il vaso.
'It is Maria who broke the vase'

(36) a. Chi di voi due ha **rotto** il vaso?
which of you two has broken the vase
b. MARIA ha **rotto** il vaso.
'It is Maria who has broken the vase'

In **(35),** an answer with a preverbal (that is identificational) focus is not allowed, because the wh-phrase of the question is not **d-linked;** in **(36),** instead, the answer with preverbal focus is possible, because the d-linked wh-phrase ***chi di voi due*** 'who of you two' requires that the referent for the answer is selected fiom a closed set of known candidates, and such a requirement is satisfied by the identificational focus.

Elsewhere (see footnote 1) I have shown that 'exhaustive identification' is never a property of focus in Italian, neither when the focused constituent expresses contrast **and/or** moves to the left periphery, nor whent it carries new information. In fact, the differences between the exchange in (35) and that in (36) can be explained without having to postulate two semantically different foci.

In par. 3.2. I have assumed that a wh-question has always the same informational partition as its answer, that is: the wh-phrase corresponds to the focused part, the rest of the question corresponds to the background part of its answer. I argue that this informational partition changes if the wh-phrase of the question is d-linked. In fact, d-linking requires familiarity, **givenness** of the possible referents from which an answer is chosen. Therefore, the properties of a d-linked wh-phrase are close to those of background material, not of focus.

If this is true, then no surprise that an answer where focus is preverbal and more importantly post-focal material is not elided is given to a question with a d-linked wh-phrase. The informational partition of the question is now reversed, so it is different fiom that of its answer, as it is clear **from (36),** repeated below as (37).

(37) Q: Chi di voi due [ha **rotto** il **vaso**]$_F$?
'Who of you two broke the vase?'
A: [**Maria**]$_F$ ha **rotto il** vaso.
'Mary broke the vase'

The background part of the answer does not have a discourse antecedent in the question. Therefore, given **(13),** ellipsis does not apply, in accordance with the data.

4 Conclusion

In this paper I have shown that information focus movement is possible in Italian, but it is usually not visible because, in the context where information focus occurs, namely in an answer to a wh-question, ellipsis of post-focal material always apply.

In fact, I have argued that ellipsis applies whenever the elided background material has an antecedent with the same discourse status. This is the case of

whquestion-answerpairs, unless the wh-phrase is d-linked.

If the wh-phrase is d-linked, it has properties of **givenness** that are similar to those of background material. Therefore, the informational partition of a question with a d-linked wh-phrase is reversed than that of a 'normal' question. As a consequence, the background part of its answer does not have an antecedent with the same discourse status, and ellipsis does not apply.

I have **further** shown that the same discourse conditions on ellipsis are present in English, although the syntax of English is different as far as sentences with focused subjects are concerned

Finally, I have presented data showing that in contexts not involving **wh-**questions, such **as** out-of-the-blue contexts, information focus movement can occur without simultaneous ellipsis of the rest of the sentence.

Notes

I wish to thank Adriana Belletti, Rose-Marie Dechaine. **Valentina** Bianchi, Marcel **Den Dikken,** Elena Guerzoni, Rita Manzini, **Luigi Rizzi,** Linda **Tamburri** for helpful comments and discussions on this work. All errors are mine.

1 In **Brunetti** (in prep, forthcoming) I bring evidence that there **are** no semantic differences **either,** between the two foci.

2 They assume **Rizzi's** (1997) left periphery. Rizzi's left periphery derives from the split of the C head into the following more specialized heads:

(i) **[ForceP** [TopP* [FocP [TopP* **[FinP [IP**

'Force' expresses the **illocutive** force of the sentence; 'Top' is a head dedicated to **topicalized** material and can iterate, as indicated by the asterisk; **'Foc'** is the head dedicated to focused material and cannot iterate; 'Fin' is the head expressing the finiteness of the sentence.

3 My proposal differs from that of **Alonso-Ovalle** and **Guerzoni** only in the idea that it is not necessary that a focused constituent occupies a Focus position, dedicated to it.

Rizzi (1997) says that focus is an operator. When the operator moves to **FocP,** it teaches its scope position. I would rather suggest that a focused constituent is the ***argument*** of an operator, and moves to the left to associate with that operator. The operator is **phonologically** null, but it functions in the same way as overt operators like 'only', 'also', etc. In other words, my suggestion is that association with focus occurs whenever focus occurs, but **sometimes** the operator is null. For further discussion, see **Brunetti** (forthcoming).

4 Cf. **Rizzi** (1997). Belletti (forthcoming).

5 But see the discussion aobut d-linked wh-phrases in par. **3.4.**

6 Judgments are not homogeneous among speakers. According to some informants, contrastive sentences are fully acceptable with a verb following the focused element, while answers to **wh-**questions are not. **Ather** informants say on the contrary that both **are** acceptable. I think this variety of judgments depends on the fact that the differences between short and full sentences in this cases are very subtle.

7 Italics indicate the information focus, capital letters indicate the **identificational** focus.

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Disjoint Anaphora and Reciprocals in Salish

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1 Introduction

This paper begins by addressing an intriguing formal similarity between a class of discourse-topic regulating morphemes in Salish known as ***topical object markers*** and the pan-Salish reciprocal morpheme. As first pointed out by Kinkade (1988), the reciprocal morpheme historically contained a topical object marker, suggesting the two are more than casually connected.

Relating the two morphemes syntactically and/or semantically, however, proves more difficult. At first glance, the two have little in common: topical object markers (as their name suggests) enforce coreference between the pronominal object of a transitive predicate and the protagonist ('topic') of a discourse, whereas reciprocals in Salish, as elsewhere, are anaphors which require a locally c-commanding group-denoting antecedent but enforce a disjointness condition on each proper subpart of the group.

I argue here that an apparently aberrant 'topical object' marker, the ***non-topical subject marker*** found ***in*** the Northern Interior Salish language Lillooet (a.k.a. St'át'imcets) provides the requisite missing link. This marker ***prevents*** coreference between the discourse topic and the subject, rather than ***coercing*** coreference between the discourse topic and the object. As such, it can be linked to both its topical object cognates (via reanalysis from non-topical subject to topical object) and to the reciprocal (via the disjointness condition which is common to both).

The fact that reciprocals in Salish contain a disjoint component in turn suggests an analysis of reciprocals which is in some ways the inverse of the standard approach advocated by Heim, Lasnik and May (1991): rather than consisting of a referring expression containing an anaphor, reciprocals in Salish (and perhaps universally) are anaphors (much like reflexives) containing a disjoint element.

2 Topic Maintenance and Topical Objects in Salish

Several Salish languages possess what is known as a ***topical object*** marker, following Kinkade (1989, 1990):

> The morphological markers that I am calling 'topical objects' are special object inflections used to keep track of a topic when it is not an **agent/subject,** and specifically when it is the patient (or the like) of a transitive construction (which in its default role would be a direct object). (Kinkade 1989:11)

Topical object markers form part of the discourse tracking system characteristic of all Salish languages. The central component of this system is a rigid mapping from the ***primary*** discourse topic (the protagonist or most salient discourse referent in a given stretch of discourse) to the subject position of a transitive predicate, which is in turn typically associated with the agent theta role (see **Kroeber** 1987, Davis 1994). A typical discourse fragment from Lillooet will serve to illustrate the system (van Eijk and Williams 1981: 58).

(1) **q^{w}úšxitaš** ta **x̌zúma šx̌^{w}əláxken**
"He$_{i}$ shot a big **buck.**

niɬ šk^{w}ánaš, nit **šḱihmíṅaš** ʔayɬ, **niɬ** s**ʔúx^{w}aḻš**.
"Then **he$_{i}$** took it, **he$_{i}$** put it on his back, and **he$_{i}$** took it home."

Here, as is typical, the primary discourse topic is represented throughout by a null pronoun (pro) associated with the third person subject agreement marker **-aš**. This means that in the first line, the overt DP [ta *x̌zúma šx̌^{w}əláxken]* "a big buck" must be interpreted as object rather than subject. In the second line, where both arguments are pro, the discourse topic is still associated with the subject position: this shows us that it is the topic → subject mapping that is responsible for the default interpretation of the DP as object in the **first** line, rather than an alternative 'DP → object' mapping, with the subject being realized as a default pro.

The topic → subject mapping has two useful consequences for the Salish speaker. First, it allows for the efficient tracking of the primary discourse topic through quite lengthy stretches of discourse, since the topic will always correspond to the subject of a transitive predicate. Second, in transitive clauses with a single overt DP (which comprise the vast majority of transitive clauses in all Salish languages) the DP will always be interpreted as a non-subject (typically, a direct object), since the discourse topic will be (a) associated with the subject and (b) represented by a null pronominal. Since argument **DPs** in Salish are generally not distinguished by case-marking this mapping serves to disambiguate subject and object DPs.[2]

Notice, however, all this depends on a consistent three-way correspondence between discourse topic, subject, and agent. In cases where the correspondence fails to hold, special topic maintenance devices must be employed. Across Salish, there are two such devices. The **first,** passive, disrupts the **subject=agent** relation by demoting the agent, thereby allowing the patient to map to subject, where it will in **turn** be associated with the discourse topic. Passive is used in all

Salish languages to maintain topic continuity (see Kroeber 1987). An illustration from Lillooet is given in (2) (van Eijk and Williams 1981: 57):

(2) **xʷiḱxitə́m** kʷu? ta **taχʷ?ačša,** nit **ƛ̓u? szuhumčiṅəmnəm.**
"He$_i$ was handed his bow, and **he$_i$** was bade farewell,

kʷanxitə́m kʷu? ki **xʷ?učinálqʷa,** ki **qʷəšmálčša, niɬ ƛ̓u? šmáyšxitəm.**
"Four of his arrows were taken from **him$_i$,** and they were **fixed** up for **him$_i$."**

The other, much less familiar topic-maintenance device, attested in six out of twenty three Salish languages, is the topical object construction, which interferes with the mapping from topic → subject, rather than that from subject → agent. Textual examples from three of the six languages with topical objects are given below, from Kinkade (1989). (Nb: gender is not marked in the Salish pronominal system, so it cannot be used as a discourse tracking device.)

(3) ***Upper Chehalis***
tit **q̓'iyúts, hóy** n **ta** ?əx̌twali
"He$_i$ called **her$_j$** and then **she$_j$** saw **him$_i$** (the one who called)."

(4) ***Columbian***
?alkíc ?atu kkíy̓a?s,
"He$_i$ got back to his **grandmother$_j$,**

kʷa? **cús, 'ha?əm··,** kn **tqnúxʷ.'**
"and **he$_i$** says to **her$_j$,** 'Oh **my,** I'm hungry.'

kʷa? **cúntus, 'sta··ṁ....?.'**
"and **she$_j$** says to **him$_i$, 'Wha...**t?'"

(5) ***Lushootseed***
t̓əl̓qayd ti?ə? qəlx̌ ?al tsi?ə? yiyəq̓ʷus
"He$_i$ soaked these salmon eggs in a small basket

stabigʷstagʷi ?a **tsi?iɬ kia?s.**
"which his grandmother had given him$_i$."

Topical object markers have the following properties:

(i) They occur only in transitive sentences with two third persons.

(ii) They occur in the regular object **suffix** slot, following **transitivizers,** replacing object inflection, and preceding subject **inflection.**[3]

(iii) They license an object which is obligatorily anaphoric to the discourse topic.

A seventh language, Lillooet, has an aberrant variant of the topical object marker, which, though historically related to topical objects, and serving the same discourse function (to maintain topic continuity when topic ≠ subject), neither marks object nor topic. Instead it marks a ***non-topical subject.*** More specifically, the non-topical subject marker has the following properties:

(i) It occurs only in transitive sentences with two third persons.

(ii) It replaces all object and subject inflection (i.e., it is not an object marker).

(iii) It occurs only when the transitive subject has been extracted via A'-movement (in relative clauses, WH-questions, clefts, and quantifier raising environments).[4]

(iv) It licenses a subject which is obligatorily ***disanaphoric*** to the discourse topic.

These properties are illustrated in (6-7), from van Eijk and Williams (1981); note that the passive in the fourth line of (6) performs exactly the same function as the non-topical subject marker in the thud line.

(6) xʷʔaz kʷanswa **zwátən ɬnkàʔməxás** ka ti? kʷu ti? kʷu **smúɬac**
"I don't know which people that **woman$_i$** came from,

ɬənkáʔaš ka ti? **ɬɬiqaš**
"where it was **she$_i$** came from.

niɬ kʷu? **ɬu?** **šwaʔš ʔi** wa? **qʷaɬùtmintáli**
"So there were those who proposed to **her$_i$**;

cixʷ kʷu? **ʔayɬ** ti **pápəlʔa šqayxʷ, qʷaɬùtminəm**.'
"One man came, and proposed to **her$_i$**."

(7) nit kʷu? ti? **šqʷə́qʷəɬš šHarry** Carry na **šəmʔámša, šqʷáɬnas ʔi**
"That story was told by Harry Carry's **wife$_i$, she$_i$** told the people

šáma? ka kʷu **šqwaɬəntáli**
"It must have been a white person who told **her$_i$**."

Cognates of the topical object marker are distributed widely but sporadically in Salish, occurring in both major branches of the family (Central and Interior) as well as in two southern offshoots (the Tsamosan sub-branch and the geographically isolated language Tillamook). Kinkade (1989) reconstructs the topical object marker to **Proto-Salish** on the basis of the following correspondences:

(8) ***Topical Objects across Salish***

Tillamook	-gal, ***-əgl***
Tsamosan	
Upper Chehalis	***-wali***
Cowlitz	***-wali***
Quinault	***-uli***
Central Salish	
Lushootseed	***-əgʷi***
Southern Interior Salish	
Columbian	-wa
Northern Interior Salish	
Lillooet	***-tal***[5]
****Proto-Salish***	****-wali***

3 A More than Suggestive Resemblance?

There is a striking resemblance between the **form** of the Salish topical object markers and the pan-Salish reciprocal marker, reconstructed by Kinkade as in (9).[6]

(9) ***Reciprocal Markers in Salish languages with topical object markers***

Tillamook	***-əgʷəl, -ágʷəl, -ágʷəl,*** -gʷl
Tsamosan	
Upper Chehalis	***-wal, -ɬ***
Cowlitz	***-(a)wal-, -(a)wɬ-, -(a)wɬx***
Quinault	***-tulutʷ***

Central Salish	
Lushootseed	*-əgʷəl, -agʷəl*
Southern Interior Salish	
Columbian	***-waxʷ, -wap lx***
Northern Interior Salish	
Lillooet	*-twaɬ ,(-twaxʷ)*
**Proto-Salish*	**-(a)waɬx*

However, in other ways, reciprocals differ from topical object markers. In particular:

(i) Reciprocal markers in every Salish language create derived intransitive predicates: they are **suffixed** to a transitivized predicate, but take intransitive subject markers.

(ii) As in English, reciprocals must take plural antecedents.

(iii) As in English, reciprocals must be locally A-bound: they cannot refer to discourse antecedents not syntactically present in their binding domain.

These properties are illustrated in **(10-12),** from Lillooet (other languages pattern in an identical fashion).

(10) a. **ʔaċx-ən-twáɬ** (-wit) **ʔi šməɬmúɬač-a**
see-tr-rec(-3pl.intr) pl.det women-det
"The women saw each other."

b. * **ʔaċx-əm-twáɬ (-wit) ʔi šməɬmúɬač-a**
see-intr-rec(-3pl.intr) pl.det women-det

c. * **ʔaċx-ən-twáɬ -itaš ʔi šməɬmúɬač-a**
see-tr-rec(-3pl. tr) **pl.det** women-det

(11) * **ʔáċx-ən-twaɬ** ta **šmúɬač-a**
see-tr-rec **pl.det** woman-det
"The woman saw each other."

(12) * **čut ʔi šməɬmúɬač-a** kʷ **s-ʔaċx-ən-twáɬ-s** kʷ **š-Mary**
say **pl.det** woman-det det **nom-see-tr-rec-3poss** det nom-M.
"The women said Mary saw each other."

In spite of these differences, the striking resemblance between the topical objects in (8) and the reciprocals in (9) is not likely to be coincidental, as pointed out by Kinkade:

> The fact that all three branches of the family [Central, Interior, and Tsamosan: HD] show phonological similarity between the two **suffixes** cannot be accidental, and the similarities suggest that the topical object is somehow derived from the reciprocal. If so, it is difficult to make a semantic connection that would result in the derivation. However, when put this way, the question is backwards. If one considers that the reciprocal might be derived from the topical object, things fall into place. ***If X sees*** Y ***and Y sees X (regardless of the topic status of X), then they see each other.*** (Kinkade 1989: 39. My italics)

In what follows, I will adopt Kinkade's fundamental insight that the Salish reciprocal morpheme derives from (and possibly contains) the topical object marker. Given, however, that reciprocals involve two complementary relations, one involving obligatory ***coreference*** and one involving obligatory ***disjoint reference,*** a further important question arises. Which of these two relations corresponds to the topical object part of the reciprocal?

The obvious answer is that the topical object corresponds to the coreferent relation in the reciprocal, since it involves obligatory coreference between the primary discourse topic and the object of a transitive sentence. I will argue, however, that the obvious answer is wrong: it is the disjoint reference relation that links the two. Evidence for this conjecture will come from the aberrant **non-**topical subject construction in Lillooet, which I claim provides the 'missing link' between the reciprocal and the topical object in Salish.

4 Reciprocals

Before going on, however, let's take a closer (albeit necessarily brief) look at the syntax and semantics of reciprocals. For our purposes, I will adopt the well-known analysis of Heim, Lasnik and May (1991): henceforth HLM. HLM's starting assumption (contra standard binding theory) is that English expressions such as "each other" are both syntactically and semantically complex: in other words, a sentence such as (13) should be treated in the same way as the equivalent sentence in (14):

(13) The women loved each other.

(14) Each of the women loved the other.

Accordingly HLM divide reciprocal expressions into the following component parts:

(15) ***group-denoting antecedent --- distributor — reciprocator — predicate***

In both (13) and (14), "the women" is the group-denoting antecedent, "each" the distributor, "other" the reciprocator, and "loved" the predicate.

HLM assign (13) an LF like (16):

(16) $[_S[_{NP}[_{NP}$ the women$_1$] each $_2$] $[_S$ e$_2$ $[_{VP}[_{NP}$ e$_2$ other$]_3$ $[_{VP}$ love e$_3$]]]]

This is derived by (i) movement of the distributor "each" to adjoin to the antecedent "the women" (ii) QR of "the women each" to adjoin to S (iii) QR of the reciprocator "other" to adjoin to VP. Furthermore,

(i) the antecedent inherits the index of the distributor which is adjoined to it (2), not the index of the group to which it is adjoined (1).

(ii) the trace of "each", e2, is subject to Condition A of the Binding Theory, accounting for the anaphoric properties of "each other" while the trace of "[NP e_2 other]", e_3, is subject to Condition C.

The translation of the LF in (16) is as in (17):

(17) $\forall x_2 (x_2 \cdot \Pi$ the women') $\forall x_3 (x_3 \cdot \Pi$ the women' A $x_2 \neq x_3)$ love (x_2, x_3)

where the relation $\cdot\Pi$ stands for 'proper (atomic) subpart of'. The formula says that truth holds iff every woman loved every woman who is not herself. In turn (17) follows from the compositional relationship between the NP containing "each", whose semantic representation is given in (18) and the VP containing "[e_2 other]", the reciprocator, whose semantic representation is given in (19).

(18) $[a\text{each}_i]\phi \Rightarrow \forall x_j (x_j \cdot \Pi \alpha')\phi'$

This just says that "each" universally quantifies over the proper subparts of its range (i.e. it is a universal distributor).

(19) $[e_i$ other$]_j \zeta \Rightarrow \lambda y \forall x_j (x_j \cdot \Pi x_k \wedge x_i \neq x_j) \zeta'(y)$

This says that when applied to the translation of a VP, $[e_i$ other$]_j$ is a one place predicate restricting a universal quantifier over all proper subparts x_j of a range argument x_k (supplied by the NP antecedent) which are not equal to a contrast argument x_i (supplied by "each").

It is the reciprocator which is of greatest interest to us, since it is the part of the reciprocal that imposes a disjoint reference requirement on members of the group denoted by the antecedent. HLM treat the reciprocator as a special

instance of the disjoint pronoun "other", whose semantic representation is given in (20):

(20) other $\Rightarrow \lambda x\, \lambda y\, \lambda z\, (z \in y \wedge z \neq x)$

Here, "other" is a 3-place predicate, with the range (y) and contrast (x) arguments supplied by the discourse.

5 Non-Topical Subjects as A'-Anaphors

Now we finally get to the central claims of the paper. They are as follows:

(i) Semantically, the non-topical subject marker -tali in Lillooet corresponds rather closely to English "other"; both are three place predicates associated with a range and a contrast argument, as in (20). The contrast argument of -tali, however, is obligatorily associated with the primary discourse topic, unlike that of "other".

(ii) Syntactically, -tali resembles English "other" in that both license an empty category subject to Condition C of the Binding Theory: as such they must both be A-free.

(iii) However, -tali differs from "other" in that it is an *A'-anaphor*, in the sense of Generalized Binding Theory (Aoun 1985). As such, it must have a local A'-binder, unlike "other".

(iv) Though differing from 'pronominal' "other" in its binding behaviour, *-tali* rather closely resembles reciprocator "other", which, recall, is also associated with both Conditions A and C in the HLM model. The difference is that whereas HLM assume a complex syntactic representation in which different elements are associated with Conditions A and C, I assume that both Conditions apply to the same syntactic element (an option made possible by Generalized Binding Theory).

(v) Finally, this leads me to a different perspective on reciprocals. Whereas HLM treat reciprocals as disjoint expressions (subject to Condition C) containing an anaphoric element (subject to Condition A), I claim that they are anaphors (subject to Condition A) containing a disjoint element ("other") which must be A free.

Let us look at how this works in a little more detail. Semantically, -tali will be represented as in (21):

(21) non-topical subject ⇒

λx hy λz (z·Πy A x= primary discourse topic A z ≠ x)

This representation is close to that of English "other" in (20); like "other", *-tali* has a range and a contrast argument supplied by the discourse: however, the contrast argument is specifically identified with the primary discourse topic.

The syntax of -tali, however, differs from that of "other" in one crucial way: -tali is an *A'-anaphor* in the sense of Aoun (1985). This means that, like "other", it must be A-free, but unlike "other", it must have a locally c-commanding A'-antecedent (corresponding to the argument (z) in the semantic representation in (21)). This accounts for the fact that, as pointed out in section 2, the antecedent of the empty category associated with *-tali* must be A'-extracted via questioning, clefting, relativization, or quantifier extraction.

It is worth pointing out that this analysis has clear parallels to the 'disjoint anaphor' analysis of the yi/bi alternation in Athapaskan first proposed for Dogrib by Saxon (1984) and subsequently applied to Navajo within a Generalized Binding framework by Horseherder (1998). However, the details differ: on Horseherder's analysis, for example, the disjoint anaphor must be contra-indexed with an antecedent in A-position, whereas the analysis here simply requires that the anaphor be A-free. I will leave aside the question of whether this constitutes a genuine empirical difference between Athapaskan disjoint anaphora and the Lillooet non-topical subject construction, or is simply a difference in analytical approach.

With this much in place, let us now return to thread of our original story, and supply answers to two questions. First, how does the Lillooet non-topical subject construction relate to the Salish topical object construction? And second, how does it relate to the reciprocal?

6 Back to Topical Objects

In our earlier discussion of topical objects in Section 2, I pointed out that they enforce coreference between the primary discourse topic and the direct object of a transitive predicate, as opposed to enforcing disjoint reference between the primary discourse topic and a transitive subject, as with the non-topical subject marker of Lillooet. How, then, does the former relate to the latter?

I assume the following tentative semantic representation for the topical object marker.

(22) hy λx hz (x·Πy A x= primary discourse topic)

As with the non-topical subject marker, the topical object marker has three arguments, in this case a subject argument (z), an object argument (x), and a

range argument (y). The difference is that the non-identity condition on the subject (z) in (21) has been replaced by an identity condition on the objecct (x) in (22).

Syntactically, topical objects differ from non-topical subjects more drastically (see Section 2). They are ordinary object markers, and as such license null pronouns, subject to Condition B, not variables, subject to Condition C. This is clear in cases of intra-sentential topical objects like the following **(Kinkade p.c.).**

(23) ***Upper Chehalis***
ƛ̓alstwn t **q̓amayɬ tuɬ saʔúƛ̓awštwali**
"**He$_i$** looks for a girl to **cook** for **him$_i$.**"

(24) ***Upper Chehalis***
t̓úqʷitn t **ʔo·c̓s tuɬ tal̓ic̓twalis**
"**He$_i$** finds one to help **him$_i$.**"

(25) ***Cowlitz***
ʔatmann tit **nawíɬmx** tit 1 **ʔay̓smstul-n**
"That **man$_i$** was dying from what was **making him$_i$** sick."

Here the antecedent (topic) is in an A-position in a clause superordinate to that containing the topical object, and coreference is possible, as expected by Condition B. In other words, the shift from non-topical subject to topical object **(i.e.** from disjoint to conjoint anaphora) is accompanied by a switch in binding behaviour, **from A'-anaphor** to ordinary pronoun. For reasons of space, I will set aside the important question of whether this change in binding behaviour is an automatic consequence of the shift from disjoint to conjoint reference. I suspect, however, that it will turn out that all disjoint elements must be A-free, in which case, if they are anaphoric, they must be A'-anaphoric; in contrast, conjoint elements can clearly be A-anaphoric (either as pronouns or reflexives).

7 Back to Reciprocals

In Section 4, I analyzed the non-topical subject marker as a case of disjoint anaphora, and claimed that it is a component of the reciprocal. This leads in effect to the claim that reciprocals contain a disjoint anaphor **(i.e.,** an element with an obligatorily disjoint antecedent).

But if this is so, we come to a rather different view of the relation of the components of the reciprocal to that proposed by HLM. Rather than claiming that reciprocals are disjoint expressions (subject to Condition C) containing anaphors (subject to Condition A), we effectively claim the reverse: that reciprocals are anaphors containing disjoint expressions.

Again, space considerations prevent a full exploration of the implications of this claim. Briefly, however, it involves altering the HLM LF representation in (16) to something like (26):

(26) $[_S [_{DP}$ the women$]_i$ $[_S$ e$_i$ $[_{VP} [_{DP}$ (each) $[_{DP}$ other$[e_i]]]_i$ $[_{VP}$ loved e$_j$$]]]]$

The main claims in (26) are the following:

(i) "other" is not a pronoun, but modifies a null NP (whose overt equivalent is "one"). This NP is subject to Condition C.[8]

(ii) "each other" is an anaphoric DP, with "each" as its determiner. This seems plausible, given that other determiners occur in this position without detectable effects on meaning (as in "one another", "les uns les autres", and so on).

This analysis suggests that reciprocals are more closely allied to reflexives than on the **HLM** view. Salish evidence (along with that from very many other languages)[9] supports this view, since reflexives are morphosyntactically identical to reciprocals (both attach to transitive stems and derive intransitive predicates). In view of this, I suggest the reciprocal be treated like the reflexive in Reinhart and Reuland (1993): that is, as deriving a one place reflexive predicate. This has the advantage that it immediately accounts for Condition A effects via principles of argument structure (as in Reinhart and Reuland's treatment of the reflexive)."

8 Conclusion

What I've done in this paper is:

(i) Given an account of the relation between the reciprocal, the non-topical subject and the topical object in Salish, to the effect that the first two share an ***obviative core*** (a disjointness requirement) and the third is derived by reanalysis of the non-identity condition associated with the non-topical subject as an identity condition associated with the topical object.

(ii) Reanalyzed the reciprocal as containing as an anaphor, subject to Condition **A,** containing a disjoint expression, subject to Condition C.

Notes

[1] This paper owes a great debt to the work of Dale Kinkade, as will be obvious throughout, and to Lisa Matthewson, which will not be as obvious but is equally important. I am indebted to both. Mistakes are all mine, but you can blame SSHRC (grant #410-98-1597) for supporting me if you want.

[2] This topic-subject mapping is the source of the 'One Nominal Interpretation Constraint' of Gerdts (1988).

[3] This is not always obvious, since third person object is zero in most Salish languages, and in Tillamook, Lushootseed and one paradigm of Upper Chehalis and Cowlitz, third person transitive subject is also zero. But in Columbian and the other paradigm of Upper Chehalis and Cowlitz, there is an overt subject (visible in the Columbian example in (3)). Since the only thing occurring between a transitivizer and a subject suffix is an object suffix, the topical object marker must be an object suffix.

[4] Crucially, however, the converse is not true: transitive subjects may be directly extracted without the mediation of *–tali* just in case detopicalization is not involved. See Davis (1994) for details.

[5] The extra *[t]* in *–tali* comes from a Proto-Salish transitivizer, reanalyzed in Lillooet as part of the pronominal system.

[6] For ease of comparison, I include in (9) only the seven languages which have cognates of the topical object marker. The other sixteen languages for which data on reciprocals are available fall into one of two patterns: the Central Salish pattern (nine languages), which is reconstructible as ***-awal;*** and the Interior Salish pattern (seven languages, including the northern isolate Bella Coola), which is reconstructible as ***-wax***^{w} As Kinkade points out, the Tsamosan data in (5) allow us to unify these two patterns, yielding Proto-Salish ***-awalx***^{w}.

[7] See footnote 5 for the source of the extra *[t]* here.

[8] See Déchaine and Wiltschko (2002), who argue explicitly that pronominal "one" is subject to Condition C.

[9] For example, some reflexives (e.g. *se* in French) have both reciprocal and reflexive meanings, reinforcing the view that reciprocals may simply be reflexives with a plural antecedent and a built-in disjointness condition.

[10] It also explains Rooth's observation that only with "each other", not with other cases of anaphoric "other", must the range argument be furnished by the NP that is sister to the moved "each": see HLM, p.69, fn 3.

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The Laryngeal Sphincter as an Articulator: How Register and Phonation Interact with Vowel Quality and Tone

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1 The Study of Pharyngeal and Laryngeal Articulations

The laryngeal sphincter can be thought of as the **epiglottal** place of articulation. It plays a role in the production of pharyngeal articulations and participates in the modification of supraglottic shape in the production of phonation type. **Laryngeals** have traditionally been thought of as only encompassing glottal articulation, and pharyngeals have traditionally been thought of as only lingual retraction gestures into the pharyngeal space. **Our** research has shown that laryngeal sounds involve both glottal aperture control and optional immediate supraglottic compression of the airway by the laryngeal sphincter mechanism and that pharyngeal sounds in obligatorily involve constriction of the laryngeal sphincter at the level of the aryepiglottic folds as their primary component.

1.1 The collaboration

Testing theories of laryngeal and pharyngeal articulation has become the focus of an international collaboration between a team of researchers at the University of Texas at Arlington, led by Jerold A. Edmondson, and a team of researchers at the University of Victoria. The Texas team includes Lama Ziwo, whose work on the Tibeto-Burman language, Yi, at the University of Texas at Arlington, aims to answer the question of what constitutes laryngeal register, and Li Shaoni of the Central University of Nationalities, **Beijing,** whose work on Bai aims to explain how laryngeal register interacts with tone. Jimmy G. Harris, **Barry** F. Carlson, Katie Fraser, Greg Newton, and Allison **Benner** have been instrumental in collecting and evaluating laryngoscopic data at the University of Victoria, initially in the pursuit of a definitive phonetic description of pharyngeal articulations but also to define **glottalized** phenomena and basic states of the glottis. **Łuuta** Qamiina of Victoria, BC, and Rhoda **Spinks** of Lytton, BC, also served as language consultants in the research on pharyngeals reported here (in Nuuchahnulth and **Nlaka'pamux,** respectively). Laryngoscopic experimentation has taken place in Victoria, and has also included work on Arabic, Tigrinya, Thai, Cantonese, Tibetan, Sui, **Pame,** Korean, and Somali.

1.2 Research approach

Many observations of the articulatory production of the cardinal phonetic 'benchmark' categories of glottals and pharyngeals have been established for comparison with articulations produced by native speakers of languages with salient glottal/pharyngeal or laryngeal register contrasts (Esling 1996, 1999a, 1999c). In our approach, articulations behind the back of the tongue and beneath the level of the top of the epiglottis are viewed by means of the Kay Elemetrics 9100 Rhino-Laryngeal-Stroboscope system. Target words are pronounced in isolation and in carrier phrases, usually in the environment of close vowels [i] or [u] to expose maximum pharyngeal area. The software-based Kay system includes dual halogen (fixed) and xenon (strobe) light sources, a Panasonic KS152 camera, and a Mitsubishi S-VHS BV-2000 video-cassette recorder running at 30 frames/second. The rigid endoscope which is standard equipment on the Kay system is used for exploratory oral examination of laryngeal behaviour but cannot be used while the subject is speaking or to see effectively behind the back of the tongue. Cardinal illustrations of glottal states and pharyngeal postures shown here are taken with the rigid oral scope. The view obtained with the rigid scope does not normally extend very far back over the epiglottis, and front lingual movements are precluded because of the oral positioning of the instrument. Therefore, an Olympus ENF-P3 flexible fibreoptic laryngoscope is attached to the Kay system for nasal insertion through to the pharynx to view relatively unimpeded normal speech. For maximum light transmission into the pharynx with the flexible scope, only the brighter halogen light source is activated. It is difficult to see beyond the epiglottis and behind the tongue during open vowels, even using a flexible fibreoptic laryngoscope; therefore, a close vowel, preferably a close front vowel, is preferred for target utterances. To further improve the view, a 28mm lens is attached for optimal wide-angle framing of laryngeal and pharyngeal mechanisms during extreme pharyngeal articulations and of laryngeal postures during the varying pitch conditions of a full tonal paradigm. The optical image is white-balanced, and camera settings are adjusted for light and resolution prior to each experimental session. With a physician as part of the team, the 3.6mm distal end of the Olympus laryngoscope is inserted through the subject's nasal passage with some lubricating jelly but with no anesthetic or application of any drug.

The pharyngeal/laryngeal view in the photographic images presented here is taken from just behind the uvula, near the posterior pharyngeal wall. The image is not perfectly square but rotated about 10" (the notch at the top) in order to eliminate Moiré effects – striated interference patterns produced by the interaction of fibrescopic and single-chip camera optics (cf. Yanagisawa and Yanagisawa 1993:262). Once the endoscope is inserted, the image is positioned and focused and, when necessary, cleared through swallowing to wipe excess moisture from the end of the scope. The production of word lists takes about 20 minutes each session, primarily to allow for repositioning of the scope and multiple retakes of each token. Sets of target items recorded on S-VHS

videotape are exported to PC-based video-editing applications for processing. Analyses are based on viewing selected articulations in real time and frame by frame in conjunction with the synchronized speech waveform. Calculations of articulatory duration are made by counting frames in sequence and are limited to the 30-frame/second speed. Visual interpretations are made using standard landmark reference. Subjects are able to produce items relatively naturally under the controlled conditions of laryngoscopic observation, and the examination procedure appears not to distort speech. Items are typically produced a few times and are sometimes articulated more deliberately, sometimes more rapidly, but are always representative of the language.

2 Phonetic Findings for Cardinal Glottals and Pharyngeals

2.1 The physiology of pharyngeals

In baseline research on cardinal consonantal categories (Esling 1996, 1999a), it has been established that pharyngeal sounds involve the arytenoid cartilages moving together, forwards, and upwards under the epiglottis. This implies that the 'pharyngeal articulator', e.g. for [h] and [F], is essentially aryepiglottic, as the aryepiglottic folds constitute the upper boundary of the epilaryngeal tube which forms the sphincter. Pharyngeal sounds, therefore, involve retraction of the tongue root and raising of the larynx for efficient laryngeal sphincteringand closure of the airway. This also implies that the feature [-ATR] or [+RTR] (Jakobson, Fant and Halle 1952, Halle and Stevens 1969, Czaykowska-Higgins 1987) is equivalent to the familiar voice quality label, 'raised larynx'. Whether the glottis is open, vibrating, or closed during this manoeuvre is purely a function of whether the sound is a voiceless continuant, a voiced continuant, or a stop. Full closure occurring at the aryepiglottic location (at the upper border of the laryngeal sphincter) constitutes an epiglottal stop [ʡ]. In pharyngeal sounds, including both voiceless frication and voiced approximation, the tongue retracts pharyngeally, but only after the laryngeal sphincter has been engaged to restrict the opening of the airway over the glottis. In full constriction for stoppage of the airstream, in a voiceless epiglottal stop, the aryepiglottic folds are sealed tightly against the base of the epiglottis before the tongue reaches maximum retraction into the pharynx (cf. Gauffin 1977, Laufer and Baer 1988).

During these essentially sphincteric manoeuvres, the vertical channelling of the airway can have an effect on the character of the airstream. One effect is the production of trilling at the aryepiglottic folds during extreme degrees of sphincteringwhich has the function of enhancing sounds that are already a fricative or an approxirnant, generating what could be called an enhanced fricative or an enhanced approximant. In this interpretation, the voiceless pharyngeal fricative [h] is enhanced by trilling to produce the voiceless epiglottal fricative with trilling [ʜ]. Similarly, the voiced pharyngeal approxirnant [ʕ] is enhanced by trilling to produce the voiced epiglottal

approximant/fricative with trilling [ʢ]. The former is essentially a voiceless growl, in paralinguistic terms, as in throat clearing, while the latter is a growl proper. This phonetic phenomenon parallels what happens at the uvular place of articulation when uvular fricatives [χ] or [ʁ] are enhanced by trilling of the uvula. In the uvular case, the presence of trilling is usually not marked in a symbolic way. In the case of pharyngeals, the incidence of trilling may be significant enough that we should note its occurrence symbolically. At the very least, we should be aware that trilling is a predictable concomitant of an extreme degree of constriction at a point of stricture where the soft structures at its margins are likely to be set into vibration. At the same time, another feature may account for the qualities that have been identified in languages as epiglottal [ʜ] and [ʡ]. Larynx raising is a concomitant of laryngeal sphincter ing that could also account for [ʜ, ʡ], whether or not some degree of trilling is present, which leaves [ħ, ʕ] to be phonetically distinct in having lowered larynx (and inherently less likelihood physiologically of being trilled).

2.2 Glottal/pharyngeal consonantal distinctions

The difference between glottal articulations and pharyngeal articulations is primarily a matter of the degree to which the laryngeal sphincter mechanism is engaged for antero-posterior shortening of the distance between the aryepiglottic folds (specifically, the cuneiform cartilages or tubercles of the aryepiglottic folds) and the base of the epiglottis. Symbolically, pharyngeals are grouped together with epiglottals, as they both involve aryepiglottic sphinctering to a greater degree than in glottals. Glottals are defined as in the following table:

[h]	Voiceless glottal fricative
[ʔ]	Voiceless glottal stop

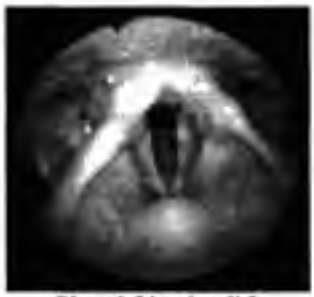
Pharyngeals and epiglottals are viewed as exploiting the same primary point of stricture, the laryngeal sphincter at the aryepiglottic place of articulation (ignoring for the time being details of larynx height), as in the following table:

[ħ]	Voiceless pharyngeal fricative
[ʜ]	Voiceless epiglottal fricative (with aryepiglottic trilling)
[ʕ]	Voiced pharyngeal approximant
[ʢ]	Voiced epiglottal fricative (with aryepiglottic trilling)
[ʡ]	Voiceless epiglottal (pharyngeal) stop

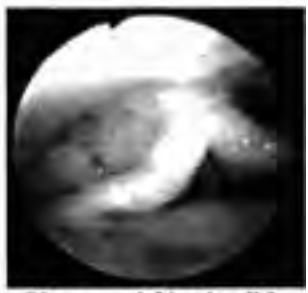
Whether the aryepiglottic folds are engaged in trilling or whether the larynx as a whole is raised or lowered are components that decide the fine-tuning of phonetic identification. All of these articulations may be produced with a raised or lowered larynx, with mixed consequences, as reported in Esling (1999a).

Articulatorily, a voiceless glottal fricative implies an open, unsphinctered epilarynx with the glottis itself in the state of breath (Esling and Hams 2002).

By contrast, a sphinctered epilarynx with air passing through an open glottis yields a voiceless pharyngeal fricative. This results in a difference between glottal [h] and pharyngeal [h], as in the two figures below:



Glottal fricative [h]



Pharyngeal fricative [h]

In the rhino-laryngoscopicview of the pharynx and larynx in these images, top is posterior and bottom is anterior. The V-shaped vocal folds define the glottis. The larger and higher inverted V of the aryepiglottic folds reaching forwards and upwards to the epiglottis defines the upper border of the laryngeal sphincter. This is the efficient protective mechanism for closing off the airway. Directly behind the supraglottic laryngeal tube is the posterior pharyngeal wall with the pyriform recesses laterally and beneath leading to the oesophageal opening. The ventricular folds are at the sides of the vocal folds within the supraglottic tube. The distal end of the fibreoptic tube is just behind and below the uvula. The epiglottis is attached to the base of the tongue and moves with it in a posterior or anterior direction. The tubercle at the base of the epiglottis is the prominent round structure at the bottom of the picture, at the anterior cornrnissure of the vocal folds. As the airway closes, the sphincter engages, the larynx moves upwards closer to the endoscope, and structures (namely, the aryepiglottic folds) become larger and more reflective in the fibreoptically transmitted light.

In states of closure, the glottis is closed at the level of the vocal folds by adduction of the vocal processes of the arytenoid cartilages at the posterior end of the glottis; but this is no different from the arytenoid adduction already present in voicing. To effect a glottal stop, and thereby to arrest voicing, it is also necessary to apply some slight stricture of the aryepiglottic sphincter mechanism, pulling the aryepiglottic angle forward slightly and causing the ventricular folds to press down on the vocal folds, thereby stopping vibration. The small degree of engagement of the sphincter for a glottal stop is the beginning of a process which culminates, at its most extreme degree, in the complete closure of the airway in the process of laryngeal sphinctering, tongue retraction, and larynx elevation that constitutes a full epiglottal stop. The difference between a moderate glottal stop and an epiglottal stop is shown in the following images, where the larynx itself is raised in the latter so that the aryepiglottic folds are closer to the camera and appear larger (an action which defines in essence the basic elements of how pharyngeal sounds are produced):

Glottal stop [ʔ]

Epiglottal stop [ʡ]

There is a further relationship in the analysis of states of the glottis that parallels the difference between the open and relatively open states of breath [h] and glottal stop [ʔ] and the epilaryngeally closed, sphinctered states of a pharyngeal fricative and an epiglottal stop; namely, the difference between breathy and whispery phonatory states. Like breath as in [h], the production of breathy voice requires an open epilaryngeal space. The defining trait of whisper is the action of the sphincteringmechanism and its effect on the shape of the space through which phonation is generated (Gao 2002). The effect at the glottis proper is not much greater than in the case of the voiceless pharyngeal fricative, but the degree of aryepiglottic, sphincteric constriction is high. In breathy voice, below, breathy flow escapes between the arytenoid cartilages, while voicing occurs anteriorly through the vocal folds, which are separated as far as they can be and still achieve voicing. Whisper, on the right, is open glottally (with no vibration) but closed aryepiglottically. The key is not glottal shape but the shape of the epilaryngeal channel formed by the advanced and raised cuneiform cartilages at the 'elbow' of the aryepiglottic folds, bent in nearly a right angle.

Breathy voice phonation

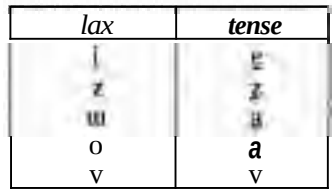
Whisper

In each pair of photographs presented above, the one on the left demonstrates greater openness of the epilaryngeal tube (even in the case of glottal stop, where a small degree of sphincteringis applied), and the one on the right demonstrates engagement of the laryngeal sphincter mechanism over the top of the glottis in a postero-anterior motion. In a physiological sense, this is an elegant opposition of mechanical movement for efficient valve control. In a contrastive phonetic sense, the opposition implies two levels of action – one glottal, which might be labelled [± voice], and one aryepiglottic, which might be labelled [± sphincter].

3 Tenseness, Register, and Tone

3.1 Tenseness, tongue root, and vowel quality in Yi

Applying laryngoscopic techniques to the analysis of vowel quality differences in the Tibeto-Burman language, Yi (Chen 1988), gives a clear idea of the role of the laryngeal sphincter mechanism in a vocalic paradigm, the members of which are all voiced. In a variety of Yi with five pairs of vowels, the phonemic difference is given as a contrast between lax and tense, with tense members marked as retracted and sometimes designated with altered vowel qualities, as in the following paradigm from Lama (1998):



Yi vowels

In each vowel pair, the tense counterpart is always opener (lower in height) and usually backer than the lax vowel. Thus /ɛ/ is retracted relative to /i/, and /a/ is much lower than /ɯ/. Beyond vocalic tongue shape, all five tense vowels share a uniformly altered quality, as signalled by the retracting diacritic. This pattern of vocalic opposition in Yi mirrors the [±ATR] vowel opposition in Akan (Lindau 1978, Tiede 1996) and in other languages where the [RTR] set can be taken to parallel the [tense] set of vowels here. A clue to the auditory nature of the quality difference can be drawn from Catford's 'epiglottopharyngealization' (1968, 1977) and Laver's 'raised larynx' (1980) qualities. To investigate the articulatory nature of this quality, Lama Ziwo, the author of the 1998 study, travelled to Victoria to the laryngoscopic research centre of the Phonetics Laboratory of the Department of Linguistics at the University of Victoria to film the action of the pharyngeal mechanisms during these quality contrasts.

Results of the filming of a large set of Yi lexical contrasts reveals that the lax vowels of this variety of Yi have an open epilarynx while the tense vowels have a sphinctered epilaryngeal posture. This feature contrast is uniform across all lax/tense pairs at the level of the lower pharynx, so whatever tongue shape in the upper vocal tract defines the difference between lax/tense vowels, that difference will always be distinguishable in the lower vocal tract by the absence of sphincteriing (laxness) or the presence of sphincteriing (tenseness). As in the case of cardinal pharyngeal articulations, sphincteried posturing implies a narrowing of the space between the aryepiglottic folds and the epiglottis as well as tongue retraction and larynx raising. All three components are present in the production of Yi tense vowels. A sample lexical paradigm for the fiicativized vowels of Yi, all at mid tone, from Esling (1999b) is as follows:

lax		*tense*	
mv ^{33}	'horse'	mv̲ ^{33}	'what sisters call brothers'
pz ^{33}	'eagle call'	pz̲ ^{33}	'to poop/fart (baby talk)'
p^{h}z ^{33}	'to gum'	p^{h}z̲ ^{33}	'to throw'
pv ^{33}	'river deer'	pv̲ ^{33}	'to go back'

Some Yi syllables, by laryngeal sphincter setting

The example pair in the following two images illustrates the paradigmatic **lax/tense** contrast medially in the vowel. The lax token on the left, /pz ^{33}/ 'eagle call', contrasts with the tense token on the right, /pz̲ ^{33}/ 'to poop (baby talk)':

Yi lax /pz ^{33}/ 'eagle call'

Yi tense /pz̲ ^{33}/ 'to poop'

The lax series has a relatively open epilaryngeal tube, considering that [z] is less fronted than [i]. The crescent-shaped epiglottis defines the front of the epilaryngeal tube, through which the glottis is visible in the image of the lax vowel. In the image of the tense vowel, the arytenoids and aryepiglottic folds have moved up and forwards to lie closely under the epiglottis. This gesture is virtually the same posture as required to produce a pharyngeal approximant. The posture of the lower pharyngeal structures in the tense series shows the systematic larynx raising, tongue retraction, and aryepiglottic narrowing of the laryngeal sphincter that was found to differentiate every **lax/tense** pair. Thus, the role of the sphincter in the tense ([+sphincter]) series is to modify vowel quality by reducing the volume and therefore altering the resonance characteristics of the lower pharynx cavity. Spectrographic evidence for the acoustic properties of the **lax/tense** sound opposition are detailed in Esling and Edmondson (2002).

3.2 Tenseness, register, and tone in Bai

The role of the sphincter in the tense series in the Sinitic language, Bai, is not so much to modify the vowel quality in a syllable as to shift the register of a syllable to a phonatory quality that could be categorized as harsh. The full oral paradigm for the close front vowel across all tones in Bai as described by Li (1992) and Edmondson and Li (1994, 1997) is as follows:

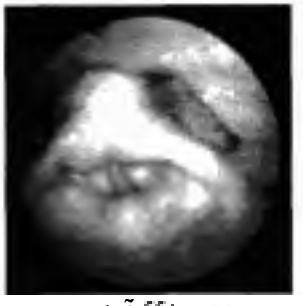
	lax	*tense*
high	tɕi ^{55} 'much'	tɕi̱ ^{66} 'to mail'
mid	tɕi ^{33} 'to pull'	tɕi̱ ^{44} 'leech'
breathy	tɕi ^{31} 'field'	tɕi̱ ^{42} 'to chase'
harsh		tɕi̱ ^{21} 'flag'
rising		tɕi̱ ^{35} 'nervous'

The effect on tone is to raise pitch in the tense series. Pitch increase is one concomitant of the notion of tenseness but not necessarily a result of sphinctering per se. The realization of tenseness in the phonatory domain is that all tokens in the right-hand column have a harsh component. This is a direct result of constriction at the laryngeal sphincter, at any pitch. At higher pitch, the vocal folds at the glottis are stretched, but the sphincter adds postero-anterior tightening above the glottis which restricts the vibration of the vocal folds. This phenomenon is a general function of harsh states of the glottis at elevated pitch levels (Esling and Harris 2002). At mid pitch, tightening over the glottis also has an impact on the quality of glottal vibration. This applies not only to the 44 category but also to the 42 category, which contrasts with breathy by virtue of its harshness. At low 21 pitch, however, harshness is no longer solely a function of impeded glottal phonation due to the pressure of sphinctering but also a function of the trilling of the aryepiglottic folds at the rim of the tight stricture over the top of the glottis. In this sense, it is not a mistake to mark the 21 tone as doubly harsh. Harshness is both a result of being in the tense series (sphinctered) and of having a second order of vibration (induced by sphinctering) that reinforces the auditory impression of an enhanced degree of harshness. This phenomenon is characterized generally by Esling and Harris (2002) as a form of harsh voice at low pitch. The rising tone begins with harshness (at pitch level 3, about where tones 21 or 42 begin and with the same quality) but rises into modal voice. Most oral vowels also have a nasal counterpart. The paradigm for nasal /ĩ, ĩ̱/ in Bai is the same as for oral /i, i̱/ except for the absence of rising tone, illustrated below in a table and with a corresponding photograph of each.

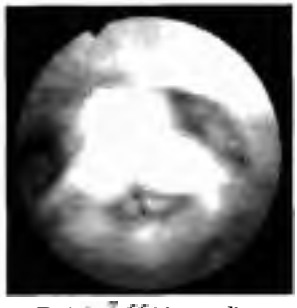
	nasal lax	*nasal tense*
high	tɕĩ ^{55} 'gold'	tɕĩ̱ ^{66} 'sword'
mid	tɕĩ ^{33} 'near'	tɕĩ̱ ^{44} 'naughty'
breathy	tɕĩ ^{31} 'alkaline'	tɕĩ̱ ^{42} 'arrow'
harsh		tɕĩ̱ ^{21} 'bracelet'
rising		

The laryngoscopic images of an extensive sample of contrasts in Bai confirms that the lax series is open, epilaryngeally, while the tense series is moderately to

tightly sphinctered. The openness of the immediately supraglottal space depends also on pitch. At higher pitches, the vocal folds at the glottal level are stretched, which contributes to openness. The degree of **sphinctering** in Bai does not invoke as extreme tongue retraction or larynx raising as is the case in Yi, except at low pitch. Parallel constructs and singing-style-dependent relationships are found in the research of **Honda, Hirai,** Estill and **Tohkura** (1995). Still frames of a medial point in the production of each vowel in the Bai nasal paradigm **are** presented below. Further data are illustrated in Esling and Edmondson (2002).



Bai /tɕĩ ^{55}/ 'gold'



Bai /tɕi̱ ^{66}/ 'sword'

Bai /tɕĩ ^{33}/ 'near'

Bai /tɕi̱ ^{44}/ 'naughty'

Bai /tɕĩ ^{31}/ 'alkaline'

Bai /tɕi̱ ^{42}/ 'arrow'

Bai /tɕi^{21}/ 'bracelet'

The extremely narrowed sphincter at low tone, inducing periodic vibration of the aryepiglottic folds, corresponds to similar uses of the same mechanism for sphincteric phonation in !Xóõ (Traill 1985, 1986) and 'growling' tone in Zhenhai (Rose 1989). It is significant from an articulatory point of view to note that narrowing of the sphincter for 'tenseness' in Bai is not as tongue retracted as in Yi. In this respect, the posture for the vowels of Yi is more similar to the posture for pharyngeal consonants in those languages studied here in which pharyngeals occur. From the point of view of register, it is significant that breathiness in Bai does not extend lower in pitch than tone 31 but that harshness does occur at tone 21. This separation represents the division between unsphinctered settings as open postures, predisposed to glottal openness (breathiness), and sphinctered settings as constricted postures, predisposed to restricting the passage of air over the glottis (often generating harshness).

4 Glottals, Glottalized Resonants, and Pharyngeals

As in the case of tenseness and register phenomena, pharyngeals also have a component made deep in the throat and not easily observed. The goal has been to describe as accurately as possible the articulatory mechanisms involved in the production of glottal stop, glottalized resonants, and pharyngeals in contexts such as the Wakashan language Nuuchahnulth (Nootka) and the Salish language Nlaka'pamux (Thompson), and to relate them to features found in other languages. A hierarchy of phonetic incrementation is proposed to isolate and show the interrelationships that occur among the individual articulatory gestures that are involved in the production of these complex sounds. Of particular interest is the link shown between glottal phenomena and the mechanism of the laryngeal sphincter. This is a double, perhaps sliding relationship, which creates a range of pharyngeal phoneme variants in both languages.

The Pacific Northwest is a region of different language families with outwardly similar phonological inventories (Haas 1969, Rose 1981, Stonham 1999). The research goal has been to study the articulations of these sounds in detail using audio recordings and digital laryngoscopic images of the lower vocal tract in the

same way that Yi and Bai have been studied. Illustrations will be compared with the cardinal postures established for glottal and pharyngeal consonantal categories in the baseline research described in section 2 above.

4.1 Glottal stop and fricative

The glottals of **Nuuchahnulth** can be compared directly with cardinal glottals. Voiceless glottal **fricative** /h/ is an abduction of the vocal folds to permit glottally unimpeded airflow through the rest of the vocal tract while the epilarynx remains open. Voiceless glottal stop /ʔ/ is a brief sequence where the ventricular folds momentarily arrest the vibration of the vocal folds as a response to slight sphincteric tension. The nasendoscopic images below illustrate the broadly open epilarynx for [h], as in **/himwits'a/** 'story', and the slightly more constricted **epilaryngeal** tube for [ʔ], as in /ʔiːɬ/ 'big'.

Nuuchahnulth [h]

Nuuchahnulth [ʔ]

Similarly, the glottals of **Nlaka'pamux** also show the degree of openness required for breath during [h] aspiration, as in **[mi̤jʔə̤tʰ]** 'spreading disease', and the moderate degree of back-to-front compression required to squeeze the ventricular folds in and over the glottis to stop vocal fold vibration for [ʔ], as in the glottalized component of **/mijʔt/** 'spreading disease'. The brighter reflection in the image of glottal stop on the right is a **function** of larynx raising accompanying moderate sphincteric.

Nlaka'pamux [h]

Nlaka'pamux [ʔ]

4.2 Glottalized resonants

In addition, Nuuchahnulth and Nlaka'pamux both demonstrate secondarily glottalized consonants in their inventories. In the case of glottalized resonants in Nuuchahnulth, the resonant sounds are preceded by [ʔ]. In the case of glottalized resonants in Nlaka'pamux, the resonants are followed by [ʔ] with attendant laryngealization and typically voiceless release. The Nuuchahnulth inventory includes two glottal, two pharyngeal, and four glottalized consonants (in bold).

bilabial	p	**pʼ**		m	**ʔm**
denti-alveolar	t	tʼ			
	ts	tsʼ	s		
apico-alveolar	**tɬ**	**tɬʼ**	**ɬ**	n	**ʔn**
postalveolar	**tʃ**	**tʃʼ**	**ʃ**		
palatal				j	**ʔj**
velar	**k** **k**	**ʼ**	x	w	**ʔw**
	kʷ	**kʷʼ**	**xʷ**		
uvular	**q**		(χ)		
	qʷ		(χʷ)		
pharyngeal			**ħ**	**ʕ**	
glottal	**ʔ**		h		

Nuuchahnulth consonant inventory (Carlson, Esling and Fraser 2001)

The Nlaka'pamux inventory includes two glottal, four pharyngeal, and up to nine glottalized consonants, two of which are pharyngeals (shown in bold).

bilabial	p	**pʼ**		m	**mʔ**
alveolar	t	(tʼ)		n	**nʔ**
	ts	tsʼ	s	z	**zʔ**
		tɬʼ	ɬ	l	**lʔ**
postalveolar	**tʃ**		**ʃ**		
palatal				j	**jʔ**
velar	**k**	**kʼ**	**x**	**(ɣ)**	**(ɣʔ)**
	kʷ	**kʷʼ**	**xʷ**	w	**wʔ**
uvular	**q**	**qʼ**	**χ**		
	Sʷ	**qʷʼ**	**Xʷ**		
pharyngeal				**ʕ**	**ʕʼ**
				ʕʷ	**ʕʷʼ**
glottal	**ʔ**		**h**		

Nlaka'pamux consonant inventory (Thompson and Thompson 1992)

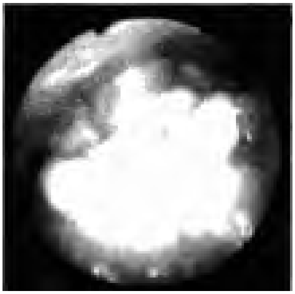
The [ʔ] that occurs in glottalized pharyngeals in Nuuchahnulth is the same shape and duration of [ʔ] that occurs as the separate phoneme /ʔ/. In the data from Nlaka'pamux, it appears that the [ʔ] that occurs as the separate phoneme /ʔ/ may be shorter in duration than the [ʔ] that occurs in glottalized pharyngeals, although the measurement of the length of the articulatory event of a glottalized pharyngeal may be influenced by the time taken for laryngealization of the vowel or for voiceless release. As illustrated by the photographs above, the physical, articulatory phonetic properties of [ʔ] in either context are the same, resulting in what we have called a 'moderate glottal stop' (Esling and Harris 2002). Speaking Ahousaht Nuuchahnulth, Katie Fraser and Łuuta Qamiina produced consistent differences between the non-glottalized/glottalized pairs: [m] as in /mu:/ 'four' vs. [ʔm] as in /ʔmutʃ'itʃtup/ 'clothes' and [w] as in /wi:ʔu:/ 'nephew' vs. [ʔw] as in /ʔwiχʔitap/ 'to clearcut'. Similar results were obtained for /n/ vs. /ʔn/ and for /j/ vs. /ʔj/ pairs. In Nlaka'pamux, Rhoda Spinks produced consistent differences between pairs such as: [mˀ] as in /piχmˀ/ 'to hunt' and [m] as in /mij ʔt/ 'spreading disease' and [nˀ] as in /nˀtɕ/ 'giving it' and [n] plus plain glottal stop as in /n-ʔ-aq'/ 'to rot'. These Salish glottalized resonants are characterized by the resonant itself usually decaying into *creaky* voice preceding the glottal stop and the glottal stop being released into voicelessness, as in [mi̯jˀə̯tʰ]. The voiceless release is not present in the non-glottalized /n-ʔ-/ sequence (cf. Carlson and Esling 2000).

Quantifying the effect of glottalization in Nuuchahnulth yields a set of /ʔm,ʔj,ʔw/ tokens that are longer in articulatory duration than a set of /m,j,w/ tokens by an average of a factor of 1.93 for the two speakers over three production sessions. The glottalized set of /mˀ,nˀ,jˀ,wˀ/ in Nlaka'parnux is longer in average articulatory duration than a set of /m,n,j/ tokens by a factor of 1.47 for the one speaker. In terms of the timing of articulatory events, therefore, glottalized resonants can be said to be one and a half to two times longer than plain resonants, due to the addition of a glottal stop. Details of these measurements are reported in Esling, Fraser and Harris (in press).

4.3 Pharyngeals: approximant vs. (epiglottal) stop

Both Nuuchahnulth and Nlaka'pamux make a significant contribution to phonetic theory in demonstrating the contrast between glottal stop and epiglottal stop. They also offer a challenge to phonological theory in that the contrast between glottal stop and epiglottal stop occurs in two very different phonological series. In Nuuchahnulth, /ʔ/ is realized as glottal stop and /ʕ/ is realized as epiglottal stop. An extremely detailed narrow representation of the phonetic sequencing for phonemic /ʕ/ might be [ʔʢˤ], where a pharyngeal approximant is present as an offglide as the sphincteric articulators open from fully closed position into the following vowel. This sequence takes an average of 2.56 times longer to perform than glottal stop (either as a phoneme or as a component of a glottalized resonant). In Nlaka'pamux, /ʔ/ is realized as glottal stop, /ʕ, ʕʷ/ are realized either as pharyngealized uvulars or as pharyngeal

approximants, and 'glottalized' /ʕ', ʕʷ'/ are realized as epiglottal stops. The pharyngeal approximant sequences take an average of 4.25 times longer to perform than glottal stop as a phoneme and an average of 2.49 times longer to perform than [ʔ] **as** a component of a glottalized resonant (Carlson and Esling 2001). The 'glottalized' pharyngeals are not glottalized in the same sense as other glottalized resonants but contain epiglottal stop where a non-pharyngeal resonant would contain plain glottal stop. A narrow representation of the phonetic sequencing for phonemic /ʕ', ʕʷ'/ might be [ˤʡ̥, ˤʡʷ̥], where a pharyngeal approximant is present **as an onglide as** the sphincteric articulators move into **fully** closed position from a preceding vowel. These sequences take **an** average of 4.65 times longer to perform than glottal stop **as** a phoneme and an average of 2.72 times longer to perform than [ʔ] **as** a component of a glottalized resonant. The full epiglottal stop is released **as** voiceless aspiration (or **as** a voiceless vowel) in the same way that a final glottal stop is released. The posture of the sphincteric articulators near the point of maximum stricture in the following images is similar. Because of concomitant tongue retraction into the pharynx (and consequent bright reflection off the tongue), it is difficult to see all of the structures in the throat when sphincteric closure is at its maximum, so the Nlaka'pamux image, for example, shows the structures just after they have opened slightly after maximum tongue-backed occlusion for [ʡ].



Nuuchahnulth [ʡ] in
/ʕiħu:/ [ʡˤɪħˤu:] **'to cry** after'

Nlaka'pamux 131 in
/npaʕʷ'/ [n:'paˤʡʷ̥] 'ice'

Nuuchahnulth also has a pharyngeal **fricative /ħ/** in opposition to glottal fricative **/h/.** The pharyngeal fricative has all the characteristics of a pharyngeal approximant **(aryepiglottic** constriction, larynx raising, and tongue retraction), except that the glottis itself remains open for voicelessness. The articulatory sequence for **/ħ/** takes an average of 2.70 times longer to perform than glottal stop (either as a phoneme or **as a component** of a glottalized resonant). As an articulatory event, it is therefore longer than Nuuchahnulth **/ʕ/** (with epiglottal stop) and similar in length to the glottalized pharyngeals of **Nlaka'pamux.** A narrow representation of the phonetic sequencing for phonemic **/ħ/** might be [hhˤ], where voiceless airflow is not yet pharyngealized at the beginning of the sound (unless it is preceded by another pharyngeal, **as** in the case of **/ʕiħu:/)** and where a voiced pharyngeal approximant **offglide** leads into a following vowel.

5 Reflections on [*sphincter]

There are many phonological ways in which the pharyngeal and laryngeal articulators can be utilized. One obvious lesson from the study of these phonetic mechanisms is that laryngeal sphinctering is required for pharyngealization, normally accompanied by larynx raising and lingual retraction. A less obvious lesson is perhaps that the laryngeal and pharyngeal articulators operate in a backwards orientation to the lingual articulator. While the tongue acts as an active articulator, approximating or contacting a passive point of articulation from dental to uvular above it, the immediately supraglottal, aryepiglottic or sphincteric articulator acts as the active articulator, approximating or contacting the base of the tongue at the epiglottis as the passive point of articulation above it. The implication of the laryngeal sphincter being a component of pharyngealization is that what has been called [RTR] is a function of the laryngeal sphincter rather than of the tongue itself.

The similarity between the lax/tense register distinction in Yi and the [ATR]/[-ATR] distinction as in West African languages is inescapable. Although phonological descriptions may vary, the phonetic process is the same. The shift in quality in the alternation is a result of the shape of the structures around the sphincteric articulator and of the resonating balance they create between the epilaryngeal tube and the rest of the lower pharynx. Some vowel quality differences can be accounted for by front lingual changes, but sphincteric constriction behind the base of the tongue is the main quality controller in what has heretofore been called the 'retracted' member of the [ATR]/[-ATR] pair.

The laryngeal sphincter can also be responsible for harshness, creakiness or whisper. The effect of the sphincter is such that in constricted mode it introduces channelling over the top of the glottis that can generate aperiodicity, friction, or other correlates of harshness, depending on the nature of voicing (or of voicelessness) and the pitch of voicing at the glottis proper. The significant observation here is that the glottis is one level of stricture, responsible largely for the [*voice] distinction and for pitch, while the sphincter is another level of stricture, responsible for stopping voicing, for maintaining tension over the glottis in an opposite (posterior-to-anterior) direction to glottal control of pitch, and for narrowing the tube directly over the glottis. The tonal contrast in Bai reveals the kind of difference that this variable, sphincteric control of tension produces – tightly opposed to stretching for pitch at high tone and looser but still sphinctered to generate irregular, aperiodic effects at low tone. Force of airflow also plays a role in how sphinteric tension interacts with the glottal source to introduce added vibratory effects or friction noise.

Finally, maximum closure of the sphincter accounts for the phonetic category, epiglottal plosive, which is far more common than may have been supposed. Many diverse accounts of this sound quality have been presented, some of which involve glottal stop combined with other articulations (Catford 1977). Evidence from Nuuchahnulth and from Nlaka'pamux makes it clear that laryngeal sphinctering, larynx raising, and tongue retraction account for the

pharyngeal category of sounds, that the active articulator is the aryepiglottic sphincter and the passive articulator is the epiglottis, and that full engagement of the aryepiglottic mechanism defines an epiglottal stop. As an articulatory event, epiglottal stop has the longest duration of any phoneme in either language. Still, it is not clear that epiglottal stop can be treated the same phonologically in both languages. Nuuchahnulth /ħ/ parallels Nlaka'pamux plain pharyngeal /ʕ, ʕʷ/ in having pharyngeal constriction without stop closure. But Nlaka'pamux glottalized pharyngeals /ʕˀ, ʕʷˀ/ parallel Nuuchahnulth /ħ/ in that both cover larger articulatory distances, having longer event durations in terms of timing and coarticulatory effect.

6 Note

This research has been supported by Research Grants 410-93-0539 and 410-2000-0901 from the Social Sciences and Humanities Research Council of Canada. We are grateful to B. Craig Dickson and the staff of STR–SpeechTech Ltd. (formerly Speech Technology Research Ltd.) for providing research facilities to accommodate laryngoscopic experimentation. We also appreciate the active medical collaboration of Dr. Michael Mawdsley, the attending physician, the technical image-processing assistance of Greg Newton, and the published insights of Luke van Buuren (1983) on the auditory classification of laryngeal and pharyngeal postures in relation to phonation type. The phonetic insights of Thomas M. Hess in working on the sound system of Nuuchahnulth with George Louie have also had a decisive impact on the direction of research that we have taken in analyzing pharyngeal and laryngeal articulation. Full-motion videos of laryngoscopic research data can be viewed on the University of Victoria Department of Linguistics web site: http://web.uvic.ca/ling/ (Research pages).

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Wh-Quantifiers, Disjunction, and Free-Choice in Korean*

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1 Introduction

In this paper we examine the distribution and interpretation of certain quantifiers in Korean, namely those formed by combining ***wh*** words or what Kuroda (1965) calls ***indeterminates*** with morphemes denoting conjunction or disjunction as in the following examples:

(1) a. *Nwukwu-na* kimch-lul cohahan-ta
who-or kimchi-ACC like-DE'
`Everyone/anyone likes kimchi'
b. Nwukwu-to ku pati-ey kaci anh-ass-ta
who-and the party-t go NEG-PAST-DE
(lit.) 'Anybody did not go to the party'
'Nobody went to the party'

Quantifiers of this form are found in a number of the world's languages, including Japanese, Malayalam and many more. Although the peculiarity of this pattern has been noticed early on, most of the theoretical proposals available turn out to leave unexplained large chunks of the distributional constraints (or even more interestingly as we will see the lack thereof) and interpretational characteristics of such items. In this paper we will focus on quantificational elements formed using the suffix *-(i)-na* in Korean. These are particularly interesting from two distinct perspectives: first because they do not receive the expected interpretation (see section **2),** and second, because they and their counterparts in other languages, have been used as the main motivation against a compositional semantic derivation of their meaning and in favour of a diachronic/typological explanation. We will attempt to address both points in as much detail as space permits in this article. The paper is structured as follows. In section 2, we present the puzzle that arises in connection with the intepretation of *wh+(i)-na*. We then move on to present in some detail the distribution of

these elements in section 3. In section 4, we present a proposal concerning the nature of ***-(i)-na***, the syntactic structure of of *wh+(i)-na* and the interpretive mechanism that derives the observed interpretations. In the final section we offer some speculative concluding remarks.

2. The puzzle with *-(i)-na*

Several past studies on expressions like the ones found in (1a) and (1b) have converged towards the following conclusion, initially formulated by Nishigauchi (1990)[2]. In a nutshell, the proposal is that quantificational expressions formed by the combination of a ***wh*** indeterminate and a **conjunction/disjunction** word display an impeccably logical behaviour, **i.e.** a wh word introduces a simple variable which is only constrained by a semantic feature of the type [+/- HUMAN] or some other appropriate feature. The conjunction/disjunction-denoting morpheme on the other hand is considered some kind of unselective operator which applies to the variable and yields, in the case of a conjunction, an infinite conjunction and in the case of a disjunction, an infinite disjunction. Within this proposal, the fact that these combinations result in universal or existential quantifiers is to be expected given that, as is well known from elementary classical logic, the following equivalences hold:

(2) $\exists x(\phi x) \leftrightarrow \phi(x_1) \vee \phi(x_2) \vee \phi(x_3) \vee \ldots \vee \phi(x_n)$
(3) $\forall x(\phi x) \leftrightarrow \phi(x_1) \wedge \phi(x_2) \wedge \phi(x_3) \wedge \ldots \wedge \phi(x_n)$

This account is based on Japanese facts where this is precisely what we get. When the ***wh*** element dare (who) combines with the conjunctive morpheme mo (and), the end product is a universal quantifier, whereas when it combines with ka (or) the result is an existential quantifier. This remarkable state of affairs is almost identically reproduced according to Jayaseelan (2001) in Malayalam. We should point out here that the universals created in this way have the additional characteristic of being 'negative sensitive'' but we will leave this point aside in this paper. Let's now turn to Korean. At first sight all the ingredients are in place for the same operations to recur. More specifically, Korean allows wh words to combine with the relevant conjunction and disjunction morphemes and the result is quantificational but not the quantifier one would expect. Most suprising of all is the result of the combination of wh with *-(i)-na* (or). According to the literature, the result is a universal quantifier **and/or** a free choice item, most crucially it is not an existential quantifier. Witness the following examples:

(4) Chelswu-nun **pati-ese** ***nwukwu-na*** mana-keytoilcesi-ta
Chelswu-TOP party-at who-or meet-FUT-DE

'Chelswu will meet anybody/everybody/*somebody'

(5) Younghi-nun [nayngcangko-ey iss-nun] ***mwues-ina*** mek-ess-ta
Younghi-TOP freezer-in exist-REL what-or eat-PAST-DE
'Younghi ate everything/anything/*something that was in the **freezer'**

Thus, two major questions arise here, first, assuming the spirit of **Nishigauchi's(1990)** analysis to be correct, one wonders how can the (alleged) tight and transparent relation between natural language and elementary logic break down in so spectacular a manner. A priori, there are three potential approaches that one might take in order to explain the exceptional behaviour of these elements. First, one may try to claim that Korean wh elements are crucially different form their Japanese and Malayalam counterparts. It would be unclear, however, what kind of difference this might turn out to be in order to produce these results (while preserving the fact that the combination of wh with the conjunction morpheme is largely similar to the Japanese one). Second, one might attempt to argue that what seems like a disjunction morpheme does not act like one in these elements and their quantificational force is to be accounted for independently. A similar tack has been pursued by Chung (2000) where he claims that the morpheme *na* is not the disjunction morpheme but a question marker. Finally, One could argue that there is little to say about these elements as their 'coming together' is idiomatic rather than strictly compositional and they are listed as such in the lexicon with their semantics somehow frozen, thus leading one to question the asssumption that a compositional account is the most suited one. This route has actually been taken by Haspelmath (1997) where he argues that a better understanding is achieved through a **diachronic/typological** analysis.

Thus, in order to respond to the last type of approach, the challenge that we face is to offer a natural compositional account of the quantificational force of *wh+(i)-na*. This is the challenge that we take up in subsequent sections. However, before we can move on to examine more closely our analytical proposals, some empirical matters ought to be settled, namely, what are the distributional generalisations that can be drawn concerning *wh+(i)-na*.

3. *wh+(i)-na* : Distribution

Little distinction is made in the literature between universality and free-choice (FC) concerning these elements. However, speakers describe the meaning of *wh+(i)-na* in terms that most closely evoke the meaning of free-choice items such as any. Although the confusion between the two notions is to a certain extent understandable given the intuitive closeness of the two notions, it seems that they should be considered separate. If this is so, it seems legitimate to expect to be able to somehow establish the FC nature of these, or any given item

from their distribution. This is indeed what Giannakidou (2001) proposes. She proposes that free-choice items (FCIs) have a characteristic distribution which distinguishes them from (affective) polarity items (APIs) more generally. Giannakidou (2001) provides the following comparative table of environments. Only the column under FCI is relevant to our purposes here.

(6)

Environment	Any	FCIs	APIs
Episodic Negation	OK	*	OK
Episodic Question	OK	*	OK
Conditionals	OK	OK	OK
Restriction of Universal	OK	OK	OK
Future	OK	OK	OK
Modal verbs	OK	OK	OK
Directive Intensional Verbs	%	OK	OK
Imperatives	OK	OK	OK
Habituals	OK	OK	OK
Disjunctions	OK	OK	OK
Perhaps	OK	OK	OK
Stative verbs	OK	OK	*
Generics	OK	OK	OK
NP-Comparitives	OK	OK	OK
Only	OK	*	*
Negative Factives	OK	*	*
Affirmative Episodic Sentences	*	*	*
Existential Constructions	*	*	*
Epistemic Intensional Verbs	*	*	*
Progressives	*	*	*
Factives	*	*	*

Assuming for the moment that this set of environments represents the characteristic distribution of FCIs, let us turn to the distribution of ***wh+(i)-na***. We will use as a representative of this class of elements the items ***Nwukwu-na*** (anyoneleveryone) and also mwues-i-nu **(anything/everything)**. The sets of examples below illustrate the distribution of ***Nwukwu-na/mwues-i-na*** and its interpretations in contrast with those of any or other possible counterparts in English. The contexts for ***Nwukwu-na*** given below include negative and affirmative declaratives (generic; episodic and modal constructions), imperatives and interrogatives. Consider declaratives first :

(7) a. Generic

Nwukwu-na kimchi-lul cohahan-ta
who-or kimchi-ACC like-DE

'Everyone likes kimchi', or
'(*)Anyone likes kimchi'

b. Episodic
Chelswu-nun mwues-ina **cal** mek-ess-ta
Chelswu-TOP what-or well eat-PAST-DE
'Chelswu ate everything well', or
'(*)Chelswu ate anything well'

c. Modal
Younghi-nun eti-ese-na cam-ul **cal- swuiss-ta**
Younghi-TOP where-at-or sleep-ACC well sleep-able-DE
'Younghi can sleep everywhere', or
'Younghi can sleep anywhere'

In the examples above, the starred translations are meant to indicate the interpretation rather than equivalent grammaticality. Now if *Nwukwu-na* were equivalent to any or even a pure FCI[4] only part of the above distribution is predicted, namely, in the terms of Giannakidou (2001), when *Nwukwu-na* appears with the FC interpetation in 'nonveridical' environments such as modal constructions. However, *Nwukwu-na* can receive a **universal-like/FC** interpretation in 'veridical' environments too such as episodic constructions. (7b) is one such example (as can be seen in the English translation, English FCI any is again ruled out in this environment).

Now consider the followingsentences which are the negated counterparts of the above examples:

(8) a. *Nwukwu-na* **kimchi-lul** cohahaci **anhnun-ta**
who-or kimchi-ACC like not-DE
a'. 'Nobody likes kimchi', or
a''. 'Not just anyone likes kimchi'

b. Chelswu-nun mwues-ina mekci anh-ass-ta
Chelswu-TOP what-or eat not-PAST-DE
b'. 'Chelswu did not eat anything', or
b''. 'Chelswu did not eat just anything'

c. Younghi-nun eti-ese-na cam-ul **cal-swu eps-ta**
Younghi-TOP where-at-or sleep-ACC sleep-able not-DE
c'. **'Younghi** cannot sleep anywhere(-else)', or
c''. **'Younghi** cannot sleep just anywhere'

When *Nwukwu-na* appears in a negative sentence, it receives two different readings: one is that of NPI any (as in a', b' and c') and the other that of FC any. More accurately, the reading obtained here is what Horn (2000) calls the indiscriminative reading (as in a'', b'', and c''). These examples seem to indicate that *Nwukwu-na* may have polarity sensitive **interpretation** while not being

sensitive to polarity for its formal licensing. Turning now to imperatives, we observe that

(9) Imperatives
a. (context: pointing at a basket full of fruits...)
Mwues-ina mek-era
what-or eat-IMP
'Eat any (fruit(s))'
b. cip-ey ka-meyn, nwukwu-ekey-na anpwu-lul cenhay-ra
house-to go-if, who-to-or regards-ACC pass-IMP
'If (you) go home, send (my) regards to anyone'

Here, the interpretations are rather different, whereas English FCI any will give us an existential reading in an imperative sentence (e.g., *Pick* any number). The interpretation assigned to sentences like (9) can be described as follows: In the example (9a), the request expressed would be fulfilled if the adressee eats only one apple out of all the fruits, but an utterance of (9a) would also be felicitous if (s)he eats all of the fruits in the basket. What seems to matter here is that the addressee of such an utterance is being granted permission to eat any number of fruits which (s)he likes/intends to eat/finds appetising or whatever. Similarly, in (9b), it does not matter whether the addressee sends regards to one member or all of the members of the set of people who are at home. What matters is that (s)he will have to pass on the regards of the speaker to those (s)he meets/talks to etc... Conversely, the request will remain unfulfilled if (s)he eats any of the fruits even if (s)he didn't really intend to/etc ... (9a), or if (s)he does not pass the regards to some person even though (s)he encounters them. Thus in these sentences an extra, covert and contextually supplied, restriction seems to be in operation. Moving on to the interrogative constructions, observe the following examples:

(17) Interrogatives
a. Chelswu-nun Yoku tayhak-ey *Nwukwu-na* a-ni?
Chelswu-TOP York University-at who-or know-Q
'Does John know everyone at the University of York?'
b. Younghi-nun ece cenyek-e mwues-ina mek-ess-ni?
Younghi-TOP yesterday dinner-at what-or eat-PAST
'Did Younghi eat everything?'

The interpretations in this case are clearly not those of polarity*any*, i.e. existential. A positive answer to the above questions entails that in (17a) either Chelswu does know everyone at the University, or that he knows a sufficiently large amount of people to qualify, for all relevant and practical purposes as 'knowing everyone'. The same applies to (17b). Again then there seems to be a

extra specification at play here. What is clear though from this distribution[5] is that according to the distributional criteria **wh+*(i)-na*** cannot be characterised as a paradigmatic FCI (assuming that Giannakidou's characterisation of their distribution is correct). On the other hand, it also seems inaccurate to characterise ***wh+(i)-na*** as a universal given that the interpretation it receives in imperative sentences is clearly not universal. Further, it seems that to characterise ***wh+(i)-na*** as parallel to English any and its double nature would be misleading in that there seem to be no licensing requirements accompanying the different interpretations and though it is true that the existential interpretation surfaces more readily in imperative contexts this isn't so in other modal contexts. On the other hand, its behaviour is in obvious ways similar to that of FC-any in that, as pointed out above, any in imperatives is also, in general, interpreted existentially. Therefore, the central question concerning the nature of ***wh+(i)-na*** is to establish how the free-choice interpretation (the most salient one) can be derived in such a way as to bypass so to speak the requirement that FC items occur in special environments only. Beyond that immediate question, of course, one would like to be able to establish the reasons why the given combination is not interpreted uniformly as existential given the pattern in (2) and (3). In the next section we will approach these questions in turn starting from the nature of ***-(i)-na*** itself.

4. The nature of *-(i)-na*: structure and interpretation

The morpheme na is a disjunction marker but functions also as a question marker:

(18) a. Chwup-na?
cold-Q
'(It is) cold?'

This fact, together with the idea, elaborated to some extent in Larson (1985) that there is arguably a natural relationship between questions and disjunctions, has led researchers such as Jayaseelan (2001) to treat. questions and wh quantifiers in the same manner. Although this analysis is perspicuous and illuminating, it only provides an indirect account of the quantificational force of ***wh+or*** elements and, moreover, it has little to say about their free-choice interpretation. On the other hand, based on similar intuitions but from a slightly different perspective, Chung (2000) concludes that wh + ***(i)-na*** elements in Korean have more elaborate, sentential-type structure and should thus be analysed as covert indirect questions. Although there is an undeniable, albeit rather obscure, link between indirect questions and this particular type of wh quantifiers, again it is hard to see how the full range of their distribution and

interpretation is to be accounted for. What we will retain here from Chung's ideas is that Korean ***wh+(i)-na*** is not a simple item and does contain sentential structure. The evidence suggesting that this line of approach is on the right track comes from the fact that ***-(i)-na*** does not seem to attach directly to the wh expression. In particular, when the phonological context allows it, the element ***-i*** appears between the wh and na. It is argued in the literature that ***-i*-insertion** is not just a phonological process and that ***-i*** is in fact a form of the copula (see Jang (1999), Lee (1996), Martin (1992)).

Similarly when awh word is used with the particle ***–nka*** which is usually assumed to produce an existential quantifier, the copula appears whether or not the wh word ends in a consonant.

Adopting this general idea though does not automatically force us to accept that the covert structure is an embedded interrogative sentence. What we would like to suggest as an alternative is that, in fact, the sentential component of these items is a relative clause restricting the variable introduced by the wh. The disjunction morpheme is then attached to that structure. Several questions arise in connection with this proposal. Let's begin with the structure. Given that relative clauses in Korean are prenominal, it follows that the proposed relative clause must be a head-internal one or we would get the wrong morpheme order, therefore the structure we propose is the following:

(20) 

The second question that arises here concerns the nature and content of the predicate of the relative clause, what we represent in (20) as Ψ. We will simply assume that the content of the predicate is contextually supplied. Relying on contextual supplementation in this case seems indeed fitting since it expresses the intuition consistently expressed by our informants, as we also pointed out in section 3, that there was some extra restriction to the variable. The restriction in question will simply depend on the discourse context. Now, assuming that there indeed is a relative clause instead of an interrogative one, it follows that in the absence of a question operator, the wh will be interpreted as an indefinite rather than a question word, a situation otherwise possible in Korean, cf. (21)

(21) Nwu-ka achim-ey **Swunja-ekey cenhwa-lul** hay-ess-ta
who-NOM morning-at Swunja-to telephone-ACC do-PAST-DE
'Someone phoned for Swunja in the morning'

Interpreting wh words as indefinites in this context is both a major point of departure from other recent studies of similar phenomena for example as Jayaseelan (2001) but also we can thus recapture Kuroda's (1965) characterisation of such elements as indeterminates. There is, however, a second aspect of the puzzle which finds a rather natural answer under this

account, namely the distribution of ***wh+(i)-na*** items. As we saw there was no real distributional constraint, as there should have been if these items are to be understood as FCIs. The syntactic structure that we have proposed here is reminiscent of the other device which, in English, lifts so to speak, the distributional constraints on **FCIs, i.e.**, a relative clause. As is well known sentences like (22) are perfectly acceptable in English despite the fact that they occur in episodic contexts:

(22) Tom talked to ***any waitress who approached his table***

It is an example of this phenomenon, known as subtrigging, studied initially by **LeGrand(1974)** that we claim occurs in Korean with these items. They are licensed in all contexts thanks to the relative clause inside them. In other words, these items carry along with them their own licensing environment. We call this type of licensing ***snail licensing.***

Let us now **turn** to the interpretation of ***wh*+na** and how it arises.

4.1. Interpretation

Assuming what we proposed in the previous section concerning the interpretation of the ***wh*** in these cases, it is natural to suggest that the existential quantifier (if existential quantifier there is) is not the result of the composition of the ***wh*** and the disjunction marker but essentially, it is the ***wh*** itself. If this is correct there is no infinite disjunction to speak of in these items. How are we then to reconcile this interpretation and the crosslinguistically attested **patterns**[6] that we have invoked in the beginning of this paper? Let us first of all take a closer look at the notion of infinite disjunction itself. There seems to be an inherent problem with this notion, namely, that the operations of conjunction and disjunction are, in classical logic at least, defined only for a finite number of terms, as Reichenbach (1947) specifically points out :

> (22) However, it would be incorrect to say that (5) and (6) [our (2) and (3)] are 'definitions of the operators. Conjunction and disjunction are operations defined for only a finite number of terms. To extend these operations to an infinite number of terms requires new primitive terms. The correct form of statement is therefore that a conjunction and a disjunction of an infinite number of terms is defined by the operators.

It would seem then that the approach that bases the existential interpretation on infinite disjunction makes precisely ***the wrong form of statement.*** Besides, there would be no room for representing the other uses of an item such as ***Nwukwu-na*** (the FC use), which are, as we have shown, the most salient ones. Still, however, the recognition of this state of affairs does not provide us with a

straighforward account of the **universal/free-choice** interpretations that we encountered above. What seems to be peculiar about this disjunction is not a question of finiteness but rather a question of exhaustiveness.' Assume, for the sake of the argument that there are two types of disjunction: non-exhaustive disjunction v and exhaustive disjunction (v^e). A v–statement implies that there is at least one potential proposition whose truth value is unspecified, whereas a v^e statement asserts that there is no such proposition. Notice here that there is no requirement on the actual truth values, there need not be. Thus the perceived universality results from two factors (a) exhaustiveness, and (b) the fact that at the moment of the v^e statement being made there can be no asserted value for any of the propositions involved. This is a conclusion similar to the modal analysis of any advocated by Dayal (1998) or the alternative-semantics one of Giannakidou (2001) without invoking those notions explicitly though. This view also goes some way towards explaining the episodicity restriction on **FCIs,** truth is known in those cases. One question that remains to be addressed is whether it would be appropriate to characterise -na as an exhaustive disjunctor. The most likely answer to this question is no. It is much more probable that the exhaustiveness requirement in this case comes from the wh itself. As is well known, exhaustiveness is part of the semantics of a host of wh constructions. If this is so then we could dispense with v^e as a separate object on its own right in favour of an account based on the the interaction of the semantics of wh with disjunction[8]. These are questions though that we have to leave for another occasion.

It is interesting, however, to **pointout** that the idea of exhaustive disjunction underlying the meaning of FC-constructions is not completely new. In fact our modelling of the meaning of ***wh+(i)-na*** items in Korean mirrors an intuition expressed in Jackendoff (1972) where he says:

> '... any of these, then, we claim to be equivalent to this one or this one or this one or ... or this one, exhausting the set described by ***these***.'[9]

Jackendoff, however, went on to say that this was proof that natural language should not be analysed in terms of **V** and 3. This conclusion does not seem correct.

5. Concluding Remarks

The syntax and interpretation of the types of quantifier that we have been looking at in this paper is greatly complex and we have only scratched the surface in this paper. What seems clear is that the distinction between the type of (distributive) quantifier that concerned us here and free-choice items is at best blurred. Moreover, there seem to be a codified version of the relationship

between disjunction and free-choice which, if not completely unexpected, raises further questions concerning the other, more deeply entrenched in the formalism relationship, the one between disjunction and existential quantification. We proposed here that for the Korean items in question it was the first relationship that was more important. Our account combined common properties of wh elements (exhaustivity, existential intepretation), with licensing by subtrigging (snail-licensing) to account for the distribution and interpretation of such items. A large amount of questions remains unanswered here such as the variation in judgements (which we did not discuss here). However, our account seems to establish at least one thing, namely, that so far as Korean is concerned there really is no need to go looking for typological or diachronic explanations for the phenomena. Such explanations, though useful on their own right, if they are conceived as replacements of formal explanation they only serve to obscur generalisations and prevent proper understanding of structural aspects of the constructions.

Notes

'This paper is a short version of Gill et. al (2002). Earlier versions of this work were presented at the Syntax Research Group in York, and at colloquia at the University of Nanzan, Kobe Shoin Graduate School and Oxford University. For comments and discussion we are grateful to those audiences and especially to David Adger, Keiko Murasugi, Taisuke Nishigauchi, and Mamoru Saito for insightful observations and discussion. We would also like to thank Bernadette Plunkett. Akira Watanabe, Youngjun Jang, Eun-yun Joo, Jong-Bok Kim, Chungmin-Lee, Ik-Hwan Lee, Gillian Ramchand, and Sung-Shim Hong. We would also like to thank the audience at WECOL in Vancouver and especially Bill Ladusaw and Emmon Bach, for their comments and reactions. The authors' names are listed alphabetically. This research was supported by the ***Arts and Humanities Research Board,*** Grant B/B/RG/AN5827/APN1247**1** : ***Strategies of Quantification.***

[1] The following abbreviations are used in this paper: TOP: topic marker. REL: Relativiser, IMP: Irnperatitive. Q: Question marker, ACC: Accusative, DE: Declarative Ending.

[2] This conclusion is accepted as such (at least fot what concerns us here) by Jayaseelan (2001), which is the most recent study on this topic.

[3] We borrow this term from Sells (2001), and we use it in the same neutral way, without any specific claims about the contribution of negation to formal licensing in these cases

[4] According to Giannakidou (2001) ***any*** is not the best representative of the FC class as it can also appear in episodic negative sentences and episodic questions.

[5] Space prevents us from giving a full account and exemplification of the distribution of ***wh+(i)-na***. See Gill et. al. (2002) for a detailed exposition and discussion.

[6] This crosslinguistic pattern is precisely what Haspelmath (1997) denies. According to his survey only Japanese and Kannada behave in the expected way. To this we could also add Malayalam. However, if we are right in the analysis pursued here and if this analysis can be extended to other languages then the critique would be invalid.

[7] This statement is similar in spirit though very different in both conception and implementation with the notions of ***closed*** and ***open*** disjunction proposed by Lee (1996).

[8] Again, space constraints prevent us from showing how this can be done by taking into account the ***i-operator*** present in head internal relative clauses. We refer the reader to Gill. Harlow and Tsoulas(2002) for details.

[9] Italics are from the original, the boldface emphasis is ours.

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Even and Minimizer NPIs in Wh-Questions

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This work follows up on a previous paper of mine on y/n questions with 'minimizer' Negative Polarity Items (NPIs) like *lift* a finger, bat an eyelash, budge (an inch) (i.e. Guerzoni 2002) and brings into the picture the case of wh-questions. In the interest of space, the summary I provide of that paper is very brief; for a fuller understanding the reader should refer to the paper itself.

1 Background and Goal

Ladusaw (1979) observes that, unlike any and ever, minimizers induce bias in questions. Questions of this sort convey the speaker's expectation for a negative answer:

(1) a. Did Mary contribute a red cent for this cause? (biased question)
b. Who contributed a red cent for this cause? (biased question)

Heim (1984) and Wilkinson (1996) point out that the same effect of bias is forced by the presence of even, whenever this focus particle is associated with expressions referring to the lower end-point of a contextually relevant pragmatic scale. This provides additional support for Heim's suggestion that the meaning of minimizers contains even:

(2) a. Can this truck even fit an $[\text{elephant}]_F$? (neutral question)
b. Can this truck even fit a $[\text{fly}]_F$? (biased question)

In addition, Karttunen & Karttunen (1977) and Wilkinson (1996) show that questions with even are ambiguous with respect to what they presuppose. For example. a question like (6a) has a reading that carries the same presupposition as the corresponding affirmative sentence (i.e (4a)), but also has another reading presupposing what the corresponding negative sentence (i.e. (5a)) presupposes, although no negative expression is overtly present in the question.

(4) a. Sue can even solve [Problem 2]$_F$.
b. Assertion (p): Sue can solve Problem 2
c. Scalar presupposition (*p* is the LEAST *likely*): For any salient alternative x to Problem 2 it is LESS likely that Sue can solve Problem 2 than that Sue can solve x

(5) a. Sue can't even solve Problem 2.
b. Assertion (–p): Sue cannot solve Problem 2

c. Scalar presupposition (***p is the MOST likely***): For any alternative x, it is MORE likely that S can solve Pr.2 than that Sue can solve x

(6) a. Can Sue ***even*** solve [Problem 2]$_f$? (ambiguous)
b. If (4c) is true **3** neutral quesdon
c. If (5c) is true **3** biased question

Importantly, the latter kind of presupposition, systematically co-occurs with a biased interpretation of the questions. Specifically, while a question like (5a) is neutral in contexts where Problem 2 is the hardest for Sue (as in (7a)) it conveys the speaker's bias towards the negative answer whenever Problem 2 is the easiest for Sue (as in (7b)).[1]

--more difficult+

(7) a. < the easiest problem, , problem 5, problem **3, …,**…,.., problem 2>
b. < problem 2, problem **3,** problem 5, **…,** the most difficult problem >

Given this, the unambiguous cases in (2) are just special instances of the general pattern shown in (5): (2a) is a neutral question and at the same time it is compatible only with the presupposition ***that objects satisfying the predicate in the focus of even- i.e. elephants- are the LEAST likely to fit in this truck*** because the expression ***elephants*** associated with ***even*** is the higher point on the scale (i.e.); (2b), on the other hand, is biased and compatible only with the opposite presupposition (i.e. ***that objects satisfying the predicate in the focus of even- i.e. flies- are the MOST likely to fit in this truck)*** because the focus of ***even*** clearly refers to the opposite extreme of the scale.

The parallelism between the questions with minimizers in (1) and this latter case is quite straightforward. As it has often been observed, it is a distinctive property of the idiomatic interpretation of minimizers that their overtly expressed component refers to a minimal amount or extent. Given this they systematically involve reference to the low endpoint of the scale, no matter what the context looks like.[2] Thus, if we endorse Heim's (1984) independently justified proposal, that the meaning of minimizers also involves ***even,*** then these items are equivalent to ***even*** + the low end-point of the scale in every context.

On the basis of this observation, I argued, in Guerzoni 2002, that an account of the bias of minimizers in questions becomes available once we understand the bias of questions with ***even*** + low scale endpoints. Moreover, I showed that such an account is possible in the case of y/n questions if one takes into account the scope possibilities of ***even*** in the question (in the spirit of Wilkinson 1996) and the effect of the presuppositions introduced by ***even*** on the interpretation of that question in a given context.

Besides providing an explanation of bias in polar questions with minimizers, my analysis predicts, without any further stipulation, the puzzling but systematic connection between bias and the presupposition that ***even*** typically introduces in the presence of negation. This aspect of the analysis makes it preferable over two recent alternative proposals (i.e. Abels 2002 and van Rooy's 2002), which, crucially have failed in this respect.

However, what was still missing in Guerzoni 2002 was a discussion of constituent questions with minimizers.

Let's first have a closer look at the facts regarding these cases as well. Exactly like yln questions, bith wh-questions with minimizers and with ***even*** + lower scale-points, convey the speaker's bias towards the negative answer:

(8) a. Who contributed a red cent for this cause? (biased question)
b. Which truck can even fit a $[\text{fly}]_F$? (biased question)

In addition, wh-questions crucially exhibit the same correlation between bias and the unexpected presupposition that we saw above. Compare (9) with (5).

(9) a, Who can even solve $[\text{Problem 2}]_F$?
b. Scalar Presupposition: for every contextually relevant person x, it is LESS likely that x solved Problem 2 than that x solved any other contextually relevant problem → neutral reading
c. Scalar Presupposition: for every contextually relevant person x, it is MORE likely that x solved Problem 2 than that x solved any other contextually relevant problem → biased reading

Like (5a), the question in (9a) is ambiguous in the following related way: it can carry presupposition (9b) and be neutral or it can carry presupposition (9c) and be biased. Once again, neutrality and bias are each linked to just one of the two presuppositions, in the same way as in y/n questions.

Since wh-questions and yln questions with ***even*** exhibit the same pattern of distribution of bias and presuppositions, a unified analysis of the effect of minimizers and ***even*** in the two types of questions is'desirable. The goal of the present paper is to show that the view I presented for y/n questions in Guerzoni 2002 can cover the case of wh-question as well, in this way providing such a unified explanation. Since my account derives not only the effect of bias in questions like (8a) and (8b), but also the special presuppositions they convey, it is superior to Abel's 2002 and Van Rooy's 2002.

I will begin by illustrating two alternative theories of ***even.*** I then ***turn*** to constituent questions with minimizers and show what syntactic and semantic assumptions one needs in order to extend my 2002 proposal to this type of interrogatives as well. Finally, I discuss some general implications these assumptions bring along and provide some tentative justification for them.

2 Two Theories of *Even*

In order to see how ***even*** affect questions it is worth stepping back and briefly examining the effect of ***even*** in declaratives. In declarative affirmative sentences, ***even*** contributes a scalar presupposition like (10c), (but see note 1).

(10) a. Sue even solved $[\text{Problem 2}]_F$.
b. Assertion (p): Sue solved Problem 2
c. Presupposition: For any contextually salient alternative x to Problem 2, it is LESS likely that Sue solved Pr.2 than that Sue solved x
p is the LEAST likely / Problem 2 is the HARDEST

One way to capture this effect is to attribute to ***even*** the following lexical content:

(11) For every possible world w:[3]
$[\![\textbf{even}]\!]^w = \lambda C_{\langle st,t\rangle}.\ \lambda p_{\langle s,t\rangle}.\ \forall q_{\langle st\rangle}[q \in C \,\&\, q \neq p \rightarrow q >_{likely} p].\ p(w)$

Although this lexical analysis of ***even*** correctly predicts that (10a) presupposes (10c), it does not account, by itself, for the effect this focus particle has in negative (and more generally Downward Entailing) environments. For example, in (12a), ***even*** appears to introduce quite a different presupposition.

(12) a. Sue didn't even solve $[\textbf{Problem 2}]_F$.
b. Assertion (not p): Mary didn't solve Problem 2
c. Presupposition: For any x among the contextually salient alternative to Pr. 2, it is MORE likely that S. solved Pr.2 than that S. solved x
p is the **MOST** likely / Problem 2 is the **EASIEST**

What precisely generates this contrast is a question that is still under debate. The question is whether we should assume a lexical ambiguity for ***even*** (see Rooth 1985, Rullmann 1997 and Berker & Herbuger 2002) or analyze what appears to be a different presupposition in negative contexts as an effect of the scope, as was first suggested in Karttunen & Peters 1979 (K&P) (see also Wilkinson 1996). These two camps agree that ***even*** introduces the presupposition in (11) in affirmative sentences, but disagree on the analysis of (12). According to K&P's scope theory, ***even*** has just one meaning (i.e.11) and the presupposition (12c) is due to the obligatorly wide scope of ***even*** relative to the local negation:

(13) a. even [Sue did not [solve Problem 2]$_F$]
c. Presupposition: 'For every contextually relevant alternative x, it is LESS likely that M. did NOT solve Problem 2 than that M. did NOT x
Not p is the **LEAST** likely $\Leftrightarrow$ p is the **MOST** likely /Pr2 the EASIEST

Rooth, instead, proposes that this presupposition is due to a second, NPI, lexical entry of ***even:***

(14) $[\![even_{NPI}]\!]^w = \lambda C_{\langle st,t\rangle}.\ \lambda p_{\langle s,t\rangle}.\ \forall q_{\langle st\rangle}[q \in C \,\&\, q \neq p \rightarrow q <_{likely} p].\ p(w)$
ScalarP: p ***is the MOST likely among the alternatives***

In Guerzoni 2002, I argued that yln questions with ***even*** provide evidence in favor of the scope theory. This paper shows that also the ambiguity of wh-questions with ***even*** can be fully understood only in terms of scope.

3 The Puzzle of Wh-questions with *Even*

Recall that what we want to account for is the following pattern:

(15) a. Who even solved [Problem 2]$_F$?

b. Scalar Presupposition: for every contextually relevant person x, it is LESS likely that x solved Problem 2 than that x solved any other contextually relevant problem → neutral reading
c. Scalar Presupposition: for every contextually relevant person x, it is MORE likely that x solved Problem 2 than that x solved any other problem → biased reading

Allow me to introduce two useful abbreviations for the presuppositions in (15). From now on I will refer to (15b) as **hardP** and to (15c) as **easyP.**

Hard, can be easily derived as follows. Since, in declarative sentences, ***even*** introduces the requirement that the proposition in its scope is the least likely among the alternatives, we can reasonably assume that the effect of ***even*** in a question is to introduce partiality in each possible answer in the same way. If so then the Hamblin-set for the question in (15a) is (16).

(16) $[\![15a]\!] = \{r: \exists x$ [person x & r= hw: **hardP**. [solved Pr 2]$^w(x)=1\}$

Each proposition in (16) presupposes **hardP**. Following the suggestion, implicit in Higginbotham 1993, that a question presupposes the conjunction of the presuppositions of its possible answers, we can conclude that (15a) as a whole also presupposes **hardP**. How about the second reading of (15a)?

Deriving this reading is less straightforward. At first, he availability of this reading appears to provide support for Rooth's ambiguity theory of ***even*** and against the scope theory. In fact, the scope theory predicts that a presupposition like **easyP**, is generated only when the scope of ***even*** contains an entailment reversal operator, but there is no overt negation in (15a). Rooth's ambiguity hypothesis, instead, explains **easyP** as the presupposition introduced by $even_{NPI}$ and therefore predicts that it should always be possible in questions, because questions are licensing environments for NPIs. Despite this apparent advantage of the ambiguity theory, however, it cannot explain the obligatory effect of bias triggered by this reading (see Guerzoni 2002, for more details).

This paper shows that, in fact, the ambiguity in (15a) is structural in nature and that an explanation of (15c) in terms of the scope of ***even*** allows us to derive the effect of bias as well. Part of the task ahead of us, then, consists in addressing the question of how a presupposition like (15c) can be derived compositionally. What is the component in the structure of (15a) that ***even*** can scopally interact with? The problem is the same as in the case of y/n questions, as it was pointed out in section 1, and finds a similar solution.

4 A Solution in Terms of Scope

The puzzle mentioned above. is reminiscent of the one concerning y/n questions with ***even,*** like (17a). Indeed, also this question can carry the unexpected presupposition in (17b).

(17) a. Did Mary even solve [Problem 2]$_f$?
b. ***That Mary solved problem 2 is the MOST likely proposition in C***

In Guerzoni 2002 I argue that in y/n questions this presupposition can be derived without further stipulation about the meaning of even (as given in (11)) or the denotation of y/n questions (as proposed in Hamblin 1973). All we need to assume is that the structure of a y/n question involves a Q-morpheme (as in Karttunen 1977), with the set forming meaning illustrated in (18a) and a wh-quantifier over functions of type <t,t>, i.e. whether, with the meaning in (18b).[4]

(18) a. $[\![Q]\!]=\lambda p.\ p$

b. $[\![\textbf{whether}]\!] = hf_{<<t,t>,t>} \cdot \exists\ h_{<t,t>} \cdot [\ h=\lambda t.t=1$ or $h=\lambda t.\ t=0]$ and $f(h)=1$

Whether is generated below the Q-morpheme and moves above it by LF, like all other wh-words, leaving a trace of type <t,t>. The presupposition (17b) results from even having wide scope relative to the trace of whether:

[Whether, [Q [even [t_1 [Mary solved [Problem 2]$_f$]

The intuitions behind this analysis are (i) that the unexpected presupposition in (17b) is the presupposition of the negative answer, if even scopes over negation in this answer, and (ii) that the scope of even in the answers to a question is determined compositionally from its scope in the question itself.

If we assume a Hamlin-denotation also for wh-questions, we immediately encounter a problem: no proposition in the Hamblin-set is a 'negative' answer, thus the task of deriving **easyP** in the same way as (17b) appears very hard:

(19) a. Who solved [Problem 2]$_f$?

(p: $\exists$x [person x and $p=\lambda w.$ x solved problem 2)

(That Mary solved Problem 2, that **Bill** solved Problem 2, ...}

While in the case of y/n questions assuming a quite standard question denotation and making just slightly unconventional assumptions about the lexical semantics and syntax for whether was sufficient to derive bias and presuppositions of questions with minimizers, in the case of wh-questions it is necessary to depart a bit more radically from a Karttunen-Hamblin's semantics of questions. What we need is a set containing both affirmative and negative answers for each relevant individual in the restrictor of the wh-word and to arrive at this set in such a way that the possibility for even to scope over negation in the negative answers follows compositionally, from its scope in the question.

4.1 Whether in Constituent Questions

The puzzle described above can be solved if we entertain the hypothesis that also constituent. questions (can) contain a whether (see Higginbotham 1993), with the same denotation and the same syntactic properties as in y/n questions. Therefore, according to the assumptions we made above about whether, a question like (20a) (optionally) has a structure like (20b).

(20) a. Who called?

b.

Given the semantic contribution of Q and whether, the denotation of the LF in **(20b)** is **(20c)**. (For the relevant derivation, see the appendix)

(20) c. (p: $\exists$x [prs.(x)] & [p =λw.⟦called⟧^{w} (x)=1 $\vee$ p = λw. ⟦called⟧^{w} (x)=0}

For each person x, this set contains two propositions, that *x* called and that *x* didn't call. The conjunction of the propositions in this set that are true in a given world corresponds to the (strongly exhaustive) answer in that world (see Heim 1994). For example, if the set of the relevant people in the domain is {m, s}, **(20c)** is the set described in **(21a)** and **(21b)** is the strongly exhaustive answer to **(20a)** in w'.

(21) a. {that m called, that m didn't call, that *s* called, that *s* didn't call}
b. $\cap$ {p: p $\in$ **(21a)** & **p(w')** =1)

Therefore, although it might sound quite unconventional to assume that wh-questions contain whether, the resulting denotation is ultimately a strongly exhaustive reading, whose semantic reality has been argued for already in Groenendijk & Stokhof 1985.

4.2 Scope Ambiguities of Wh-Questions with Even

Like in the case of **y/n-questions,** even can scope either above or below the trace of whether in wh-questions as well. Given this, a question like **(15a)** (repeated below) is ambiguous. One possible LF is **(22a).** The denotation of this LF is given **(22b).** (See appendix).

(15) **a. Who** even solved Problem 2?
(22) a. **[Whether$_2$[who$_2$[Q [$t_{2,<t,t>}$[*even* [$t_{1,e}$ solved [Pr2]$_F$]** $t_{whether}$ >even
b. {p: $\exists x_e$ [pers. (x) &[**(p=** hw: $\forall$ q $\in$ C [q>$_{likely}$ That *x* solved Pr. 2]. **x** solved Problem 2 in w) or **(p=** hw: $\forall$ q $\in$ C [q>$_{likely}$ *That x* solved Pr. 2]. x didn't solve Problem 2 in w)])

Given the presence of even, the set in **(22b)** contains only partial propositions. Specifically, for each person **x,** it contains two partial propositions **(i.e.** (A) and (B)), which are partial in exactly the same way **(i.e.** they presuppose **hardP).**

(A) hw: that x solved Problem 2 is LESS likely than that x solved any other problem. x solved Problem 2 in w **hardP**

(B) hw: that x Problem 2 is LESS likely than that x answered any problem. x didn't solve Problem 2 in w **hardP**

However, under the current assumptions, (15a) has another possible LF, i.e. (23a), which denotes the set in (23b), (as shown in the appendix).

(23) a. [Whether$_2$[who$_1$[Q *[even* [$t_{2,<t,t>}$ [$t_{1,e}$ solved [Pr 2]$_f$] even > [whether
b. {p: ∃x (person (x)) & [(p = λw: ∀ q ∈ C [q>likely *That x solved Pr. 2*]. x solved Pr2 in w) or (p = hw: ∀q∈C [q>likely *That x didn't solve Pr.2*]. x didn't solve Pr2)]}

Let's have a closer look at what kind of propositions we find in this second set. Given the contribution of ***even,*** the set in (23b) also contains two partial propositions for each relevant person x. This time, however, the two propositions are partial in different ways. The proposition corresponding to the 'positive answer' (i.e. ***that x solved problem*** 2) presupposes **hardP**, while the proposition corresponding to the 'negative answer' (i.e. ***that x didn't solve problem*** 2), presupposes **easyP**, the opposite of **hardP**:

(A) hw: that x solved Problem 2 is less likely than that x solved any other problem. x solved Pr. 2 in w **hardP**

(C) hw: that x didn't solve Problem 2 is less likely than that x didn't solve any other problem. x didn't solve Problem 2 in w **easyP**

4.3 Bias and Presuppositions Explained

We are now in position to account for the peculiar pattern of presuppositions and bias in questions with ***even*** and with minimizers illustrated in (15). If a question like (15a) is uttered in a context where Problem 2 is the easiest for everybody, i.e. it is the lower point of the relevant scale, a presupposition like **hardP** (24a), is false, for every choice of x among the people while the **easyP** presupposition (in (24b)) is true.

(24) a. that solved Problem 2 is LESS likely than that x solved any other problem in the contextually relevant set of problems **hardP**
b. that solved Problem 2 is MORE likely than that x solved any other problem in the contextually relevant set of problems **easyP**

In a context of this sort, reading (22a) of (15a), where ***even*** has narrow scope relative to the trace of whether, is therefore pragmatically excluded because there is no way to provide a felicitous answer to it. This is so because, as we saw above, all the possible answers to (22a) presuppose (24a). What about reading (23a)? Since under this reading 'positive answers' presuppose (24a), those answers are infelicitous as well. However, for each relevant person x, the 'negative answer', ***that x didn't solve problem 2,*** is felicitous, because its presupposition is (24b). The following table summarizes these observations:

Answers	Trace whether > EVEN	EVEN > Trace whether
x did solve Pr2	⊘	⊘
X didn't solve Pr2		

If a speaker utters ***who even solved Problem 2?*** in a context where speaker and addressee both know that Problem 2 was the absolute easiest, and where this knowledge is mutually known, the addressee can safely conclude that no matter what person x s(he) picks up, the speaker must be biased against the affirmative answer ***that x solved Problem*** 2. Given this, (s)he can draw the general conclusion that the speaker intended to express bias towards the answer that ***nobody solved*** **it,** form the way the speaker worded his (or her) question.

Notice that, instead, if the context is such that Problem 2 is the hardest problem for everybody, the outcome is different. Reading (22a) is pragmatically available, because all the answers to the question under this reading are felicitous. The reading in (23a), instead, is such that only the 'affirmative' answer for each individual x is felicitous:

Answers	Trace $_{whether}$ > EVEN	EVEN > Trace $_{whether}$
x did solve Pr2	✓	✓
x didn't solve Pr2	✓	(⊘)

One might wonder why, under these circumstances, we don't perceive an ambiguity between a neutral reading and a 'positive' biased one. The reason, in my view, has to do with the function that questions are supposed to play in a conversation, i.e. evoking alternatives among which the addressee can concretely choose the ones he considers true. When one reading is available that provides the hearer for each x with two real (i.e. felicitous) alternatives to chose from, this reading is preferred and therefore the effect of bias is absent.

4.4 Towards a Theory of Bias and Infelicity

If the analysis I present is on the right track it reveals that the denotation of a questions can contain propositions with contrasting presuppositions, a possibility that, to the best of my knowledge, has never been attested before. Once cases of this sort are taken into account, we need to reconsider what condition a questions has to satisfy in order to be felicitous in a context. A requirement often implicitly assumed, (see e.g. Higginbotham 1993) for the felicity of a question is that all its possible answers have true presuppositions. If felicitous questions with 'unbalanced' presuppositions exist, this restriction turns out to be too strong. The condition for a question to be felicitous in a context c must be that at least one possible answer is felicitous in c. A desirable consequence of this amendment is that it allows us to distinguish complete inappropriateness from bias. According to this view, e.g., a question whose answers have mutually compatible, but false presuppositions is infelicitous (as shown in 27). A question is felicitous but biased when some but not all its possible answers are felicitous:

(25) Speaker and addressee believe that Mary never smoked
Has Mary quit smoking? Set of felicitous answers = **O**

(26) Speaker and addressee believe that Pr. 2 was the easiest for Mary
Did Mary even solve [Problem 2]$_F$? negative bias!
Set of felicitous answers: (that Mary didn't even solve problem 2)

5 Concluding Remarks and Open Questions

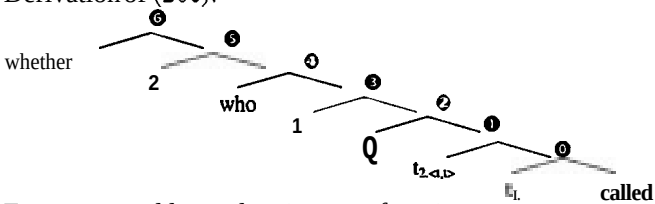
I proposed an account of why in constituent questions even can trigger bias and unusual presuppositions. This account extends automatically to Hindi NPIs (see Lahiri 1998), and to English minimizers NPIs.

Many questions need to be addressed now regarding the assumption of an unpronounced whether in wh-questions and denotation containing 'negative' alternatives. This assumption obviously has implications concerning both the syntax and the meaning of wh-questions that need to be further explored. I will just mention some issues that the meaning I propose raises. As mentioned above, the denotation of wh-questions with whether allow us to directly derive a strong-exhaustive reading. This reading has been argued to exist, e.g., in the context of predicates like know (there is at least one sense in which Mary knows who called is true only if she knows of those that didn't call that they didn't). Partition semantics of questions (proposed in Groenendijk & Stokhof 1985 and much work since then) derive this result as well.[5] However, in some important aspects, the above theory differs from G&S.

If strong exhaustivity is contingent on the presence of whether, the theory allows us to recover the semantic object of a weak exhaustive answer, if needed, in one of two ways: regarding the presence of whether as optional or defining weak answers on the denotation of the subpart of the LF of wh-questions not containing whether. This might be an advantage since various phenomena involving questions seem to suggest that the grammar of natural language sometimes makes reference to weakly exhaustive answers, rather than strongly exhaustive ones (see Lahiri 1991-2002; Heim 1994, and Dayal 1996 etc.). Which environments call for weakly exhaustive interpretations and how to derive them, is a question that I leave open for further research.

Appendix

Abbreviatons: FA = Function Application, A-a = A-abstraction (generalized to traces of type ≠ e), IFA = Intensional FA, K= Wh-quantification, see note 4.
Derivation of (20c):

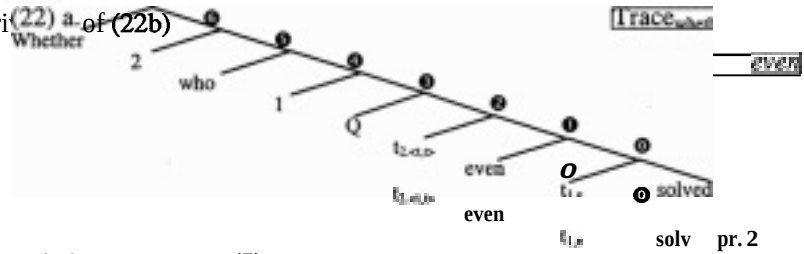


For every world w and assignment function g:

$[\![\text{❶}]\!]^{w,g}$ = [called $]\!]^{w,g}(g(1))$	By FA
$[\![\text{❷}]\!]^{w,g}$ = g(2) ([called $]\!]^{w,g}(g(1))$	By FA
$[\![\text{❸}]\!]^{w,g}$ = {hw. g(2) ([called $]\!]^{w}(g(1))=1$ }	By IFA of Q
$[\![\text{❹}]\!]^{w,g}$ = λx_e. { hw. g(2) ([called $]\!]^{w}(x))=1$}	By A-a
$[\![\text{❺}]\!]^{w,g}$ = {p: ∃x [person (x)] and p =λw. g(2) ([called $]\!]^{w}(x))=1$}	By FA
$[\![\text{❻}]\!]^{w,g}$ = Af. {p: ∃x [person (x)] and p =λw. f ([called]'' (x))=1}	By A-a

$[\![❻]\!]^{w,g}$ = {p: $\exists x_e \exists h_{<s,t>}$. [prs. (x)]& [h =λt.t or h=λt. t=0] & p=λw. h($[\![$**called** $]\!]^w$ (x))=1} = (20c)

Deri(22) a. of (22b)



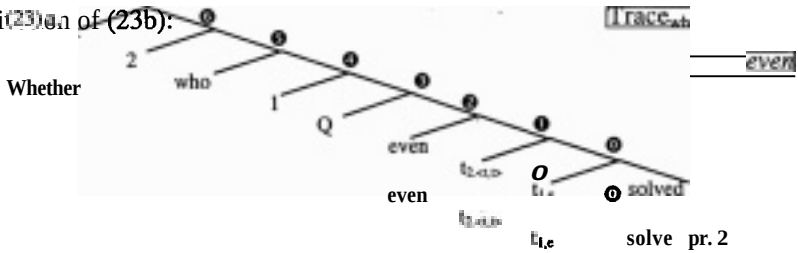
Abbreviations: **p=** that g (I) ***solved*** Pr.2, prs =person

For every world w and assignment function g:

$[\![$ O $]\!]^{w,g}$	=	[solved **Pr2**$]\!]$(g(1))	by FA
$[\![❶]\!]^{w,g}$	=	$[\![$**even**$]\!]^w$ (p)	by IFA
$[\![❷]\!]^{w,g}$	=	g(2)($[\![$**even** $]\!]^w$ (p))	by FA
$[\![❸]\!]^{w,g}$	=	{hw. g(2)($[\![$**even**$]\!]^w$ (p))=1}	by **IFA**
$[\![❹]\!]^{w,g}$	=	λx_e. {hw. g(2)($[\![$**even**$]\!]^w$ (p)) =1}	by h-A
$[\![❺]\!]^{w,g}$	=	{r: $\exists$**x** [prs.(x) & r= hw. g(2)($[\![$**even**$]\!]^w$ (p))=1}	by K
$[\![❻]\!]^{w,g}$	=	$\lambda f_{<t,t>}$ {r : $\exists x_e$ [prs(x) & r= hw. f($[\![$**even**$]\!]^w$ (p))=1}	By A-a
$[\![❼]\!]^{w,g}$	=		by K

{r: $\exists x_e \exists h_{t,t}$ [person (x) & [h =λt.t=1 or h=λt. t=0] & r = hw. h($[\![$**even** $]\!]^w$ (p))=1}
= {p: $\exists x_e$ [**pers.** (x) &[p= hw. ([even]'' (p)=1 v p= hw. ([even]'' (p) =0]}

Deri(23)a.n of (23b):



Abbreviation: solved problem 2 = P2

For every world w and assignment function g:

$[\![❶]\!]^{w,g}$	=	$[\![$ **P2** $]\!]^w$ (g(1))	by FA
$[\![❶]\!]^{w,g}$	=	g(2) ($[\![$ **P2** $]\!]^w$ (g(1)))	by FA
$[\![❷]\!]^{w,g}$	=	$[\![$**even**$]\!]^w$ (hw'. g(2) ($[\![$**P2** $]\!]^{w'}$ (g(1)))=1)	by IFA
$[\![❸]\!]^{w,g}$	=	{hw. $[\![$**even**$]\!]^w$ (hw'. g(2) ($[\![$**P2**$]\!]^w$ (g(1)))=1)=1 }	by IFA
$[\![❹]\!]^{w,g}$	=	λx_e. {hw. [even]$]^w$ (hw'. g(2) ($[\![$**P2**$]\!]^{w'}$ (x)))=1)=1}	by A-a
$[\![❺]\!]^{w,g}$	=	$[\![$**who**$]\!]$ (λx_e. {λw. $[\![$**even** $]\!]^w$ (λw'. g(2) ($[\![$**P2**$]\!]^{w'}$ (x))=1)=1}) **by** K	
	=	{p: $\exists$x [prs(x)] & p= hw. [even]$]^w$ (hw. g(2) ($[\![$**P 2**$]\!]^{w'}$(x))=1)=1}	
$[\![❻]\!]^{w,g}$	=	λf . (p: $\exists$x [prs (x)] & p= hw. [even]$]^w$ (λw'. f ($[\![$P 2 $]\!]^{w'}$(x))=1)=1} by λ-a	
$[\![❼]\!]^{w,g}$	=	$[\![$**whether** $]\!]$($[\![❻]\!]$)	by K

= {p: $\exists x_e$, $f_{<t,t>}$ [prs (x) & [f =λt.t v f =At. t=0] &p=λw. $[\![$**even**$]\!]^w$ (λw. f ($[\![$**P2**$]\!]^{w'}$ (x))=1)
=1} = {p: $\exists$x [pr (x)] & [(p=λw: $\forall$ q ∈ C [q>likely λw'. ($[\![$**P2** $]\!]^{w'}$(x))=1) . $[\![$ P2$]\!]^w$
(x)=1) v (p= λw: $\forall$ q ∈ C [q>likely λw'. ($[\![$**P2.**$]\!]^{w'}$(x) = **0**]. $[\![$ P2 $]\!]^w$(x)=**0**)]} = (23b) .

Notes

[1] Traditionally ***even*** is taken to introduce an existential presupposition as well (Karttunen & Peters 1979, Rooth 1985 and Wilkinson 1996). This assumption however has been challenged (see Krifka 1991, von Stechow 1991 and Rullmann 1997). Since the point I make in this paper is independent from this issue, I will focus only on the scalar presupposition of ***even.***

[2] This is so, if we assume that the ordering on relevant scale is based on of logical strength (i.e. generalized entailment). Predicates of smallest amount/extent are the weakest (e.g. if x is two inches long, it also is (at least) one inch long) and therefore lowest on the ranking.

[3] Here I assume that the set C is determined by the focus structure of the sentence (see Rooth's 1996). However, my proposal is compatible with analyses of focus association other than Rooth's.

[4] Here I assume that all wh-words are existential quantifiers and are combined with their sister in the syntax by the following generalized version of Karttunen's Wh-quantifying Rule: If a's daughters, β and γ, are s.t. $[\![\beta]\!]$ is type $\langle\sigma t, t\rangle$ and $[\![\gamma]\!]$ is type $\langle\sigma, \langle st,t\rangle\rangle$, then for every world w and assignment g: $[\![\alpha]\!]^{w,g} = \{p : [\![\beta]\!]^{w,g}(\lambda x_\sigma . p \in [\![\gamma]\!]^{w,g}(x)) = 1\}$. Alternatively, one could view wh-words as 'question-quantifiers' and do away with the wh-quantification rule: [who]= $\lambda Q_{\langle st,t\rangle}$. { p: 3 x [person (x) & p ∈ Q (x)}/ [whether]= $\lambda Q_{\langle\langle st,t\rangle,\langle st,t\rangle\rangle}$. {p: $\exists h_{\langle st,t\rangle}$ [(h= λt.t or h=λt.t=0) & p ∈ Q (h)}

[5] It is possible that strong exhaustivity of questions with ***whether*** will turn out to be 'stronger' than G&S's. The difference should be relevant when one considers example (i), due to Karttunen.

(i)a. Mary knows which elementary particles have been discovered.

The example has a de dicto reading according to which Mary exhaustively knows for each actual elementary particle that has been discovered that it one and it has been discovered. The present theory might lead to the incorrect prediction that (27) has no coherent de dicto interpretation of this sort. If exhaustive knowledge entails knowledge of the true negative answers, it commits us to say that, for some x, Mary knows that x is an elementary particle and that it has not been discovered (as such). Since Mary can know only as much as it has been discovered, this is incoherent, (a problem has been pointed out to me by Ingo Riech (pc)). Notice, however, what predictions the theory makes with respect to this example depend on how we derive 'de dicto'/ 'de re' distinctions in a 'strongly-exaustive' Hamblin-type semantics, a question that will be left open for further investigation.

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The State of Statives after Spell-Out*

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1. Introduction

In this paper, I examine the behavior of stative sentences in Japanese with regard to morphological Case. Stative sentences in Japanese have various Case arrays, and all the traditional approaches have treated the phenomena in C_{HL}. However, a novel set of data suggests that facts are more appropriately captured outside C_{HL}. Based on the insights of S.-Y. Kuroda's work on Japanese Case marking (Kuroda 1965, 1978, 1983), I claim that Case alternations in stative sentences in Japanese are PF phenomena. More specifically, I claim that stative sentences in Japanese have a single syntactic structure, which are processed in PF in multiple ways, which eventually leads to multiple Case arrays for this kind of sentences.

2. Basic Data

The basic properties of stative predicates in Japanese are extensively discussed in Kuno 1973, Kuroda 1965, and Saito 1982, among others. Stative predicates generally allow their object to be marked by the nominative marker: (1)–(3), and sometimes the object of a stative predicate must be marked by the nominative marker and not by the accusative marker, as illustrated in (2) and (3).

(1) Hanako-**ni/ga** tyuugokugo-**ga/-o** hanas-e-ru.
Hanako-**Dat/Nom** Chinese-**Nom/-Acc** speak-Potential-Pres
'Hanako can speak Chinese.'

(2) Tomoko-**ni/ga** hyakka-ziten-**ga/*-o** hituyoo-da.
Tomoko-**Dat/Nom** encyclopedia-**Nom/-Acc** necessary-Cop.Pres
'Tomoko needs an encyclopedia.'

(3) Hirosi-**ni/ga** sukii-**ga/*-o** deki-ru.
Hiroshi-**Dat/Nom** sukii-Nom/-Acc can.do-Pres
'Hiroshi can do skiing.'

As for the subject, stative predicates also allow two possibilities: The subject of the stative predicate can be marked,either by nominative or by dative. What is worth noting is that when a stative predicate marks its subject with the dative marker ni, its object cannot be marked by o, as in (4).

(4) ***Hanako-ni** tyuugokugo-o hanas-e-ru.
Hanako-Dat Chinese-Acc speak-Potential-Pres
'Hanako can speak Chinese.'

3. Existing Analyses of the Stative Sentences

Case alternation in stative sentences is one of the most extensively discussed topics in the generative literature of Japanese; see **Kuno** 1973, **Kuroda** 1965, 1978, 1983, Kageyama 1982, Sugioka 1984 for Rule-based approaches, Takezawa 1987 for a proposal based on Infl-lowering, **Dubinsky** 1992 and Tomioka 1992 for proposals employing syntactic Verb raising. Due to the space restriction, I restrict my attention to the two most recent approaches to stative sentences in Japanese, and argue against them on an empirical basis.

3.1. Tada 1992

Tada 1992 has proposed that the object phrase in a stative sentence may have its Case feature checked by moving into the domain of a functional category. Tada's claim is based on the contrast between nominative-marked and **accusative–marked** object quantifiers in a stative sentence with regard to scope interaction with the potential morpheme: (5).

(5) a John-ga migime-dake-o **tumur-e-ru.**
John-Nom **right.eye-only-Acc** close-Potential-Pres
'John can close only his right eye!
(i) can > only (John can wink his right eye.)
(ii) ?* only > can (It is only his right eye that he can close.)
b. John-ga migime-dake-ga tumur-e-ru.
John-Nom **right.eye-only-Nom** close-Potential-Pres
'John can close only his right eye!
(i) *can > only (ii) only > can (Tada **1992:94)**

Tada claims that the nominative-marked object phrase is raised to the domain of **Agr-o** in syntax, which will have its Case-feature checked by the **Agr-o-V** complex formed by V-raising.

3.2. Ura *1999*

Another minimalist approach to stative sentences is found in Ura 1999. Briefly put, Ura assumes a VP-shell structure for stative sentences and claims that the subject of a stative predicate is in a position which is Case-licensed either by T or the potential morpheme. When the subject phrase has its Case-features checked by T, then it is marked by ***ga,*** and when it is inherently Case-marked by the potential morpheme, it is marked by ni.

These minimalist approaches have several problems. First, they employ assumptions that are only valid in a particular version of the framework. Agr-o used in Tada's account is no longer assumed as an independent syntactic head, and the strong-weak feature distinction employed in **Ura's** account is abandoned in more recent versions of the framework. Note also that Tada's data in (5) calls for an explanation that is not dependent on overt raising of the object phrase, as pointed out in Saito and Hoshi 1998, since it lacks the connectivity effects usually found with raising. Also, both Tada and **Ura** fail to give a natural account for the lack of the dative-accusative Case array in stative sentences, because they only look at either the subject or the object. Furthermore, there are some

data that does not conform to these minimalist approaches, which will be discussed in the next subsection.

3.3. Data against the Minimalist approaches

3.3.1. The relative scope of verbal suffixes in the potential construction

The first set of data that is against the minimalist approaches comes from the scope interaction among the subject phrase, the potential morpheme and the negative morpheme discussed in Sakai 1998. As shown in (6), when a quantifier phrase is in the subject position in a stative sentence, it does not take scope over the potential morpheme.

(6) **Takasi-dake-ga** keeki-o **tabe-rare-ta.**
Takashi-only-Nom cake-Acc eat-Potential-Past
'It is only Takashi who could eat the cake.' (only > can)
NOT 'It was possible that only Takashi ate the cake.' (*can > only)
(Sakai 1998)

However, when a quantifier phrase is in the subject position of a negated sentence, both the wide scope reading and the narrow scope reading for the subject quantifier phrase are possible, as in (7).

(7) Takasi-dake-ga keeki-o tabe-nakatta.
Takashi-only-Nom cake-Acc **eat-Neg.Past**
'It is only Takashi who did not eat the cake.' (only > not)
'It was not the case that only Takashi ate the cake! (not > only)
(Sakai 1998)

Based on these facts, Sakai claims that these pieces of data suggest that there is no overt V-raising to a higher functional category, since if there were, both (6) and (7) would have the same underlying representation and the two sentences would look alike in LF, contradicting the difference exhibited by (6) and (7). Lack of V-raising in Japanese suggested by Sakai's data weakens Tada's raising analysis, since it crucially depends on syntactic V-raising to **Agr-o.**

3.3.2. An exceptional behavior of stative predicates in gapping

Another data that falls outside the minimalist approaches is the apparent lack of morphological Case identity in stative sentences under gapping. Wilder 1997 notes that in Icelandic, "forward deletion," in which the antecedent precedes the gap, does not require strict morphological identity,

(8) Backward deletion requires strict morphological identity between the gap and its antecedent. (Wilder 1997)

(8) seems to hold for sentences outside Icelandic; In the ECM construction in Japanese, which is less subject to semantic or extragrammatical factors among the Case alternation phenomena in Japanese, the sentences are acceptable under gapping, as long as the Case on the object are the same in the first part and the second part, as shown in (9).

(9) a. **Taroo-wa** **Hanako$_1$-ga** taihen **[e$_1$** kasikoi], **(sosite)**
Taro-Top Hanako-Nom very intelligent, and
Ziroq-ga sukosi [e$_2$ baka-da] to omot-te i-ru
Jiro-Nom **a.little** fool-Cop C think-Gerund be-Pres
Lit. Taro thinks that Hanako is very intelligent, and (Taro thinks) that Jiro is a little fool.'

b. **Taroo-wa** **Hanako$_1$-o** taiihen **[e$_1$** kasikoi], **(sosite)**
Taro-Top Hanako-Acc very intelligent, and
Ziroq-o sukosi **[e$_2$** baka-da] to omot-te i-ru
Jiro-Acc alittle fool-Cop C think-Gerund be-Pres]
Lit. Taro thinks that Hanako is very intelligent, and (Taro thinks) that Jiro is a little fool.'

However, when the Case on the subject of the embedded epistemic clause differs in the **first** and the second part, as shown in **(10),** the acceptability decreases.

(10) a **?*Taroo-wa** **Hanako$_1$-ga** taihen **[e$_1$** kasikoi], **(sosite)**
Taro-Top Hanako-Nom very intelligent, and
Ziroo$_2$-o sukosi [e$_2$ baka-da] to omot-te i-ru
Jiro-Acc a.little fool-Cop C think-Gerund **be-Pres**
Lit. Taro thinks that Hanako is very intelligent, and (Taro thinks) that Jiro is a little fool!

b. **?*Taroo-wa** **Hanako$_1$-o** taihen **[e$_1$** kasikoi], **(sosite)**
Taro-Top Hanako-Acc very intelligent, and
Ziroq-ga [e$_2$ baka-da] to omot-te i-ru
Jiro-Nom fool-Cop C think-Gerund be-Pres]
Lit. Taro thinks that Hanako is very intelligent, and (Taro thinks) that Jiro is a little fool.'

Given the contrast between (9) and **(10),** it seems that (8) is operative in Japanese as well.

At this point, note that stative sentences apparently fall outside the patterns we have seen so far, as shown in (11) and (12)

(11) a. Taroo-ga tyuugokugo-ga sukosi, **(sosite)** Hanako-ga
Taro-Nom **Chinese-Nom** a little, and Hanako-Nom
rosiago-ga kanari **hanas-e-ru.**
Russian-Nom much speak-can-Pres
Taro can speak Chinese a little, and Hanako can speak Russian much.'

b. **Taroo-ga** **tyuugokugo-o** sukosi, **(sosite)** Hanako-ga
Taro-Nom Chinese-Acc a little, and Hanako-Nom
rosiago-o kanari hanas-e-ru.
Russian-Acc much speak-can-Pres
Taro can speak Chinese a little, and Hanako can speak Russian much.'

(12) a. **Taroo-ga** tyuugokugo-ga sukosi, **(sosite)** Hanako-ga
Taro-Nom Chinese-Nom a little, and Hanako-Nom
rosiago-o kanari hanas-e-ru.
Russian-Acc much speak-can-Pres
'Taro can speak Chinese a little, and Hanako can speak Russian much.'

b. (?)Taroo-ga tyuugokugo-o sukosi, (sosite) Hanako-ga
Taro-Nom Chinese-Acc a little, and Hanako-Nom
rosiago-ga kanari hanas-e-ru.
Russian-Nom much speak-can-Pres
'Taro can speak Chinese a little, and Hanako can speak Russian much.'

Regardless of whether there is morphological Case matching or not between the first part or the second part in gapping, the sentences are acceptable. The minimalist analyses, nor any of the existing analyses can account for this exceptional behavior of stative sentences under gapping.

4. A Proposal

4.1. Theoretical assumptions

In proposing a system that accounts for morphological Case alternation facts in Japanese, I base on Kuroda's series of works on Case in Japanese, which is summarized in (13).

(13) Kuroda's (1965,1978, 1983) System of Case Marking in Japanese
a. Linear Case Marking
The first (leftmost) 'bare' NP (or, 'unmarked' NP) gets ga attached to it and the remaining 'bare' NPs, if any, get o attached to them. (Kuroda 1992: 254)
b. Predicate Agglutination: Concatenation of verbal morphemes
c. Equi-NP deletion: Deletes either the matrix or the embedded subject.
d. Subject ni-Raising: Assign ni to the embedded subject and raise it.
e. Canonical Sentence Patterns
i. Transitive sentence pattern: NP-ga NP-o
ii. Ergative sentence pattern: NP-ni NP-ga
iii. Intransitive sentence pattern: NP-ga

He does not specify exactly which component his system is operative, but he notes two important characteristics of Japanese Case-marking: It takes place in a cyclic domain in a linear manner. Although pointing out the important properties of morphological Case marking in Japanese, Kuroda's approach is not without problems. First, the rules in his system are unmotivated; this problem is common to all the rule-based analyses. In particular, Kuroda must assume deletion that may apply in a countercyclic way, and surface filters which are reminiscent of the ones proposed in Chomsky and Lasnik's 1977. The exact component in which the system works is left unspecified, so there is an implication that all these devices may be operative in narrow syntax. This is clearly against the spirit of the Minimalist framework, which does not allow technical devices unless they are well motivated.

Bearing in mind both the important insights and the problems with Kuroda's system, I propose the following systems described from (14) to (16).

(14) An Alternative System:

a. The Context-Sensitive (CS) Rule: Mark the NP with **Acc** (= ***o*** in Japanese) that is the sister of a ***non-stative*** V (cf. **Kuno** 1973).
b. The Dative Rule: Dative marking, for the remaining **Caseless** NP in the domain of ***vP***. (Dative = ***ni*** for Japanese)
c. The Default Rule: Nominative marking, which assigns ***ga*** to all the NP without Case at the end of a cycle (**TP/CP**). (Nominative = ***ga*** for Japanese)

(15) The Well-Formedness condition'
Every phrase with morphological features must have its features properly activated in PF.

(16) **Exhaustivity** condition[2]
The Default Rule of Case-feature activation must apply exhaustively.

It has been argued in the literature that three rules are necessary for morphological Case in any languages (Yip, **Maling,** and Jackendoff 1987, **Marantz** 1988, 1989, or San Martin and Uriagereka, to appear). The task is how to justify the three rules. My claim is that the three rules differ in terms of how context sensitive they are; the most context-sensitive one is responsible for accusative Case-marking, and the least context-sensitive one is responsible for nominative Case, which functions as default Case.

The rules in (14) will not work without overriding conditions given in (15) and (16). The Well-Formedness Condition (15) works like the Case filter in the Principles-and-Parameters Approach; it requires a noun phrase with morphological feature to get its Case-feature overtly realized in PF. In addition to the Well-Formedeness Condition, one more rule is necessary to guarantee non-vacuous application of the **Default** Rule. I propose that the Exhausativity Condition as in (16) is necessary in a system of morphological Case licensing in PF. Note that this corresponds well with the descriptive generalization made by **Shibatani** (1977) that Jaganese matrix clauses must have at least one Nominative-marked phrase.

The next question is the order of these rules applying, and how they interact with other processes in PF. As for the order, I claim that the rules in (14) apply in conformity with a general consideration in PF; that is, the Elsewhere Condition.

(17) **The** more specific rules apply prior to the more general rules (**Kiparsky** 1973).

(17) states that the more special rules apply prior to general rules. I thus assume that the Context Sensitive Rule (**14a**) applies prior to any other rules, followed by the less specific Dative rule (**14b**) and the most general Default Rule (**14c**).

(14) interacts with the two other PF processes: (i) Linearizatoin, whose main function is to break down the syntactic structure built in C_{HL} and take away the structural information, and (ii) Predicate Agglutination (PA) or phonological merger, as in (**18**).[4]

(18) Predicate Agglutination:
Phonological merger; concatenates all the verbal morphemes as one morphophonological unit so as to properly feed the phonological component.

For the structure of stative sentences, I assume a "biclausal" structure shown in (19).

(19) [TP [VP1 Taroo$_i$ [vP2 pro$_i$ tyuugokugo hanas v_2] [v1 e]] [T ru]]
Taro Chinese speak can Pres

See Kuroda 1992 and Saito 1982, among others, for positing a layered VP structure as in (19) for stative sentences in Japanese.[3] Since there is only one tense morpheme in (19), the underlying structure of these sentences are more accurately characterized as "bi-propositional." Based on this fact, I assume a structure as in (19) for stative sentences in Japanese. There doesn't seem to be any restriction as to the way how PA takes place; let us thus assume that it applies freely at any point in a given domain. If such free application of PA is possible, then the structure (19) has more than one representation in a cycle in PF, depending on the point of PA. I claim that this is the cause of multiple Case arrays in stative sentences in Japanese. In the next section, I illustrate how (14) interacts with the other processes in PF and yields multiple Case-arrays.

5. Illustrasion

5.1. Case 1: *-e* Concatenates with the verb stem right after Spell-Out

The first possibility is that PA applies prior to any other Casemarking rule; this possibility is illustrated in (20).

(20) The Nom-Nom (ga-ga) Case array:
a. [TP [vP1 Taroo$_i$ [vP2 pro$_i$ tyuugokugo hanas v_2] [v1 e]] [ru]]
Taro Chinese speak can Pres
b. [TP Taroo$_i$ *pro*$_i$ tyuugokugo **hanas-v_2-e-ru]**
Taro Chinese speak-can-Pres
c. [TP Taroo$_i$-**ga** *pro*$_i$ tyuugokugo-ga **hanas-v_2-e-ru]**
→ Taroo-ga tyuugokugo-ga hanaseru 'Taro can speak Chinese.'

After PA has applied to (20) and all the verbal affixes are concatenated into one single unit, which is the structure sent to PF, the structural information created in narrow syntax is no longer available and the only rule that can apply to NPs to be Case-licensed is the Default Rule. In this case, the two arguments of the stative predicate are marked by the nominative marker ga.

52. Case **2:** Predicate Agglutination and Case licensing rules interact

(21) The Dat-Nom (ni-ga) Case array:

a. [$_{TP}$[$_{vP1}$ Taroo$_i$ [$_{vP2}$ pro$_i$ tyuugokugo hanas v_2] [$_{v1}$ ell [ru]]
Taro Chinese speak *can* Pres

b. [$_{TP}$ [$_{vP1}$ Taroo$_i$ proi tyuugokugo **hanas-v_2-e]** [N]]

c. [$_{TP}$ [Taroo$_i$-**ni** proi tyuugokugo **hanas-v_2-e]** [ru]]

d. [$_{TP}$ Taroo$_i$-**ni** pro$_i$ tyuugokugo **hanas-v_2-e-ru]**

e. [Taroo$_i$-**ni** proi tyuugokugo-ga **hanas-v_2-e-ru]**

→ Taroo-ni tyuugokugo-ga hanaseru 'Taro *can* speak Chinese.'

If PA applies after the Context Sensitive Rule up to the potential **morpheme -e,** as in **(21),** then the environment for the Context Sensitive Rule no longer exists, because the verbal complex is **[+stative].** But the Dative Rule, on the other hand, is still applicable and the experiencer Taroo can be marked by ni. After the remaining verbal elements are assembled by PA, the Default Rule marks the object NP with the nominative marker ga. This yields the Dative-Nominative Case array.

When PA applies after the Case-marking **rules** have applied, the other Case array emerges. If PA applies **between** the Context Sensitive Rule and the Dative Rule, as illustrated in **(22),** then the context for the Dative Rule is no longer available for Taroo after PA. So Taroo becomes subject to the Default Rule, which leads to the Nominative-AccusativeCase array.

(22) The Nom-Acc (*ga-o*) Case array:

a. [$_{TP}$ [$_{vP1}$ Taroo$_i$ [$_{vP2}$ pro$_i$ tyuugokugo hanas v_2] [$_{v1}$ e]] [ru]]
Taro Chinese speak can Pres

b. [$_{TP}$ [$_{vP1}$ Taroo$_i$ [$_{vP2}$ *pro*$_i$ tyuugokugo-o hanas v_2] [$_{v1}$ ell [ru]]

c. [$_{TP}$ Taroo$_i$ proi tyuugokugo-o **hanas-v_2-e-ru]**

d. [Taroo$_i$-**ga** proi tyuugokugo-o hanas-v_2-e-ru]

→ Taroo-ga tyuugokugo-o **hanaseru** Taro can speak Chinese.'

53. Case **3:** The derivation leading to the non-acceptable Dat-Acc Case array

If PA applies ***after*** both the Context Sensitive and the Dative Rules, then either the Default Rule does not apply because there is no NP to be Case-licensed at the end of the cycle, or even it has applied to the representation in **(23d),** we cannot know its effect because there is no NP that is left unmarked for Case. Therefore the Exhaustivity Condition is not **observed,** and the output with the Dative-Accusative Case array is illicit.

(23) a. [$_{TP}$ [$_{vP1}$ Taroo$_i$ [$_{vP2}$ pro$_i$ tyuugokugo hanas v_2] [$_{v1}$ e]] [ru]]
Taro Chinese speak can Pres

b. [$_{TP}$ [$_{vP1}$ Taroo$_i$ [$_{vP2}$ *pro*$_i$ tyuugokugo-o hanas v_2] [$_{v1}$ e]] [ru]]
Taro Chinese-Acc speak *can* Pres

c. [$_{TP}$ [$_{vP1}$ Taroo$_i$-**ni** [$_{vP2}$ proi tyuugokugo-o hanas v_2] [$_{v1}$ ell [ru]]
Taro Chinese-Acc speak can Pres

d. [Tarooi-ni *pro*$_i$ tyuugokugo-o **hanas-v_2-e-ru]** ga-marking *n.a.*

→ ***Taroo-ni** tyuugokugo-o **hanaseru** Lit. Taro can speak Chinese.'

6. Concluding Remarks

To summarize, I have proposed a system of morphological Case licensing, which operates in a cyclic manner and interacts with other PF processes such as PA and Linearization. Depending on the point of PA in relation to Case marking rules, different Case arrays are yielded and in this sense, the PF. The proposed system is compatible with Sakai's data that indicates the lack of syntactic verb raising, since the proposed analysis basically concatenates all the verbal elements in PF and does not have recourse to syntactic V-raising. As for the lack of morphological Case matching in the gapping context, assuming that clausal coordination underlies gapping, the structure of (11)-(12) can be given as in (24).

(24) The structure of (11)-(12):

$[_{TP1}\ [_{vP1}$ Taroo$_i$ $[_{vP2}$ pro$_i$ tyuugokugo sukosi hanas $v_2]$ $[_{V1}$e]] [te]],
Taro Chinese a little speak Potential Ger
sosite $[_{TP2}\ [_{vP1}$ Hanako$_j$ $[_{vP2}$ *pro*$_j$ rosiago kanari hanas] $[_{V1}$e]]
and Hanako Russian much speak Potential
[ru]]
Pres

Note that each of the conjoined TP provides a distinct domain for the PF processes that we have seen above: other than cyclicity, linearity, the Well-Formedness Condition, and the Exhaustivity Condition, there are no principles that regulate the application of the PF processes.

As for Subject Raising in Japanese, which exhibits strict morphological identity, it has been analyzed in the recent framework as being due to the structurally ambiguous position of the embedded subject phrase; see Bruening 2001 and Hiraiwa 2002, among others. Since the NP undergoing Case alternation is in the edge of a phase, it can be either mapped to PF with the embedded clause and gets nominative Case, or it can be sent to PF with the phase of the matrix v and be marked as accusative. Under the assumption that Spell-Out is a kind of syntactic operation, the optionality of Case for the embedded subject in this construction is due to a syntactic factor, rather than a morphological one. At this point, note that many syntactic operations have been assumed to apply to a coordinated structure in a parallel manner, as discussed in Ross 1970 and Williams 1978, among others. Extending this "parallel" requirement on the syntactic operations applying to coordinated structures, I suggest that the embedded subject in the two coordinated TPs be mapped to PF at the same point. Hence there shouldn't be any mismatch here; the two subject phrases are Case-licensed at the same timing, regulated by a parallelism requirement on Spell-Out applying to the coordinated structure. In short, the two constructions differ in morphological Case identity in gapping, because the place in which Case-licensing takes place differ; in the case of Subject Raising, it takes place before PF processes become operative, while in stative sentences, Case marking does interact with Linearization and PA, which yield structural ambiguity in PF.

Notes

• This paper is a revised version of a portion of my dissertation (Harada 2002). I would like to thank Brian Agbayani, Naoki Fukui, Teresa Griffith, Takao Gunji, Jim Huang, Hironobu Kasai, Yasuhiro Katagiri, Hiroshi Mitoh, Hajime Ono, Yuki-Nori Takubo, the participants of Seminar in Linguistics in Fall 2002 at Kyoto University, and the participants of WECOL 2002 at UBC for their help and comments on the work. All errors are my own. This research is funded by the Media Information Science Laboratories at ATR International, to which I am also grateful.

[1] See Yip, Maling, Jackendoff 1987, who are based on Goldsmith 1976, for the necessity of this condition for a linear system of morphological Casemarking.

[2] See Halle and Vergnaud 1987 for related discussion.

[3] According to Yukinori Takubo (personal communication), the Mitsukaido dialect of Japanese is an exception to Shibatani"s generalizatoin; in this dialect, it is possible to have a sentence whose sole NP argument is marked by *ni*. As pointed out to me by Fumikazu Niinuma (personal communication), Shibatani"s generalization is not common across languages; only Japanese and Korean seem to be subject to this generalization. These two facts may suggest that the Exhaustivity Condition is either parametrized, or does not belong to the core of the grammar.

[4] Following Fukui and Takano 1998, I assume that linearization takes place in a top-down manner, targeting the root node in PF.

[5] Having only one tense morpheme, (19) is more appropriately characterized as "bipropositional." Here I simply call (19) "biclausal" for ease of exposition.

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Event Matters in the Object Internally-Headed Relative Clause[1]

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1 Introduction

In this paper, I discuss the construction which looks like the internally-headed relative clause, given in (1), and the internally-headed relative clause construction, given in (2).

The CENP (Counter-Equi NP) construction

(1) Keisatsu-wa [doroboo-ga nigeyoo-to shi-ta]-tokoro-o tsukamae-ta.
police-TOP burglar-NOM run away-by to-PST-occasion-ACC arrest-PST
"The police arrested a burglar on the occasion on which she tried to run away."

The IHRC (Internally-Headed Relative Clause) construction

(2) Keisatsu-wa [doroboo-ga nigeyoo-to shi-ta]-no-o tsukamae-ta.
police-TOP burglar-NOM run away-try to-PST-NO-ACC arrest-PST
"The police arrested a burglar in the occasion in which she tried to run away."

For the following discussion, I refer to the first construction in (1) as the CENP construction and the second construction in (2) as the IHRC construction.

In both the CENP construction in (1) and the IHRC construction in (2), the embedded NP, namely, *doroboo* "burglar" is interpreted as an argument of the matrix verb *tsukamae* "arrest". On surface, the difference between the CENP construction and the IHRC construction seems to be that, in the CENP construction in (1), *tokoro* "occasion" heads the embedded clause, whereas, in the IHRC construction in (2), *no* heads the embedded clause.

As noticed by Shimoyama (1999), what is interesting is that, as shown in (3), the IHRC can also appear as the subject of the matrix clause. On the other hand, as shown in (4), the *tokoro*-clause of the CENP construction cannot appear as the matrix subject.

(3) **[[Daidokoro-no mado-kara** shiroi-neko-ga hait-te **ki-ta]-no]-ga**
kitchen-GEN window-from **white-cat-NOM** come **in-PST-NO-NOM**
sakana-o tot-te **nige-ta.**
fish-ACC steal-and **run away-PST**
"A white cat came in from the kitchen window and it stole a fish and ran away."

(Shimoyama 1999)

(4) ***[[Daidokoro-no mado-kara shiroi-neko-ga hait-te ki-ta]-tokoro]**
kitchen-GEN window-from **white-cat-NOM** come in-PST-occasion
-ga sakana-o tot-te **nige-ta.**
-NOM fish-ACC steal-and run away-PST
"A white cat came in from the kitchen window and it stole a fish and ran away."

Then, one question arises as to why we have this kind of difference, even though the **CENP** construction in (1) and the IHRC construction in (2) look like each other. In this paper, I argue that *tokoro* which heads the embedded clause in (1) must be related to events as well as individuals. On the other hand, no, which heads the embedded clause in (2) can be related only to individuals. This difference causes the difference of **grammaticality** between the subject IHRC construction and the subject CENP construction.

Before the discussion on the above difference, I will first discuss some assumptions which we need for the following discussion.

2 Some assumptions

21 The discharge of the **E(vent)-position**

My first assumption is about where an event argument position is discharged. In this paper, following **Higginbotham** (1985) among others, I assume that the verb has an extra argument position for events. Furthermore, this position for events is discharged when T combines with VP or VP is theta-bound by T.

22 Functional application and event identification

The second assumption is about some semantic principles for compositional semantics. For the following discussion, following Kratzer (1996) and **Heim** and Kratzer (1998) among others, I assume Functional Application in (5) and Event Identification in (6).

The definition of Functional Application is given in (5).

(5) Iff is an expression of type <a,b>, and a an expression of type <a>, then *f(a)* is an expression of type <b>.

(Cann 1993:86)

Roughly speaking, under Functional Application in (5), it is assumed that the denotation of one syntactic element is a function, and it takes the other syntactic element as its argument.

The other semantic principle which I assume for the following discussion is Event Identification (Kratzer (1996)), given in (6).

(6) f <e,<s,t>> g <s,t> → h <e,<s,t>>

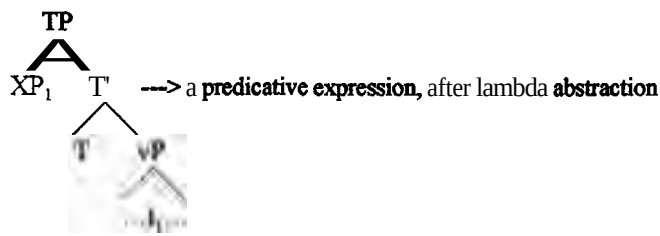
(Kratzer 1996:122)

According to Kratzer (1996), Event Identification chains together various conditions for the event described by a sentence.

2.3 Syntax-semanticsinterface

The third assumption is related to syntax and semantics. Following Heim and Kratzer (1998) among others, I basically assume that movement creates a derived predicate. However, I do not strictly follow Heim and Kratzer's assumption. I assume that lambda abstraction is simply an interpretive reflex of a configuration involving a chain. For example, in (7), under the standard assumption of A-movement of a subject NP to the Spec of TP, the movement of XP (subject NP) yields the interpretation of a lambda abstraction without making any extra syntactic elements. Thus, in this case, T' in (7) becomes a derived predicate.

(7)



2.4 Restriction on lambda conversion

The fourth assumption is about lambda conversion. In the semantic

representation in **(8),** even though the denotation of *snore* contains a variable ***x,*** this variable cannot be accidentally bound by the existential quantifier **after** lambda conversion of (8).

(8) $(\lambda\mathcal{Q}\exists x\,(man\,(x)\,\&\,\mathcal{Q}))\,(snore\,(x))$
(9) $\exists x\,(man\,(x)\,\&\,snore\,(x))$
(10) $\exists x\,(man\,(x)\,\&\,snore\,(y))$

In the semantic representation in **(8),** the variable *x* typed in bold face print is outside the scope of the existential quantifier. Therefore, the interpretation of (8) is different from the interpretation of (9). The interpretation of **(8),** in fact, should be the same **as** the interpretation in (10). Thus, the semantic formula in (8) cannot be changed to (9) by lambda conversion.

3 The impossibility of the subject tokoro-clause

This section discusses how my analysis accounts for the impossibility of the subject ***tokoro*-clause,** in contrast with the subject IHRC.

As mentioned in the introduction, I propose that ***tokoro*** of the CENP construction must be related to events **as** well as individuals. To be specific, I assume that, as shown in **(11),** the whole ***tokoro*-clause** NP takes the matrix clause **as** a relation which holds between a maximal (or unique) individual, namely, a maximal (or unique) salient participant of the embedded event and an event.

(11) $\lambda R\,\lambda z_s\,[R\,(\iota x_e[\textbf{salient}$ participant in situation' $(x_e, \iota w_s$ [situation' $(w_s)])\,\&$ **tokoro'** $(\iota w_s$ [situation' $(w_s)], z_s)])(z_s)]$

Roughly speaking, the interpretation of the whole ***tokoro*-clause** given in (11) includes two properties. The first property of ***tokoro*** is to make the ***tokoro*-clause** denote a maximal (or unique) individual which is a participant of the embedded event, namely, the ***tokoro*-clause** event, adapting the ideas of Hoshi (1995) and Shimoyama (1999). ιw [situation' (w)] in (11) corresponds to the denotation of the embedded clause. The specific property of the salient participant of the embedded clause is determined by the relevant **semantico-pragmatic** information coming **from** the embedded clause and the matrix clause.

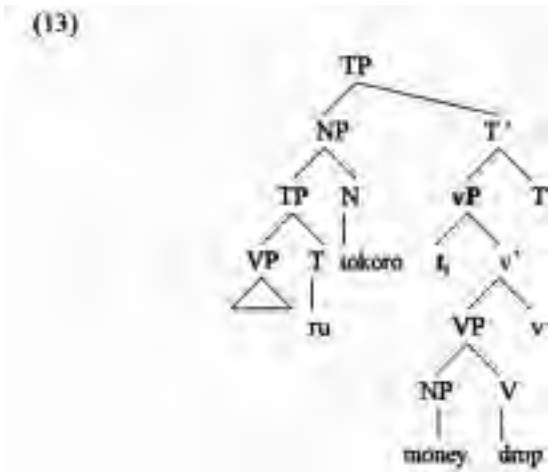
The other function of ***tokoro*** is to connect the embedded event, **i.e.,** ιw [situation' (w)] with the matrix event z_s. ***tokoro*** within the semantic representation in (11) expresses temporal **overlap** relation between the embedded event and the matrix event. Furthermore, I assume that the event variable z_s in (9) must be a bound variable. In other words, it cannot be a free

variable at LF.

I now explain the reason why the subject *tokoro*-clause is impossible under my analysis. I assume that the example in (12) has the syntactic structure in (13). Under my analysis, I assume that the subject *tokoro*-clause must move up to the Spec of TP to obtain Nominative Case.

(12) ***[gakusei-ga hamabe-o arui-te i-ru]-tokoro-ga**
student-NOM beach-ACC walk-be ing-NONPST-occasion-NOM
okane-o otoshi-ta.
money-Acc drop-PST
"A student dropped money on the occasion during which **s/he** was walking the beach."

(13)



With regard to the example in (12), the semantic representation given in (14) would be the expected translation of example (12). In this semantic representation, just for simplicity, I am ignoring the denotation of TENSE.

(14) $\exists z_s$ [**Agent**(ιx_e[**salient** participant in **situation'**(x_e, ιw_s[walk_on_the_beach' (s, w_s)]) & **tokoro-conj'** (ιw_s [walk_on_the_beach' (s, w_s)], z_s)]) & drop'(m, z_s)]

We now consider the calculation of the semantic value of the syntactic structure in (13). The semantic representation in (15) would correspond to the denotation vP in (13). After T theta-binds this vP, we would have the semantic denotation given in (16). Before the subject *tokoro*-clause NP in the Spec of TP combines with the matrix clause, the lambda operator abstracts over the variable u_s in (16). As a result, we would have the semantic representation

given in (17). This semantic representation corresponds to the denotation of T', when the tokuro-clause in the Spec of TP combines with the T'.

(15) λz_s [Agent (u_e, z_s) & drop' (m, z_s)] — vP
- u_e is associated with the trace t_i in the *structure* in (13).

(16) $\exists z_s$ [Agent (u_e, z_s) & drop' (m, z_s)] — T theta-binds vP.

(17) λu_e 32, [Agent (u_e, z_s) & drop' (m, z_s)] — T' after lambda abstraction

When the *tokoro*-clause combines with the matrix clause, we would have the semantic representation in (18). However, there is one problem with this semantic composition between the subject *tokoro*-clause and the matrix T'. At this stage, as shown in (19), the subject *tokoro*-clause is an expression of type <<e, <s,t>>, <s,t>>. On the other hand, as shown in (20), the matrix T' is an expression of type <e,t>. Thus, there is a type mismatch between the denotation of the subject *tokoro*-clause and the matrix clause T'. Thus, we have a problem with the semantic composition between the subject *tokoro*-clause and the matrix T'.

(18) $\lambda R\, \lambda z_s$ [R (ιx_e[salient participant in situation' (x_e, ιw_s [situation' (w,)]) & tokoro' (ιw_s [situation' (w,)], z_s)])(z_s)] ($\lambda u_e\, \exists v_s$ [Agent (u_e, v,) & drop' (m, v,)]) — type mismatch

(19) $\lambda R\, \lambda z_s$ [R (ιx_e[salient participant in situation' (x_e, ιw_s [situation' (w,)]) & tokoro' (ιw_s [situation' (w_s)], z_s)])(z_s)] — type <<e, <s,t>>, <s,t>>

(20) $\lambda u_e\, \exists v_s$ [Agent (u_e, v_s) & drop' (m, v_s)] — type <e,t>

Suppose that, as shown in (21), the subject tokuro-clause can take a property as its argument, which holds of a unique participant of the embedded clause.

(21) λP[P (ιx_e[salient participant in situation'(x_e, ιw_s[situation(w_s)]) & tokoro-conj' (ιw_s [situation (w_s)], z_s)])] ($\lambda u_e\, \exists z_s$ [Agent (u_e, z_s) & drop' (m, z_s)])

(22) $\lambda u_e\, \exists z_s$[Agent ($u_e$, z_s) & drop,' (m, z_s)](ιx_e[salient participant in situation' (x_e, ιw_s [situation (w,)]) & tokoro-conj' (ιw_s [situation (w_s)], z_s)])

(23) $\exists z_s$ [Agent(*or*, [salient participant in situation' (x_e, ιw_s[situation (w_s)]) & tokoro-conj' (ιw_s[situation (w,)], q)]) & drop' (m, z_s)]

In this case, we do not have any type-mismatch in (21). However, *there* is

another problem. First, by lambda conversion, we can change the semantic representation in (21) to the semantic representation in **(22)**. However, at this stage, because of the **restriction** on lambda conversion discussed in section **2.4,** we cannot change the semantic representation in (22) to the semantic representation in (23) by lambda **conversion**. This is because, **as** discussed in section 2.4, in the semantic representation in **(22),** the variable z_s typed in boldface print contained in the denotation of the ***tokoro*-clause** is outside the scope of the existential quantifier. Therefore, the interpretation of (22) is different from the interpretation in (23). Thus, the variable z_s contained in the subject ***tokoro*-clause** cannot be connected with the matrix event. Furthennore, it *cannot* be bound by anything. As a result, the subject ***tokoro*-clause** is ruled out under my analysis.

On the other hand, in the case of the object ***tokoro*-clause,** it can combine with the matrix clause below **vP**. In this case, in the same manner **as** the subject ***tokoro*-clause,** the object ***tokoro*-clause** takes a relation, namely, an expression of type $\langle s, \langle e,t\rangle\rangle$, as its argument, as shown in (25). However, regarding the matrix clause, since the position for events is not yet discharged, the matrix clause denotes a relation of type $\langle s, \langle e,t\rangle\rangle$, as shown in (26). Therefore, we do not have any type mismatch between the object ***tokoro*-clause** and the matrix clause in (24). Thus, the object ***tokoro*-clause** is grammatical.

(24) $\lambda R\, \lambda z_s\, [R\, (\iota x_e[$**salient** participant in situation' $(x_e, \iota w_s$ [situation' $(w_s)]) \,\&$ tokoro-conj' $(\iota w_s$ [situation' $(w_s)], z_s)])(z_s)]\, (\lambda v_e\, \lambda u_s[$arrest' $(v_e, u_s)])$

(25) $\lambda R\, \lambda z_s\, [R\, (\iota x_e[$**salient** participant in situation' $(x_e, \iota w_s$ [situation' $(w_s)]) \,\&$ **tokoro'** $(\iota w_s$ [situation' $(w_s)], z_s)])(z_s)]$

(26) $\lambda u_s\, \lambda v_s$ [Agent (u_e, v_s) & drop' (m, v_s)]

4 Some predictions with regard to the CENP construction

This section discusses some **predictions** made by my analysis. Under my analysis, the position where the ***tokoro*-clause** exists at LF is important for the **grammaticality** of the CENP **construction**. As discussed above, if the *tokoro*-clause combines with the matrix clause outside **vP** after the position for event arguments is discharged, then, my analysis predicts that the ***tokoro*-clause** is ruled out. This prediction seems to be borne out, as shown in (27) – (29).

(27) ***[gakusei-ga** seki-o **sur-u]-tokoro-ga** warat-ta.
student-NOM cough-ACC **do-NONPST-occasion-NOM** **laugh-PST**
"A student laughed on the occasion on which s/he coughed."

(28) *[gakusei-ga seki-o sur-u]-tokoro-ga ryokan-ni
student-NOM cough-ACC do-NONPST-occasion-NOM inn-at
tsui-ta.
arrive-PST
"A student arrived at the inn on the occasion on which s/he coughed."

(29) *[gakusei-ga hon-o ka-u]-tokoro-ga
Student-NOM book-ACC buy-NONPST-occasion-NOM
gang-ni yotte nagur-are-ta.
gangster-owing to punch-PASS-PST
"A student was punched by a gangster on the occasion on which s/he bought a book."

In the case of the unergative construction in (27), I assume that the subject NP is base-generated in the same position as the transitive subject. Furthermore, I assume that, for the Case-reason, the unergative subject must move up to the Spec of TP to obtain Nominative Case. Under this assumption, my analysis predicts that the subject *tokoro*-clause is not allowed even in the unergative construction. This prediction is borne out, as shown in (27).

In the same manner as the transitive construction and the unergative construction, my analysis also predicts that the subject *tokoro*-clause of the unaccusative construction should also be ruled out. With regard to the unaccusative construction, I assume that the surface subject is base-generated in the complement position of the verb. However, crucially, the *tokoro*-clause basegenerated in the complement position must move up to the Spec of TP to obtain Nominative Case. Thus, even in the unaccusative construction, at LF, the subject *tokoro*-clause exists outside vP and combines with the matrix clause after the position for events is discharged. Under this assumption, my analysis predicts that the subject *tokoro*-clause in the unaccusative construction should be ruled out in the same manner as the subject *tokoro*-clause of the transitive and unergative constructions. This prediction is borne out, as shown in (28).

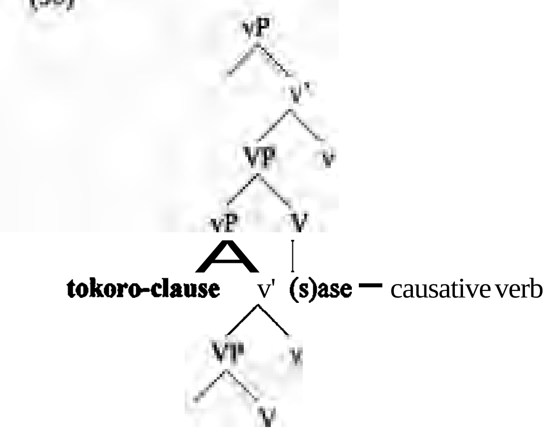
In the same manner as the unaccusative construction, even in the passive, the subject *tokoro*-clause moves out of vP to obtain Nominative Case and combines with the matrix clause after the position for events is discharged. Thus, the sentence in (29) is ungrammatical.

On the other hand, my analysis predicts that, even though the *tokoro*-clause occupies a subject position, as long as it is inside vP and it can combine with the matrix clause before the position for events is discharged, the *tokoro*-clause can combine with the matrix clause. As a result, it should be grammatical. The causative is, in fact, one of these cases.

The syntactic structure of the causative construction in (30) basically follows Kuroda (1965), Terada (1990), and Hasegawa (1999). In this structure, the

causee NP occupies a subject position of the embedded clause. If my analysis is correct, the ***tokoro*-clause** can occupy this causee subject position. This is because, when the causee ***tokoro*-clause** NP combines with the matrix clause, the position for events of the matrix verb is not yet discharged. Thus, in the same manner as the object ***tokoro*-clause** of the transitive construction, the matrix clause can denote a relation which holds between an individual and an event. This prediction is borne out, as shown in (31). In **(31),** the ***tokoro*-clause** marked by the Dative Case marker *–ni* can appear as the causee NP.

(30)



(31) Cindy-wa **[Ichiro-ga** hon-o yon-de **i-ru]-tokoro-ni**
TOP NOM book-ACC read-be **-ing-NONPST-occasion-DAT**
ocha-o ire-sase-ta.
tea-ACC **make-CAUSE-PST**
"Cindy made Ichiro make tea on the occasion during which he was reading a book."

5 The subject IHRC

Section 5 discusses the reason why the subject IHRC is possible. With regard to the IHRC, it can take a property rather than a relation as its argument, in contrast with the ***tokoro*-clause**. With regard to the denotation of the whole subject IHRC, I assume the following semantic denotation in (32).

(32) $[\lambda P [P (\iota y_x [[T(x_i)](y_i)])]]$ — an expression of type $<<e, t>, t>$

This denotation is based on **Hoshi's** (1995) analysis of the IHRC. The variable

x_s in this representation is associated with the embedded event of the **IHRC** construction. The variable y_e is an entity variable. The variable y_e is bound by the iota operator. Thus, in the semantic representation in **(32),** there is a unique individual y_e which has a property $T(x_s)$. The denotation of the variable T is determined by the **semantico-pragmatic** information coming from the embedded clause and the matrix clause. Furthermore, as shown in **(32),** the whole IHRC denotes a **function** which takes the matrix clause as a **property.** Thus, the whole IHRC is an expression of **type** <<e,t>, t>. This is crucially different from the ***tokoro*-clause**. The **IHRC** takes a **property** as its argument, whereas the **CENP** takes a relation as its argument.

We now examine the subject IHRC. With regard **to** the example in **(33),** we would have the denotation in **(34)**.

(33) **[Doroboo-ga** nige-te **i-ta]-no-ga** **Hanako-o** **osot-ta.**
burglar-NOM run away-be **-ing-PST-NO-NOM** , ACC attack-PST
"The burglar, who was running away, attacked **Hanako.**"

(34) $\exists u_s$ [Agent(u_s, [[T(u_s,[running_away'(b, z_s)]))(y_e)], u_s) & attacked'(h, u_s)]

Under the above analysis of the IHRC, the subject **IHRC** would have the semantic denotation given in (36). When this subject IHRC appears in the Spec of TP and combines with the matrix clause, we would have the semantic representation given in (35).

(35) λP [P (ιy_e [[T(ιz_s [running_away' (b, z_s)])(y_e)]) (λv_e $\exists u_s$ [Agent (v_e, u_s) & attack' (h, u_s)])]

(36) λP [P (ιy_e [[T(ιz_s [**running_away'** (b, z_s)])(y_e)])] -- type <<e, t>>, t>

(37) λv_e $\exists u_s$ [**Agent** (v_e, u_s) **& attack'** (h, u_s)] — type <e,t>

In this representation in **(35),** unlike the subject ***tokoro*-clause,** we would not have any problem with the semantic composition between the subject **IHRC** and the matrix clause. Under this analysis, the subject **IHRC** denotes a **function** which takes a property of type **<e,t>** as its argument, as shown in (36). Furthermore, the matrix clause is an expression of type <e,t>, as shown in (37). Therefore, the subject IHRC can take the matrix clause as its argument. Thus, we do not have any problem with lambda conversion in (35).

6 Some predictions with regard to the IHRC construction

Section 6 discusses some predictions made by my analysis about the subject

IHRC construction. As discussed above, under my analysis, even after the position for events is discharged, the IHRC can combine with the matrix clause. This is because, in contrast with the *tokoro*-clause, the subject IHRC can take the matrix clause denoting a property as its argument. This analysis predicts that, in the same manner as the transitive subject, the IHRC should be able to appear as the subject of the unergative, unaccusative, and passive constructions. This prediction seems to be borne out, as shown in (38), (39), and (40).

The unergative construction

(38) [gakusei-ga seki-o shi-ta]-no-ga geragerato warat-ta.
student-NOM cough-ACC do-PST-NO-NOM loudly laugh-PST
"A student laughed loudly on the occasion on which she coughed."

The unaccusative construction

(39) [gakusei-ga seki-o shi-ta]-no-ga koori-no ue-de subet-ta.
student-NOM cough-ACC do-PST-NO-NOM ice-GEN on slip-PST
"A student who coughed slipped on the ice."

The passive construction

(40) [tora-ga ori-kara nige-ta]-no-ga keisatsu-ni yotte
tiger-NOM cage-from run away-PST-NO-NOM police-owing to
tsukamae-rare-ta.
catch-PASS-PST
"A tiger which ran away from a cage was caught by the police."

7 Conclusion

In conclusion, in this paper, I have proposed that *tokoro* which heads the embedded clause of the CENP construction in (1) is inherently event-related and must be related to events as well as individuals. On the other hand, no, which heads the embedded clause of the IHRC construction in (2) can be related only to individuals. This difference leads to the difference of grammaticality between the subject IHRC construction and the subject CENP construction.

Furthermore, I speculate that the subject IHRC in Japanese is similar to IHRCs in other languages. One interesting similarity is that, as noticed by Shimoyama (1999), the internal head NP of the subject IHRC in Japanese exhibits a kind of indefinite restriction, like the IHRCs in many other languages. To be specific, the internal head of the subject IHRC in Japanese seems to be a predicative expression of type <e,t>. In my future research, I have to extend my analysis of the IHRC to IHRCs in other languages.

Notes

[1] I wish to thank Mark Baker, Lisa Travis, Jonathan Bobaljik, and Brendan Gillon for their comments and suggestions.

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Event-Kinds and the Representation of Manner

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1. Introduction

In traditional descriptive categorizations of adverbials, the notion of 'manner' figures prominently. Manner adverbials such as ***elegantly*** or ***clumsily*** are distinguished from, for example, locative adverbials such as ***in the corner*** or temporal ones such ***as for an hour.*** Yet 'manner', however useful it might be as a pretheoretical descriptive term, is a concept more ill-defined and elusive than time or place. What exactly, then, is a manner? Should it be understood as anything more than a descriptive convenience? What role should it play in the grammar? Among the goals of this paper is to address such questions by examining a parallel in several languages between certain morphologically related adnominal and adverbial modifiers. This will lead to a view in which manner is understood as analogous to the notion of kinds in the nominal domain.

The empirical starting point will be modifiers in a number of languages that seem to be, roughly speaking, anaphoric to a manner, such ***as tak*** in Polish and Russian, ***so*** in German, and ***zo*** in Dutch:

(1) a. On **tańczył *tak*.** (Polish)
he danced thus
'He danced like that.'

b. On **tantseval *tak*.** (Russian)
he danced thus
'He danced like that.'

c. Er hat ***so*** **getanzt.** (German)
He has thus danced
'He danced like that.'

d. **Hij** danst *zo.* (Dutch)
he dances thus
'He dances like that.'

These expressions all occur as adnominal modifiers as well (in Slavic, in an inflected form). In this use, they are also anaphoric, but not to a manner:

(2) a. ***Taki*** pies **uciekł** **wczoraj** w nocy. (Polish)
such.MASC.SG.NOM dog.NOM ran.away yesterday in night
'Such a dog ran away last night.'

b. ***Takuju*** sobaku my videli. (Russian)
such.MASC.SG.ACC dog.SG.ACC we saw
'We saw such a dog.'

c. Wir haben ***so*** einen **Hund** gesehen. (German)
We have such a dog seen
'We saw such a dog.'

d. Ik **zou** *zo* 'n hond **willen** hebben (Dutch)
I would such a dog want have.INF
'I would like to have such a dog.'

The relation between the adverbial modifiers in (1) and the adnominal modifiers in (2) is quite close. But the sentences in **(2),** unlike those in (1), receive interpretations that seem to involve anaphora to a kind (Carlson 1977) rather than to a manner, as we will argue below. **A** correspondence of this sort exists even in English, though only in a vestigial form, in the relation between the cognates ***so'*** and ***such:***

(3) a. ?He danced (like) so.
b. Such a dog ran away last night.

The analytical aim here will be to develop an approach to the semantics of adverbial expressions such as those in (1), guided by the intuition that their analysis should parallel that of their adnominal counterparts.

This problem is articulated in a bit more detail in section 2. In section 3, previous approaches to the analysis of English ***such*** are examined, and an analysis in terms of anaphora to kinds is adopted and extended to adnominal modifiers like those in (2). In section 4, a parallel analysis is developed for their adverbial relatives by introducing an analogue of kinds into the domain of events. In section 5, some broader implications of this approach are explored. Section 6 concludes.

2. A Closer Look at the Data

2.1. The Adnominal Use

In their adnominal incarnation, these modifiers closely parallel English ***such.*** In English, if a particular kind of dog had been under discussion (say, the poodle) a natural way to refer to a particular dog of that kind (a particular poodle) would be with ***such a dog.*** The DPs in (2) can be used in this way as well. Thus in Polish, for example, one might refer to a particular dog of the contextually salient kind with ***taki pies*** ('such dog[7]').

The parallel also extends to an alternative way of indicating the kind involved. In English, ***such*** has a use in which the kind is not provided by context, but rather indicated overtly with an ***as*** phrase:

(4) a. Such a dog ***as this*** ran away last night.
b. Such books ***as these*** were once read.

Analogues of English ***as*** phrases can be used for this purpose in other languages as well:[8]

(5) Taki pies ***jak ten*** uciekl wczoraj w nocy. (Polish)
such.MASC.SG.NOM dog.NOM as this ran.away yesterday in night
'Such a dog as this ran away last night.'

(6) So ein Hund ***wie dieser*** hat mal meinen Bruder gebissen. (German)
such a dog as this.SG.NOM has once my brother bitten.
'Such a dog like that once bite my brother.'

So, apart from expected and relatively superficial differences – like agreement between the modifier and the noun – these modifiers correspond very directly in their adnominal use to English ***such.***

2.2. The Adverbial Use

In their adverbial use, these modifiers have no direct analogue in English, though they are comparable to expressions like ***thus, that way, like that,*** or the use of ***so*** in (3). Essentially, the state of affairs seems to be that though English has limited itself to using ***such*** adnominally, German and Polish have imposed no analogous restriction.

Even so, the connection between adnominal and adverbial uses of these expressions is intimate. The semantic task adverbial uses of these modifiers perform with respect to manner is precisely analogous to the semantic task their adnominal uses perform with respect to kinds. Thus, if a particular manner of dancing (say, dancing passionately) had been under discussion, a natural way to characterize a particular instance of dancing that way (a particular passionate

dancing) would be with ***tanczyć tak*** ('dance.INF so') in Polish or with so ***tanzen*** ('so dance.INF ') in German.

Just as the adnominal incarnations of these modifiers support an alternative, overt means of expressing the kind involved as in (5-6), so too their adverbial incarnations support a precisely parallel means of expressing the manner involved:

(7) Jan tańczył tak ***jak Maria.*** (Polish)
John danced.3.SG.MASC.PAST thus ***as Mary***
'John danced this way/the way Mary did.'

(8) Jan hat so wie ***Maria*** getanzt. (German)
John has thus as ***Mary*** danced
'John danced this way/the way Mary did.'

It is not, then, just the modifiers themselves that are identical (modulo, in Slavic, inflection) across their uses, but also the phrasal complements they take.

In Polish, the correspondence between adnominal and adverbial uses is also reflected in the wh-word counterparts of ***tak/taki:***

(9) a. ***Jaki*** pies uciekl **wczoraj** w nocy?
what.MASC.SG.NOM dog.NOM ran.away yesterday in night
'What kind of dog ran away last night?'

b. ***Jak*** tańczył Jan?
how danced John
'How did John dance?'

The inflected adnominal form ***taki*** can be questioned with a corresponding inflected adnominal wh-word ***jaki;*** likewise, the uninflected adverbial form ***tak*** can be questioned with a corresponding uninflected adverbial wh-word ***jak.*** The semantics seems correspondingly parallel. Just ***as tak*** is anaphoric to a manner, ***jak*** questions a manner; and just as ***taki*** is anaphoric to a kind, ***jaki*** apparently questions a kind.[3]

2.3. The *Facts* So *Far*

The correspondence between adnominal and adverbial uses of these modifiers, then, is very close. These uses are semantically parallel, syntactically parallel (modulo inflectional morphology), support parallel as-phrase-like structures, and, in Polish, have parallel wh-words.

To our knowledge, these systematic parallels have not been previously discussed from a generative perspective. Nor is there to our knowledge an existing analysis in formal semantics that links manner modification and

reference to kinds in the way these facts seem to require. The analytical challenge these facts present, then, is to establish such a link.

3. Nominal Uses and Anaphora to Kinds

To establish the link between adnominal and adverbial uses of these modifiers, it seems natural to begin by examining the semantics of ***such*** in English.

3.1. Kinds and the Semantics of Such *in English*

Carlson (1977) analyzed English ***such*** as a kind anaphor.[4] More specifically, ***such*** means 'of kind k', where ***k*** is some contextually salient kind. For example, ***one such dog*** means 'one dog of that kind.'

The principal reason for thinking this is so (and that ***such*** is not, for example, simply a proform for an adjective, as Siegel 1994 suggests), is that expressions that cannot denote kinds do not make good antecedents for ***such:***

(10) a. People ***in the next room... ??such*** people (are obnoxious) (Carlson 1977)
b. Elephants ***that are standing there... ??such*** elephants
c. Men ***that Jan fired this morning... ??such*** men

Bare plurals like those in (10) cannot easily denote kinds, as 'their incompatibility with predicates that require a kind demonstrates:

(11) a. ??People ***in the next room*** are widespread.
b. ??Elephants ***that are standing there*** may soon become extinct.
c. ??Men ***that Jan fired this morning*** are common.

Carlson suggests that these bare plurals do not denote kinds because they "refer to a finite set of things . . . that must exist at a certain time in a given world." However – as Carlson points out – to the extent that such a bare plural can correspond to a kind, it may antecede ***such.*** For example, to the extent that ***alligators in the New York sewer system*** can be construed as a kind of alligator, it is acceptable as an antecedent of ***such:***

(12) Alligators ***in the New York sewer system... such*** alligators survive ***by*** eating rodents and organic debris. (Carlson 1977)

3.2. Nominal Uses as Properties of Kind Realizations

Such, then, can be interpreted as a property of individuals that realize a contextually supplied kind. Like a pronoun, it bears a referential index – but one that corresponds to a kind:[5]

(13) [such$_i$] = λx . x realizes k_i

This semantics for such can be directly extended to Polish taki and German so:

(14) a. [[taki$_i$]] = Ax . x realizes k_i
b. [[so$_i$]] = λx . x realizes k_i

Taki$_i$ pies, for example, is interpreted as in (15):

(15) a. [[taki$_i$]] = λx . x realizes k_i
b. [pies] = λx . x is a dog
c. [[taki$_i$ pies] = hx . x realizes k_i A x is a dog

The denotation of taki, – a property of individuals that realize the contextually salient kind – intersects with the denotation of dog – a property of individuals that are dogs – to yield a property of individuals that that realize k_i and that are dogs. German so ein Hund 'such a dog' can be interpreted likewise.

3.3. As-Phrase-Like Structures

Taki and so may occur with optional complements (comparable to English *as*-phrases), as (5-6) showed. To account for this, taki and so can be taken to have an optional argument. The complement can be taken to denote a property of kinds (like English as phrases; Carlson 1977, Landman 2002). For example, as Missy denotes the property of kinds that Missy realizes:

(16) [[jak Missy] = hk . Missy realizes k

The semantic contribution of the as-phrase is to restrict the antecedent kind: the kind anteceding taki in such a dog as Missy must be a kind that Missy realizes. More precisely:

(17) [[taki$_i$]] = $\lambda f_{\langle k,t\rangle}\lambda x$. x realizes k_i A f(k_i)

In effect, taki pies jak Missy ('such dog as Missy') denotes a property of individuals that realize some contextually salient kind that Missy realizes:[6]

(18) [[taki$_i$ pies jak Missy] = λx . x realizes k_i A Missy realizes k_i A dog(x)

4. The Adverbial Uses

The Carlson (1977) analysis of English such, which the previous section

demonstrated can be extended to adnominal uses of Polish taki and German so, can be extended even further to adverbial uses of these expressions by making some additional assumptions about the ontology of events.

4.1. Event-Kinds

The principal analytical challenge to confront in extending the kind-anaphora account of the adnominal uses to the adverbial ones is that this requires establishing a link between kinds and manner modification. This link, however, emerges quite naturally when one takes the denotations proposed above for the adnominal uses as a guide.

The first step to doing this is to exploit the parallelism between individuals and events (Davidson 1967, others). Just as adnominal taki and so denote properties of individuals, adverbial tak and so might be taken to denote properties of events. This way, both uses of expressions will have in common that they are property-denoting, and that they are interpreted by predicate conjunction.

At this point, though, one immediately encounters an intriguing complication. Pursuing the analogy further, if the adnominal uses denote properties of individuals that realize a particular contextually-supplied kind, it seems natural to suppose that the adverbial uses might likewise denote properties of events that realize a particular contextually-supplied kind. But here, we are on less familiar territory – we have encountered a funny kind of kind. It is not usual to regard kinds as having event realizations.

What the facts here seem to demand, then, is an analogue of kinds in the domain of events. This seems natural enough, but it is not a familiar notion. (One notable antecedent, though, is Hinrichs 1985, who implements kinds in the domain of events for largely conceptual reasons.) To put the pieces of the puzzle together, one might assume an ontology with both kinds, like Carlson's, and events. The domain of kinds and the domain of events, however, will have a non-empty intersection – the domain of event-kinds.

A bit more formally, the entity domain D will be partitioned into two sorts: D_o, the domain of objects (non-event individuals), and D_v, the domain of eventualities (events and states). The entity domain D_e will also be partitioned along another dimension into another two sorts: D_r, the domain of non-kinds (or realizations), and D_k, the domain of kinds.[7] Thus:

(19) $D_e = D_v \cup D_r$
$D_e = D_r \cup D_k$

The purpose of imposing this structure on the domain is only to be able to introduce event-kinds – members of both D_s and D_k.

4.2. Adverbial Uses as Properties of Event-Kind Realizations

The adverbial modifiers can now be interpreted in a way that closely parallels the nominal ones. Like the adnominal uses, the adverbial uses can be interpreted as properties of realizations of a contextually supplied kind:

(20) $[\![\textbf{tak}_i]\!]$ = he . e realizes k_i
$[\![\textbf{so}_i]\!]$ = he . e realizes k_i

The only semantic difference, then, will be sortal. That is, unlike the adnominal uses, the adverbial uses denote properties of events and are anaphoric to event-kinds. This can be made explicit as a presupposition:

(21) Adnominal uses:
$[\![\textbf{taki}_i]\!] = \lambda x: x \in D_s \cap D_r \wedge k_i \in D_s \cap D_k$. x realizes k_i
$[\![\textbf{so}_i]\!] = \lambda x: x \in D_s \cap D_r \wedge k_i \in D_s \cap D_k$. x realizes k_i

(22) Adverbial uses:
$[\![\textbf{tak}_i]\!]$ = he: $e \in D_s \cap D_r \wedge k_i \in D_s \cap D_k$. e realizes k_i
$[\![\textbf{so}_i]\!]$ = he: $e \in D_s \cap D_r \wedge k_i \in D_s \cap D_k$. e realizes k_i

Thus, adverbial ***tak,*** for example, will be defined only with respect to event realizations and only if it is anaphoric to an event-kind. (We will henceforth suppress this presupposition for brevity.)

Tańczył tak$_i$ ('danced thus'), then, will receive an interpretation as in (23):

(23) $[\![\textbf{tańczył}]\!]$ = he . e is a dancing
$[\![\textbf{tak}_i]\!]$ = he . e realizes k_i
$[\![\textbf{tańczył tak}_i]\!]$ = he . e is a dancing $\wedge$ e realizes k_i

Tak can thus be interpreted as a run-of-the-mill modifier, conjoining with *tańczył,* yielding a property of events as a VP denotation.[8]

4.3. Event-Kinds As a Way of Representing Manner

In the previous section, the analogy between the adnominal and adverbial uses was pursued almost mechanistically – to sustain it, kinds in the event domain were necessary, so they were introduced. But does this do justice to the semantics of the adverbial uses?

It seems to. To convince oneself of this, it is necessary to reflect on what an event-kind is. This is, of course, not entirely obvious, any more than it is obvious how to understand the role of kinds in the grammar more generally. But it does seem relatively clear that if, for example, there can be a kind which is realized by particular clumsy people, there may also be a kind which is realized

by particular clumsy dancings. In this way, an event-kind can model a manner. This will be explored in a bit more detail below. But as it stands, this does suggest that event-kinds may in fact suffice to reflect that adverbial uses of these expressions are, pre-theoretically, anaphoric to a manner.

5. Broader Implications: Event-Kinds and Manner Anaphora

Within the nominal domain, the main argument for treating such as anaphoric to a kind was that it could not be anteceded by an expression that denotes a set of individuals that occur at a particular time and place – an expression that does not correspond to a kind.

Tak and so seem to be subject to a similar constraint – temporal and locative adverbials cannot generally antecede them:

(24) a. *Maria hat am Dienstag getanzt und Jan hat (German)
Mary has on Tuesday danced and John has
auch so getanzt.
also thus danced
'Mary danced on Tuesday, and John danced like that too.'

b. *Maria tańczyła we wtorek i Jan też tak tańczył. (Polish)
Mary danced on Tuesday and John also thus danced
'Mary danced on Tuesday, and John danced like that too.'

(25) a. *Maria hat in Minnesota gegessen und Jan hat (German)
Mary has in Minnesota eaten and John has
auch so gegessen.
also thus eaten
'Mary ate in Minnesota, and John ate like that too.'

b. *Maria jadla w Minnesocie i Jan tez tak jadł. (Polish)
Mary ate in Minnesota and John also thus ate
'Mary ate in Minnesota, and John ate like that too.'

Temporal and locative adverbials in general restrict a set of events to having taken place at a particular time or place in a given world, and as a consequence do not make for a very good event-kind.

As with the nominal cases, what constitutes a possible event-kid is subject to some variability. Repeating (12):

(26) Alligators *in the New York sewer system... such* alligators survive by eating rodents and organic debris. (Carlson 1977)

This can be construed as involving a particular kind of alligator. Similarly, certain locatives can be construed as involving an event-kind, and thereby can antecede *tak* and *so:*

(27) Maria Spi w śpiworze i Jan też tak Spi. (Polish)
Mary sleeps in sleeping-bag and John also thus sleeps
'Mary sleeps in a sleeping bag, and John sleeps like that too.'

(28) Maria schläft in einem Schlafsack und Jan schläft auch so. (German)
Maria sleeps in a sleeping-bag and Jan sleeps also thus
'Maria sleeps in a sleeping bag, and Jan sleeps like that too.'

Even locatives containing proper names may reflect this point – if Minnesota in (25) were a restaurant and eating there a sufficiently well-established kind of eating, (25b) would be good. Thus event-kinds seem to be subject to the same constraints as kinds generally. These independent characteristics of kinds seem to suffice to distinguish manner modifiers from temporal and locative modifiers.

6. Outlook

6.1. Uses in the Adjectival Domain

The analysis here is rooted in the correspondence between the adnominal and adverbial uses of modifiers such as Polish *tak* and German *so.* It is worth noting, though, that these modifiers also have uses in the adjectival domain:

(29) a Jestem tak wysoki (jak Piotr) (Polish)
I-am so.MASC.SG.NOM tall.MASC.SG.NOM as Peter
'I am this tall/as tall as Peter.'

b. Ich bin so groß (wie Peter) (German)
I am so tall as Peter
'I am this tall/as tall as Peter.'

As modifiers of AP, these expressions are degree anaphors – they rely on a contextually-supplied degree. If the core semantics of this class of modifiers more generally involves kind anaphora, there ought to be some way in which this apparent degree-anaphora can be modeled in terms of anaphora to kinds. One way to implement this idea might be to introduce into the ontology, in

addition to degrees, degree-kinds. But this seems a suspect notion. What might a kind of degree be? What would the difference be between a degree-kind and a degree-realization? Another approach, perhaps more interesting, would be to focus not on the degree argument, but rather on the eventuality argument plausibly also present in the adjectival domain. Just as adverbial uses of these modifiers involve event-kinds, the adjectival uses could involve state-kinds. This would be quite natural – if there are event-kinds, one might expect there to be state-kinds too. This would require, of course, that an ordering on to be imposed (these) state-kinds, just as there is on degrees. This approach presents the tantalizing question of whether state-kinds might actually suffice on their own to represent degree.

Whatever the right approach to this may ultimately be – a matter we will leave for future research – we take this as an indication that it may in fact be fruitful to take kind anaphora as the core semantics of these expressions, and to treat the adjectival use as a probe into the relation between kinds and degrees.

6.2. Conclusion

The principal analytical proposal here has been that German ***so*** and Polish ***tak/taki*** are uniformly kind-anaphoric in both their adnominal and adverbial uses, and that their semantic relation is expected on a view in which anaphora to a manner is anaphora to an event-kind.

Given this approach, these modifiers constitute novel evidence for introducing event-kinds into the ontology. This approach also provides the beginnings of an answer to the question of how to represent the notion of 'manner' in the grammar. The facts considered here – coupled with the observation that there is no reason why the domain of eventualities and the domain of kinds must be disjoint – lead to a way of modeling manner in terms of an independently motivated notion, kinds. The principal semantic distinction between manner modification and temporal or locative modification then follows from known characteristics of kinds. In this way, this approach to these modifiers puts in a new light our natural intuitions about what manner is.

Notes

Thanks to Ania Łubowicz, Jan Anderssen, Maria Gouskova, and Brandt van der Gaast for judgments and help with the data, and to Angelika Kratzer, Lisa Matthewson, Barbara Partee, Chris Potts, Chris Barker, and Philip Miller.

This adverbial use of English *so* is likely related to 'identifier *so*' (Bolinger *1972*, others). Identifier *so*, though, seems to be subject to a number of idiosyncratic restrictions (see Kehler and Ward 1999 for a detailed examination) not shared by adverbial uses of the modifiers at issue here.

We will limit our examples from this point primarily to German and Polish for convenience.

It would of course require more argumentation than can be provided here to establish

convincingly that ***jaki*** in fact questions a kind. This claim, however, has been made on completely independent grounds even for English what (Heim 1987).

[4] Discussions of such include Bolinger (1972), Bresnan **(1975), Siegel (1994),** and Wood (2002). Carlson's semantics for such has it introduce a presupposition that we have not included here that the kind be a **subkind** of the kind that corresponds to the nominal such modifies. For instance, ***one such dog*** denotes a property of individuals that realize k_i, where k_i is presupposed to be a **subkind** of dog.

[5] We assume that such and its argument ***as*-clause** form a constituent at LF, in the same **way** that, for example, *more* and its ***than*-clause** complement might.

[7] We do not distinguish stages of individuals here, as Carlson does.

[8] This representation 'severs' the external argument (Kratzer 1996). This is not crucial.

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The Morphophonology of Pronominal Affixes in Portuguese[1]

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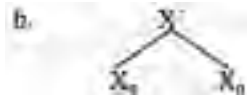
1 Introduction

Within the theory of prosodic phonology (Nespor&Vogel 1986), clitics are traditionally regarded as unstressed function words (e.g Booij 1995, for Dutch; Selkirk 1995, for English). It is a widely accepted view that they attach to a stressed host at the post-syntactic level (i.e. after the linearisation of word-level units in the syntax).

The view that cliticisation is best regarded as a phonological process has also been adopted for Romance clitic pronouns. Under this claim, the verb and the clitic correspond to two independent syntactic elements:

(1) a. sentiu-o
felt-3.sg.dat
'felt it/him'

b. 

sentiu o

Vigário (1999a,b), in line with previous work[2], argues that clitic pronouns in European Portuguese (EP) share the prosodic and syntactic status of stressless function words. Two classes of arguments have been adduced to support this position. The first is based on verb-specific phonology and the differences between clitics and affixes (section 2), the second on word-internal phonology and the similarities between clitics and function words (section 3)[3].

In this paper, I will re-examine these arguments and argue that they fail to show that clitic pronouns in EP behave phonologically like function words. Instead, the evidence is consistent with the view argued for in Luís (2002,2003, to appear) and Crysmann (2002) that clitics are best analysed as verbal affixes.

2 Verb-specific Phonology

It has recently been argued that there are certain morphophonological rules of EP which treat verbal suffixes and enclitics as distinct units (Vigário 1999b). I will examine these rules – i.e., theme vowel deletion (2.1), non-back glide insertion (2.2), and theme vowel centralisation (2.3) – and argue that they do not provide evidence against the affix status of EP enclitics.

2.1 Theme vowel deletion

Mateus (1975) observes that the absence of the theme vowel in EP verb forms, as given in (2a'-b'), results from the rule of theme vowel deletion which applies before a vowel initial suffix in all three conjugation classes. In (2a) and (2b), theme vowels are followed by the person/number suffix -o of the Present Indicative paradigm:

(2) a. com-e-o — a'. como
eat-Class2-1sg.PresInd
'(I) eat'

b. lav-a-o — b'. lavo
wash-Class1-1sg.PresInd
'(I) wash'

The fact that the rule fails to apply before 3rd person enclitics (i.e., o, a, os, as), in (3), seems to suggest that clitics must constitute independent word-level units (Vighrio 1999b).

(3) a.	com	-e	+o	a'	*com+o
	eat	-Class2.3sg.PresInd	+3sg.masc.acc		
	'(she)	eats it.'			
b.	lav	-a	+o	b'	*lav+o
	eat	-Class2.3sg.PresInd	+3sg.masc.acc		
	'(she)	washes it'			

The main problem with this kind of argumentation is that it seriously underestimates two important points. First, there is the fact that theme vowel deletion, as formulated by Mateus (1975), is only induced by specific vowel-initial suffixes. Clitics, and other morphemes as will be shown below, do not constitute potential triggers.

As the data in (4) shows, 1'' sg Preterite suffixes do not trigger deletion of the theme vowel. Instead, the suffix *–i* and *-u* which are adjacent to theme vowels semivocalise (cf. Mateus 1975, Mateus&Andrade 2000, for derivation).

(4) a. lav -a -i /lavej/
wash -TV -3sg.Pret
‘ (I) washed'
b. part -i -u /partiw/
wash -TV -3sg.Pret
'(I) broke'

This, of course, indicates that the rule is morphologically conditioned, as would be expected of a morphphonological process. Its exact environment is defined by Mateus&Andrade (2000:75) who explicitly emphasise that theme vowel deletion is dependent on specific tense and agreement combinations: it takes place when the theme vowel precedes the 1st sg Present Indicative suffix (in the first conjugation) or the subjunctive suffixes *-e* and *–a* (in the second and third conjugations). We may therefore conclude that there is no empirical evidence suggesting that vowel-initial clitics should be among the group of suffixes triggering the phenomenon. Our first counter-argument then shows that the affixal status of clitics cannot be determined on the basis of their ability to induce theme vowel deletion.

The second point I would like to address refers to the morphological differences between the verb forms in (2) and (3). Crucially, the vowel-final verb forms which serve as the basis for enclitics, in (3), do not contain a theme vowel per se. Instead, the so-called theme vowel in (3) in is in fact realising tense and agreement features, unlike the 'underlying' theme vowels in (2). This difference is also annotated in the glosses provided for each verb form. The ability for certain affixes to be associated with two or more sets of featural information is a well-known property of inflectional systems (Matthews 1974, 1991). So, in (3a) there is only one exponent realising the values for the same set of features. In other words, the final *–e* in come is associated to the values a) Conjugation 2, b) 3rd Singular and c) Present Indicative. If we now look at (2), it is clear that the tense and agreement features are conveyed by the portmanteau suffix *–a*, not by the theme vowel (Roca 1999). The morphological structure of the data in (2), where deletion applies, is significantly different from the data where it is blocked. While one case contains an 'exclusive' class marker, the other doesn't. Failure of the rule to apply cannot be imputed to the grammatical status of the clitic.

To sum up, then, empirical evidence has been provided to argue that the rule of theme vowel deletion cannot be used to determine the word-level status of clitic pronouns in EP. Two arguments support this conclusion: a) the rule, as formulated by Mateus (1975), is only triggered by a handful of tense and agreement suffixes in the Present and Subjuntive tenses; b) cliticised verb forms do not satisfy the requirements for the rule to apply and cannot therefore be used as evidence. The rule of theme vowel deletion is therefore a typical

morphologically conditioned rule which can only take place in non-cliticised verb forms[4].

2.1.2 **Non-back** glide insertion

One further argument against the affix status of EP clitics is based on the rule of non-back glide insertion. This rule is formulated by Mateus (1975) as a process which inserts a non-back glide between two adjacent vowels, the first of which is a stressed /e/. The effect of the rule is illustrated with the Present Indicative forms of recear 'fear', in (5a-b).

(5) a. rece+i+o (*receo)
'I fear'

b. rece+i+a (*receas)
'you.sg fear'

The cliticised verb form in (6a) appears to provide the necessary phonological context for the rule to apply. If the enclitic -o is part of verbal morphology (as the –o suffix in (5), one would expect to find an epenthetic vowel between the stressed /e/ and the immediately adjacent vowel-initial enclitic. Yet, the rule fails to apply and the hiatus between both vowels remains.

(6) a. vê-o b. *vê-i-o]

'(s/he) sees him/it'

Likewise, the rule is also blocked in (7) where a vowel-fmal verb is followed by a vowel initial determiner.

(7) Lê o texto! (*Lê-i-o texto.)
'Read the text'

It is therefore argued that the rule is only blocked across word boundaries (Vigário 1999b). Under this view, the enclitic in (6) cannot be regarded as being part of verbal morphology, but must be regarded as an independent syntactic unit, much like the masculine singular determiner o in (7).

This argumentation is highly problematic because it presupposes that the insertion of the non-back glide takes place after any stressed /e/ in prevocalic position. However, the application of the rule cannot be as general as assumed, otherwise one would expect to find glide insertion in (8), where the first vowel is also a stressed /e/ followed by a vowel-initial suffix. Here, the 3rd singular Preterite forms of bater 'hit' and comer 'eat' are derived by combining the stem bate- and come- with the -*u* suffix. Both stems are produced with a stressed /e/, however no insertion of an epenthetic vowel is allowed.

(8) a. bateu [ew] (*bate + i + u)
'(s/he) hit'
b. comeu [ew] (*come + i + u)
'(s/he) ate'

This data then indicates that glide insertion is determined by the morphological properties of the stressed /e/: it is part of the root in (5), but belongs to the stem in (8). A similar observation is found in Mateus (1975) who suggests that the context of insertion of the glide is best described as applying to stressed root vowels[5], found in a small set of irregular verbs ending in –ear[6]. In other words, whenever the stressed /e/ is not a root vowel, glide insertion cannot take place.

Based on this generalisation, we now seem to have an explanation for the behaviour of the cliticised verb in (6). Given that the stressed /e/ before the enclitic is a stem vowel (realising the values for conjugation class, tense, person and number), the fact it blocks glide insertion seems to follow from the highly restricted nature of the rule, conditioned by partly morphological and partly lexical factors. Evidence based on this rule therefore cannot be used to argue against the affix-status of clitics.

2.1.3 Theme vowel centralisation

The last rule in this group is known as theme vowel centralisation. As formulated in Mateus (1975), it accounts for the fact that third conjugation verbs change their theme vowel into schwa:

(9) a. parte /ə/, */i/ b. mente /a/, */i/
'(she/he) leaves' '(she/he) lies'

It has been further argued that centralisation is blocked when the theme vowel is followed by other inflectional suffixes, as in (10) (Vigário 1999a).

(10) a. partiremos b. mentiremos
'(we) will leave '(we) will lie'

The data then seems to suggest that theme vowel centralisation cannot apply word-internally. Therefore, the fact that enclitics in (11) fail to trigger the rule is taken as an indication that they cannot be morphologically part of the verb.

(11) a. parte-lhe b. mente-me
'(he/she) breaks-3.sg.dat' '(he/she) lies-1.sg.dat'

Underlying the argument that enclitics are function words is the claim that centralisation only applies to word-final vowels. This claim however cannot be

correct. For example, in the Present Indicative forms of *mentir* 'lie' and partir 'break', as given in (12), the theme vowel has changed into -e despite the fact that it is followed by an agreement marker. This observation is also in accordance with Mateus (1975) who predicts that the unstressed theme vowel /e/ may be optionally followed by consonantal segments. Word-final position, then, cannot provide an explanation as to why centralisation applies before an enclitic in (9) but not in the verb forms in (11).

(12) a. mentes
'(you.2sg) lie'

b. partes
'(you.2sg) break'

Perhaps one reason why vowel change takes place in (9) and (12) is the fact that the theme vowel is preceded by a stressed syllable. While the vowel occurs after the stressed syllable in (13), it either appears on or before the stressed syllable, in (14a) and (14b), respectively (stressed vowels are given in capital letters). Under this account, the attachment of an enclitic in (13b) has no effect on how the theme vowel is produced.

(13) a. pArte
'(s/he) breaks'

b. pArte-o
'(she) breaks it'

(14) a. partIas
'(she) broke'

b. finjirÁs
'(you.2sg) will break'

The conclusion that cliticisation does not determine how the theme vowel is realised can also be arrived at by adopting a more inflectional approach to theme vowel alternation. In this case, so-called centralisation is regarded as an instance of stem allomorphy, rather than as the result of a phonological rule applying to an underlying vowel. Under this view, the occurrence of the schwa will be derived as the output of the feature specification of the whole verb form. The fact that the theme vowel is realised as schwa in (15) is analysed as the phonological output of the verb's morphosyntactic value.

(15) 2nd Singular Present Indicative of PARTIR:

Root	→	part-
Stem formation	+	part+e-
P/N agreement	→	part+e+s

To sum up, then, regardless' of whether we account for theme vowel alternation through verbal stress (13-14) or through allomorphy, in either case we predict that the phonological form of third conjugation stems is not dependent of the presence of enclitics. Therefore, the argument that clitics are not word-internal simply because they trigger centralisation is rather weak.

3. Word-level rules

Continuing our critical overview, I will now re-examine a set of phonological rules which apparently show that clitics in EP behave like function words (Vigário 1999a,b).

3.1 Back vowel deletion

Back vowel deletion, as proposed by Frota (1996), may optionally delete a back vowel in word final position when followed by another vowel. It applies between two prosodic words, as in (16a), but fails to be triggered if function words are involved (16b):

(16) a. músico africano O
'african musician'

b. do architecto *Ø
of-the architect

Since clitics also prevent the rule from occurring, it is argued that clitic pronouns and function words behave phonologically alike (Vigário 1999a):

(17) eu não to aceito *Ø
I not CL accept
'I don't accept it from you'

Yet, the claim that clitics in EP have the same prosodic and syntactic status as function words seems to be counterexemplified by (18) where the rule of back-vowel deletion also fails to apply across morpheme boundaries, namely between a root vowel and a theme vowel:

(18) a. doar *dØar
'donate'

b. voar *vØar
'fly'

This then suggests that deletion is not only blocked by function words but also by affixes. There is then insufficient evidence to support the non-affix status of clitics.

3.2 Nasal glide insertion

The rule of nasal glide insertion, proposed by Mateus (1975), changes the nasal vowel /ẽ/ into the nasal diphthong /ẽj̃/. Standard work on Portuguese phonology has generally assumed this diphthongs can only occur word-finally (Mateus 1975), as (19) and (20) illustrate. In (19), where the nasal vowel /ẽ/ is followed by other phonological or morphological segments, glide insertion fails to apply. On the contrary, (20) offers to necessary word boundary.

(19) a. entender, enfiar /ẽ/,*/ẽj̃/ b. mentol, quente /ẽ/,*/ẽj̃/
'understand', 'insert' 'mint', 'hot'
(20) a. sentem */ẽ/,/ẽj̃/ b. dizem */ẽ/,/ẽjl
'(they) feel '(they) say'

The fact that diphthongisation is triggered before an enclitic pronoun, as in (21), has suggested that the clitic cannot be morphologically part of the verb (Vigário 1999a).

(21) a. dizem-lhe */ẽ/,/ẽj̃/ b. fazem-no */ẽ/,/ẽj̃/
'(they) give them' '(they) do it'

There is however one important piece of evidence which clearly contradicts the view that nasal diphthongs can only appear in word-final position, namely the allomorphy induced on vowel-initial enclitics by 3rd plural verb forms. In (22), the diphthong is inducing phonological shape variation on 3rd accusative pronouns. As extensively argued in Luis (2003), in standard EP we only find clitic allomorphy with 3'' plural verb forms. If the diphthong realises other verbal features, such as 3rd singular features, as illustrated in (23), pronominal allomorphy is not triggered.

(22) *dizem-o → dizem-no
'(they) say it'
(23) mantém-o → *mantém-no
'(s/he) keeps it/him'

In Luis (2003, to appear), I have argued that morphophonological data of this nature can only be derived as a morphophonological phenomenon because it does not follow from general rules of productive phonology (cf. also Spencer 1991, Crysmann 2002). Thus, the fact that n-initial enclitics are grammatically conditioned indicates that diphthongs are not restricted to word-final position.

3.3 High vowel semivocalisation

The rule of high vowel semivocalisation is found in the Lisbon dialect of EP and applies to vowels in prevocalic position. It takes place before a masculine gender suffix (24) and before a verbal suffix (25), suggesting that its domain of application is word-internal (Mateus 1975).

(24) a. rio [iu]/[iw] b. tio [iu]/[iw]
'river' 'uncle'
(25) a. eu sorrio [iu]/[iw] b. eu rio [iu]/[iw]
'I smile' 'I laugh'

In (26), where the high vowel appears word-finally, semivocalisation is blocked. Yet, in (27) it applies between verbs and enclitics - rather unexpectedly, since in this case it appears that enclitics are behaving more like the suffixes in (24-25).

(26) a. Não vi utilidAde nisso *[iw]
not saw utility in-that
'I didn't see any utility in that'

b. Eu nlo vi o carro *[iw]
I not saw the car
'I didn't see the car'

(27) a. Eu vi-o [iw]/ *[iu]
'(I) saw-himlit'

b. Eu fingi-o [iw]/ *[iu]
'(I) pretended it'

The fact that enclitics undergo semivocalisation has been accounted for by arguing that enclitics in EP combine with the verb through incorporation – in contradistinction with typical function words in this language which attach phonologically through adjunction[7/8]. This account constitutes a noteworthy attempt at capturing the similarity between enclitics and suffixes evidenced in (24-25) and (27), however the rule of semivocalisation - traditionally regarded as taking place word-internally - severely undermines the view that clitics are phonologically different from affixes.

The fact that postverbal clitics are treated like verbal suffixes clearly indicates that they share identical morphological properties. This piece of evidence then also lends support to the claim that EP clitics are best analysed as affixes. I conclude then that there is insufficient empirical evidence to maintain the view that enclitics constitute function words.

3.4 Non-back vowel deletion

One further argument in favour of the phrasal incorporation of enclitics (cf. 3.3) seems to be provided by the rule non-back deletion (Vigário 1998, 1999b). This rule deletes vowels in prevocalic position before a prosodic word boundary:

(28) pede azeitonas → pedØ]$_{Pwd}$ azeitonas]$_{Pwd}$
'(s)he asks-for olives'

Deletion is blocked between the verb and an enclitic (29a), but not after a verb-enclitic unit (29b).

(29) a. pede-a → *pedØ - a]$_{Pwd}$
asks-3sg.acc.masc
'(s)he asks for it'

b. dou-te amêndoins → dou-tØ]$_{Pwd}$ amêndoins
give-2sg.dat peanuts
'(I) give you peanuts'

The data then suggests that the verb-enclitic combination does not contain an internal prosodic word boundary, lending support to the incorporation of enclitics in phrasal phonology.,

It is however far from clear that the deletion rule is treating enclitics as function words. Instead, it only seems to show that enclitics form with the verb a prosodic word. Facts like these however are not incompatible with the affixal status of post-verbal clitics. Thus the evidence does not support the similarity between clitics and function words.

Instead, two further pieces of evidence seem to lend strength to the view that enclitics are morphologically part of the verb. First, there is the fact that non-back vowel deletion also fails to occur word-internally between a root vowel and a theme vowel, as illustrated in (30).

(30) receava → *receØ - va
'I/he/she feared'

Second, when deletion of the non-back vowel fails to take place, as in (29a) and (30), the non-back vowel must be realised as a glide (Vigário 1998). This phenomenon whereby a non-back vowel in prevocalic position alternates with a glide is ungrammatical (or more marked) across prosodic words (cf. 31a), but mandatory before suffixes or enclitics (31b-c).

(31) a. pede azeitonas → */?ped[j] azeitonas
b. receava → rec[j]ava
c. pede-a → ped[j]-a

The behaviour of enclitics with respect to non-back vowel deletion and glide insertion then appears to confirm the claim that enclitics are verb-internal elements.

4. Further Problems

This paper has shown that there is not sufficient evidence to support the claim that EP clitics behave like function words. On the contrary, some of the rules addressed in the previous section have shown that enclitics behave, in fact, like affixes. This conclusion is in line with the view presented in Crysmann (2002), Luis (to appear) and Luís and Spencer (to appear) that clitic pronouns must be generated in the morphology. The data which motivates the claim has shown that, for example, EP clitics exhibit non-productive allomorphic variation (31a), trigger idiosyncratic stem allomorphy on the verb (31b) and may intervene between the verb stem and the tense agreement marker (31c). This kind of data is highly problematic to Vigário, 's account, but expected if the object pronouns are analysed as part of the morphology of the verb.

(31) a. *Eles dizem-o → Eles dizem dizem-no
they.masc say-3.sg.masc.acc
'Maria will give it'
b. *A Maria irá dar-a → A Maria irá dá-la
the Maria give.fut-3sg.fem.acc
'They say it'
c. *Os meninos verão-*os* → Os meninos vê-los-ão (not: verão-os)
the boys see.fut-3sg.masc.acc
The boys will see them'

Previous phonological studies have suggested that these morphophonological effects can be derived through standard phrasal phonology. Within the theory of Precompiled Phonology developed (Hayes 1990), it has been argues that function words can have allomorphic variants in the lexicon (Vigário 1999b). Under this view, the I-forms and n-forms of accusative pronouns shown in (31) are derived as word-level allomorphs and inserted in the syntax postlexically.

This might at first seem a plausible approach, but upon closer inspection, the data in EP involves more than just the selection of pronominal forms. In fact, to capture the idiosyncrasies of the morphophonological effects, significant extensions must be introduced into the framework, thus seriously challenging the spirit of the theory of precompilation. By allowing precompiled rules to refer to inflectional properties (such as person and number features), the differences between precompiled allomorphy and true inflectional allomorphy are inevitably blurred, and pronominal allomorphs are assigned a rather unclear theoretical status. To us, the problems posed by the data to a 'Precompilation' analysis clearly indicates that object pronouns should not be derived as phrasal allomorphs, but as inflectional affixes in the morphology (Luis 2003)[9].

Endnotes

[1] I would like to thank Laurie Bauer, Wyn Johnson and Andrew Spencer for suggestions and discussion. Earlier versions of this paper were presented at the X Console Meeting (Leiden, 2001) and the Spring Meeting of the Linguistic Association of Great Britain (Liverpool 2002). This work was funded by the British Academy and the Portuguese Ministry of Science and Technology.

[2] For instance. Peperkamp (1997) who analyses cliticisation in Spanish and Italian as a phonlogical process, within Prosodic Phonology (Nespor&Vogel 1987). However, cf. Monachesi (1999) and Brines (2000) for counterevidence.

[3] One further class of arguments is based on the behaviour of clitics with respect to stress. However, cf. Luís (2002) where EP clitics are analysed as stress-neutral affixes.

[4] The purely morphophonological character of the rule in fact suggests that the phenomenon would best be captured as an allomorphic idiosyncrasy rather than by assuming the existence of an underling theme vowel. The obvious advantage of an allomorphic approach is that we can do without a deletion rule which, as just shown, has a very limited context of application (cf. Roca

(1999) for empirical and theoretical arguments against postulating underlying theme vowels in Romance). From a purely inflectional point of view, the idiosyncrasy of the phenomenon would be more insightfully captured as an instance of stem allomorphy. In this case, theme-less stems would be provided by a 'morphomic' rule (Aronoff 1995) which associates the 'absence' of the theme vowel to a specific combination of tense&agreement features. One would assume that, for example, 1st singular forms of the Present Indicative selects a theme-less stem which combines with the 1st singular Present Indicative marker -o:

(i) 1st Singular Present Indicative of PARTIR:

Root	→	part-
Stem formation for 1sg.PresInd	+	part-
P/N agreement	+	part+o

This realisational account would correctly capture that theme-less stems are morphologically conditioned. Furthermore, it would also show that there is no empirical motivation for Vigário's claim that the cliticised verb forms in (6) should undergo deletion.

[5] Further supporting the idiosyncratic nature of the stressed /ɐ/ vowel is its articulatory description (cf. Mateus 1975).

[6] The fact that glide insertion also seems to apply to a reduced number of nouns and adjectives, such as *cheio* 'full' or *areia* 'sand', further reinforces the restricted context of application of this rule.

[7] While the process of adjunction creates a prosodic boundary between the prosodic word and the function word, the process of incorporation unites both the function word and the prosodic word under one prosodic word domain without such boundary (Peperkamp 1995). Both processes take place in phrasal phonology.

[8] Treating enclisis as the more marked option is clearly at odds with the fact that it is found very early in child language before the acquisition proclisis (Duarte et al. 1995).

[9] An alternative inflectional analysis is given in Luís (to appear) within Paradigm Function Morphology (Stump 2001).

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An Underspecified Tense in St'át'imcets[1]

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1 Introduction

In some languages, tense marking is obligatory in finite clauses. Examples from English are given in (1a). On the other hand, some languages lack obligatory tense morphology, as shown in (1b) for St'át'imcets (Lillooet Salish).

(1) a. Helen played / is playing / plays / *play.

b. **sáy'sez'** kw-s Helen
play **DET-NOM** Helen
'Helen played / is playing.'

The first goal of this paper is to determine whether superficially 'tenseless' sentences like (1b) contain a covert tense morpheme; I will argue that they do. The second goal is to determine what the semantics of that tense morpheme is. I will propose that (1b) contains a phonologically null tense morpheme which is lexically underspecified with respect to whether the reference time precedes or overlaps with the utterance time. I will show that this analysis is empirically distinguishable from, and preferable to, an alternative analysis according to which St'at'imcets possesses both a null past and a null present tense morpheme.

The material presented here forms part of a broader research agenda, whose aims are to discover what constraints exist on tense systems cross-linguistically. As a first step toward the broader perspective, I will examine the consequences of my analysis of St'ht'imcets for learnability and for cross-linguistic variation.

2 St'át'imcets Tense Data

St'ht'imcets (Lillooet) is a Northern Interior Salish language spoken in the southwest interior of British Columbia. As mentioned above, morphological marking of tense is optional in this language. (2) contains sentences without overt tense morphology, which may be interpreted as either past or present.[2]

(2) a. thyt-wit
hungry-3PL
'They were / are hungry.'

b. it'-em kw-s Helen
sing-INTR DET-NOM Helen
'Helen sang / is singing.'

The interpretation of superficially 'tenseless' sentences is partially dependent on the aspectual class of the predicate (Aktionsart). For example, states have a default interpretation as present tense, while activities may freely be either present or past. Determiners and demonstratives also have an effect on temporal interpretation. Analysis of these phenomena goes beyond the bounds of this paper; see Demirdache (1997a,b), Matthewson (in prep. a, b), Davis (in prep.) for discussion.

Not all sentences lack overt tense marking. The temporal enclitic *tu7*, illustrated in (3), unambiguously forces a past tense interpretation.

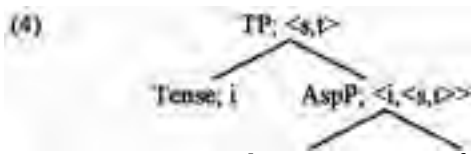
(3) a. thyt-wit *tu7*
hungry-3PL *PAST*
'They were / *are hungry.'

b. sáy'sez' *tu7* kw-s Helen
play *PAST* DET-NOM Helen
'Helen played / *is playing.'

3 Background Assumptions and Framework

I assume that tense is a relation between the utterance time and the reference time (the time about which a claim is made; see Reichenbach 1947, Klein 1994, etc.). For example, past tense requires that the reference time precedes the utterance time. For concreteness, I adopt Kratzer's (1998) analysis of tense and aspect.[3] The T head is sister to Aspect Phrase, which denotes a property of times. The tense morpheme in T introduces a variable over time intervals (i is the type of time intervals). This time variable corresponds to the reference time, and receives its value from the context:

(4)

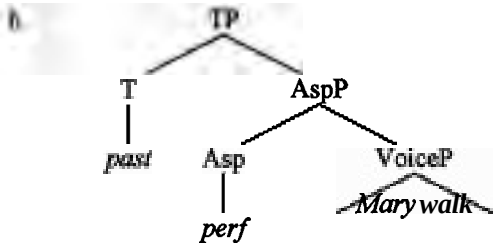


denotes a property of times (Kratzer 1998)

The lexical entries of the tense morphemes place restrictions on the reference time. For example, ***past*** necessarily picks out a reference time which precedes the utterance time. **Kratzer's** (1998) lexical entry for ***past*** is given in **(5),** and applied to an example in (6) and (7).

(5) $[[past]]^{g,c}$ is only defined if c provides an interval t that precedes t_0 (the utterance time). If defined, then $[[past]]^{g,c} = t$. (g an assignment function and c a context index)

(6) a. Mary walked.



(7) a. $[[TP]]^{g,c} = \lambda w\, \exists e\, [walk(e)(w)\ \&\ agent(Mary)(e)(w)\ \&\ \tau(e) \subseteq t]$ (t a past time provided by c).

b. There is an event e of Mary walking, whose running time τ is included in the contextually salient past time t.[4]

4 St'át'imcets Possesses a Tense Node

The task now is to determine whether sentences like (1b) or **(2a,b)** above, which lack any overt temporal information, contain an element in their syntactic representations which introduces a reference time.

It is a standard assumption within compositional semantics that elements which are not present in the representation fed to the semantics cannot affect the truth conditions. Contextually-supplied information (such as referents for pronouns, quantifier domain restrictions, or modal bases) is mediated via a variable in the svntactic representation, which receives its value from the contextually given assignment **function**. An example with a pronoun is given in (8). If the assignment function g assigns the value 'Ana' to i, then (8) is true iff Ana sings.

(8) $[[\ she_i\ sings\ ]]^g$ = 1 iff **g(i)** sings

This is exactly how **Kratzer's** analysis of tense works: There is a variable (under T) for the reference time, which receives its value **from** the contextually

given assignment function.

If the reference time is not present anywhere in the tree, there are two main possibilities. The first is that there is complete vagueness (i.e., the truth conditions pay no attention to when events take place). The second is that there is existential closure over time intervals. In the remainder of this section I will show that neither of these potential analyses is right.

4.1 Tenseless attempt 1: Complete vagueness

The complete vagueness approach predicts that the truth conditions for a superficially tenseless sentence say absolutely nothing about time; the event(s) *can* take place at any time whatsoever. This approach *can* easily be shown to be incorrect. As illustrated in (9), temporal interpretation is restricted in context.

(9) **nilh ts7a** ta **skúl-a**
FOC here DET school-DET
'Here is the school.'

(wa7) alkst lts7a kw-s Rhonda
(IMPERF) work here DET-NOM Rhonda
'Rhonda works here.' / * 'Rhonda worked here.'

The judgements in these contexts are strong. It is not just that speakers prefer to insert the temporal enclitic *tu7* into the second sentence to disambiguate. Rather, (9) is rejected as false if the situation is that Rhonda worked at the school in the past and no longer does. If Rhonda is dead (pragmatically forcing the past-tense interpretation), (9) is rejected.

An example of past tense being forced by context is given in (10).

(10) **tsícw-kan** *tu7* **áku7** Amsterdam-a
go-1SG.SUBJ PAST DEIC Amsterdam-DET
'I went to Amsterdam.'

cw7it i qvl-a sman'c **n-s-mán'c-em**
many DET.PL bad-DET tobacco 1SG.POSS-NOM-smoke-INTR
'I smoked a lot of pot.' / * 'I smoke a lot of pot.'

The data in (9-10) show that temporal information is part of the truth conditions of sentences which lack overt temporal marking. We can therefore abandon the 'complete vagueness' approach.

4.2 Tenseless attempt 2: Existential closure

If we allow existential closure over times, we predict that sentences without any overt temporal marking will assert that there is some past or present time at

which the relevant situation holds.

This analysis is **incorrect** for **St'át'imcets**. It seems to give correct results for the basic **cases,** as shown in (11-12).

(11) **matq kw-s Mary**
walk DET-NOM Mary
'Mary walked / is walking.'

(12) a. $[\![(11)]\!]^{g,c} = \lambda w\, \exists t\, \exists e\, [\text{walk}(e)(w) \,\&\, \text{agent}(\text{Mary})(e)(w) \,\&\, \tau(e) \subseteq t]$

b. There **is** an event e of Mary walking, and there is a time **t**, and the running time of e is included in t.[5]

However, recall **Partee's** (1973) 'stove' argument. **Partee** observes that under the existential closure theory, there are only two readings the sentence in (13) could have, namely those given **in** (14) and (15). (14) **is** a **very** weak assertion, true as long as I have spent any time doing anything which was not turning off the stove. (15) means 'I have never tumed off the stove.'

(13) I didn't turn off the stove.

(14) $\lambda w\, \exists t\, \neg\, \exists e\, [\text{turn.off.stove}(e)(w) \,\&\, \text{agent}(I)(e)(w) \,\&\, \tau(e) \subseteq t]$
There exists some time at which I did not turn off the stove.

(15) $\lambda w\, \neg\, \exists t\, \exists e\, [\text{turn.off.stove}(e)(w) \,\&\, \text{agent}(I)(e)(w) \,\&\, \tau(e) \subseteq t]$
There does not exist a time at which I turned off the stove.

Neither of these two formulas captures a reading that (13) has, namely that during some particular time interval **(e.g.,** just before we left the house), I failed to tum off the stove. The conclusion is that a purely existential account **is** inadequate to explain the **interpretation** of (13).

The **St'át'imcets version** of the stove sentence **is** given **in (16),** with the possible and **impossible readings** below the example. We can see that just as **in English,** the existential **analysis** is inadequate to account for the **interpretations** of the **St'át'imcets** sentence.

(16) ay t'u7 **kw-s** **1háp-an'**-an ta np'ámsten-a
NEG just DET-NOM **put.out-TR-**1SG.ERG DET stove-DET
'I didn't turn off the stove.'

= At some particular time **(e.g.,** after I cooked dinner **tonight),** I did not turn off the stove.
There is some time **in** my life when I was not engaged in **turning** the stove off.
≠ I have never turned the stove off.

In this section we have seen that the 'complete vagueness' and the existential closure analyses both failed. These were the two options for analysis which do not involve an element in the tree dealing with temporal information. I therefore conclude that there must be an obligatory position in **St'át'imcets** which introduces temporal information (in our framework, the reference time). Space prevents discussion of the syntax of the position; I will assume that it is T.[6]

5 Analysis

5.1 *hr7*

My analysis of the temporal enclitic ***hr7*** is that it introduces a reference time which necessarily precedes the **utterance** time. This is illustrated and applied to an example in (17-19).

(17) **[[*hr7*]]^{g,c}** is only defined if c provides an interval t that precedes t_0 (the utterance time). If defined, then **[[*tu7*]]^{g,c}** = t.

(18) matq tu7 kw-s Mary
walk **PAST** DET-NOM **Mary**
'Mary walked / *is walking.'

(19) a. $[\![(18)]\!]^{g,c} = \lambda w\, \exists e\, [\text{walk}(e)(w) \,\&\, \text{agent}(\text{Mary})(e)(w) \,\&\, \tau(e) \subset t]$

b. There is an event e of Mary walking, whose running time τ is included in the contextually salient past time t.

We saw above that ***hr7*** is optional when a past time interpretation is intended. The next sub-section addresses the cases where ***tu7*** does not appear.

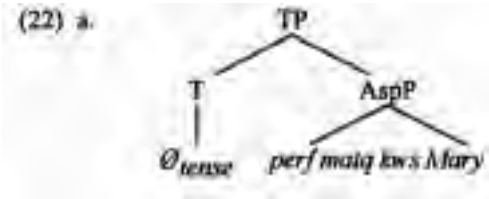
5.2 An **underspecified** tense

It follows from the argumentation in section 4 that **St'át'imcets** sentences which do not contain ***hr7*** contain a **phonologically** null tense morpheme. My claim is that this $\emptyset_{tense}$ introduces a variable over time intervals which receives its value from the context (just like the English past or **St'át'imcets** ***tu7.)*** The difference is that $\emptyset_{tense}$ does not lexically restrict possible values for the reference time:

(20) $[\![\emptyset_{tense}]\!]^{g,c}$ is only defined if c provides **an** interval t. If defined, then $[\![\emptyset_{tense}]\!]^{g,c}$ = t.

(21) **matq** kw-s Mary
walk DET-NOM Mary
'Mary walked / is walking.'

(22) a.



b. $[\![\text{TP}]\!]^{g,c} = \lambda w\, \exists e\, [\text{walk}(e)(w) \,\&\, \text{agent}(\text{Mary})(e)(w) \,\&\, \tau(e) \subseteq t]$.

c. There is an event e of **Mary** walking, whose running time τ is included in the contextually salient time t.

The analysis presented here correctly **accounts** for the fact that there are two ways to express a reference time which precedes the utterance time: ***hr7*** or $\emptyset_{tense}$. **The** $\emptyset_{tense}$ morpheme is possible whenever there is a contextually salient time, which may be either in the past or the present.

6 Arguments Against a "Null – Null^n Analysis

There is a plausible alternative analysis of the **St'át'imcets** system, which I call the "null – null" theory. According to this alternative, **St'át'imcets** is like English, except that it has null ***present*** and null ***past.*** (This analysis **was** adopted by **Arregui** and **Matthewson** 2001.)

The "null – null" theory is conceptually undesirable. Why is the same meaning ('past') expressed by two different morphemes ***(tu7*** and ***0).*** while on the other hand null 'past' contrasts semantically with the morphologically identical null 'present'? This would violate morphological **iconicity**.

The "null – null" theory can also be shown to be empirically inadequate. The first piece of evidence comes from sentences with plural subjects but a single main predicate. (23) and (24) show that in such cases, we can have different situation times for each individual in the denotation of the subject.

(23) Context: Your white friends Theresa, Charlie and Marie got **drunk** at the bar. **You** are looking after them because you don't drink. Theresa threw up **at 10pm;** Marie hasn't thrown up at all. Just as Charlie is in the process of throwing up, another friend calls and asks (a); you can answer with (b):

a. wat'k' ha i **snek'wnuk'wa7-lhkálh-a**
vomit **YNQ** DET.PL **friend(PL)-1PL.POSS-DET**
'Our friends throw up?'

b. wat'k' **kw-s** Theresa **múta7** s-Charlie
vomit DET-NOM Theresa and NOM-Charlie
'Theresa and Charlie throw **up.'**

(24) Context: Your friends Theresa, Charlie and Marie are taking a building class and they wanted to each build a doghouse. Theresa has already finished hers and Charlie is in the middle of his. Marie hasn't started hers yet and she probably won't do it at all. Now another friend calls. She doesn't know what they were planning to build or whether they've done it yet. She asks (a), and you can reply with (b).

a. stam' ku **máys-en-as** i **snek'wnuk'wa7-lhkálh-a**
what DET build-TR-3ERG **DET.PL** **friend(PL)-1PL.POSS-DET**
'What did our fiiends build / are **our friends** building?'

b. **mays-en-ítas** kw-s Theresa **múta7** s-Charlie i
build-TR-3PL.ERG **DET-NOM** Theresa and NOM-Charlie **DET.PL**
sqax7-álhcw-a, t'u7 **cw7ay** t'u7 kw-s mays-en-as
dog-house-DET but NEG but DET-NOM build-TR-3ERG
ku **stam' kw-s** Marie
DET what DET-NOM Marie
'Theresa and Charlie built / are building doghouses, but Marie hasn't built anything.'

There is only one predicate in each of the relevant clauses in (23) and (24); therefore, by assumption, there is only one tense node in each. We see that this single tense morpheme is compatible with both a past-time sub-event and a present-time sub-event, simultaneously. This is impossible in English, as shown by the impossibility of translating (23) and (24) into English using single tensed verbs. This therefore shows that **St'át'imcets** cannot be a null version of an English-like system with contrasting present and *past.*

The underspecified tense analysis accounts for (23-24) quite simply. The reference time provided by the context can be large enough to cover both a stretch of time in the past as well as the time of utterance. The denotation of **(23b)** is given in **(25).**[8]

(25) a $[\![\text{TP}]\!]^{g,c} = \lambda w\, \exists e\, [\text{vomit}(e)(w)$ & agent(Theresa.and.Charlie)(e)(w) & $\tau(e) \subseteq t]$.

b. There is an event of Theresa and Charlie throwing up, whose running time τ is included in the contextually salient time t.

Further evidence for the **underspecified** tense analysis comes from the contextual restrictions on interpretation introduced in (9-10) above. The requirement that the reference time be contextually specified correctly predicts the restrictions on the second sentence in each case. Importantly, the English translation with overt contrasting tenses is acceptable **(e.g.,** 'This is the school. Rhonda worked here.'). If **St'át'imcets** possessed null contrasting tenses, then the past interpretation should be able to be forced (even if it were dispreferred).

Yet recall from above that the effects in (9-10) are strong and not cancelable.

Two final pieces of evidence for the underspecified tense analysis come from interactions between **Aktionsart,** outer aspect (perfective / imperfective), and tense. The first case concerns activities. Unlike in English, activity predicates in **St'át'imcets** can be interpreted in the present tense, without needing to be in the imperfective aspect:

(26) **sáy'sez'** kw-s Helen
play **DET-NOM** Helen
'Helen played / is playing.' (imperfective required in English present)

Let us adopt Bennett and **Partee's** (1978) idea that the utterance time is an instantaneous moment, and that only predicates which possess the sub-interval property can hold at the utterance time (without needing to be in the imperfective).[9] Let us further **assume** that activities, unlike states, do not possess the sub-interval properly (since they are not entirely homogeneous; see Taylor 1985). This **accounts** for the English activity data.

Now, since **St'át'imcets** does not possess a present tense morpheme, there is nothing which would require an instantaneous moment. **Our** current analysis therefore predicts that in St'at'imcets, activity predicates (which do not possess the subinterval property) can 'fit into' a larger present-time interval, and therefore do not need to be in the imperfective. This accounts for (26); the **cross-**linguistic difference is thus explained by the absence in **St'át'imcets** of a present tense morpheme.

A similar idea can also explain a difference with respect to achievement predicates. In English, achievement predicates are not felicitous in the perfective aspect in the present tense, as shown in (27). The explanation for (27) is that the instantaneous moment picked out by the English present tense is smaller than the time it takes to complete an achievement (again, see Taylor 1985).

(27) a. Context: you have been climbing a mountain, and just at the exact moment when you reach the top, you say: * 'I reach the top!'

b. Context: you are crossing the threshold, and at the exact moment when you enter the room, you say: * 'I arrive!'

In **St'át'imcets,** there is of course no present tense morpheme, according to my analysis. We therefore predict that achievement predicates will be acceptable in if uttered at the exact moment of culmination. This is correct, as shown in (28). **(28a,b)** are acceptable in the contexts given in **(27a,b)** respectively.

(28) a. qáyt-kan
reach.top-1SG.SUBJ
'I reach the top!'

b. **t'íq-kan**
arrive-1SG.SUBJ
'I arrive!'

Summarizing the results of this section, I have argued that in clauses with no overt tense morphology, there is a single morpheme which picks out the contextually provided reference time. I have provided several pieces of evidence that the analysis is empirically better than an alternative, according to which there is a phonologically neutralized but semantically contentful ambiguity between past and present.

7 Universality, learnability and variation

The analysis presented here involves minimal cross-linguistic variation. The analysis of St'át'imcets differs from that of English in two ways: (i) One of the tense morphemes is phonologically null, and (ii) One of the tense morphemes is lexically unrestricted. Both of these constitute minor differences in the lexical entries for tense morphemes. The differences with English which fall out are listed in (29).

(29) i. The apparent 'optionality' of tense marking in St'át'imcets as opposed to English.
ii. The ability of sentences with plural subjects to involve two different sub-event situation times, one in the past and one in the present, in St'at'imcets but not in English.
iii. The necessity, in St'át'imcets but not in English, of keeping the same reference time in a connected discourse (unless some other temporal marking appears).
iv. The fact that activity predicates, in St'at'imcets but not in English, can be in the present without being in the imperfective.
v. The fact that achievement predicates, in St'at'imcets but not in English, can be uttered in the perfective when the event takes place at the utterance time.

Interestingly, most of these (ii, iii, v) *are* intuitively not learnable from primary linguistic data available to children. This seems to raise a learnability problem, to which I will now sketch a solution.

Suppose that step one is that the child learns that there is a phonologically null tense morpheme. This is presumably easy, since I assume that the child knows that every language has an obligatory position containing tense information.[10] This will mean that any sentence with no overt temporal marking will be evidence for a null morpheme.

Now, step two is for the child to learn that the null morpheme is lexically unrestricted. Suppose that s/he does this by knowing that semantically

contrasting null tense morphemes are not allowed (i.e., that any null tense morpheme must be underspecified). Since there is a null / overt contrast, and since the child can easily learn from primary linguistic data that past reference times do not require *tu7,* then the null morpheme must be lexically unrestricted.

9 Conclusion

I have argued in this paper that St'át'imcets possesses two tense morphemes: the past tense enclitic *tu7,* and $\emptyset_{tense}$, a phonologically null, lexically underspecified tense morpheme whose value is provided by the context. I have argued that this analysis is empirically better than a 'contrasting null tenses' analysis. I then observed that several cross-linguistic differences (obvious and subtle) between St'át'imcets and English fall out from minor lexical differences in the tense morphemes. I claimed that the learnability problem can be solved if the child knows (a) that a position containing tense information is universally present, and (b) that semantically contrasting null tense morphemes are not allowed. A final prediction that this makes is that all else being equal, any language with a null tense morpheme should display the effects listed in (29) for St'at'imcets. Whether this is correct is obviously a task for future research.

Notes

[1] Many thanks to St'át'imcets consultants Beverley Frank, *Gertrude* Ned, Laura Thevarge and Rose Whitley, and to Henry Davis for help in eliciting data. Thanks to Henry Davis. Irene Heim, Toshi Ogihara and Martina Wiltschko for much helpful feedback and discussion. Thanks to audiences at the University of Washington, Seattle, the 37th International Conference on Salish and Neighbouring Languages, the University of Calgary and WECOL. Fieldwork is supported by SSHRC grants #410-98-1597 and #410-2002-1715. Errors are solely mine.

[2] Future interpretations are impossible in (2). My claim will be that 'future' is not a tense, but the issue of the future goes well beyond the bounds of the current paper.

[3] The arguments to be made could be replicated within any of the other available formal approaches, e.g. Enç (1986, 1987). Zagona (1990). Stowell (1993), Kamp and Reyle (1993). Ogihara (19%. 1999), Kusumoto (1999), Demirdache and Uribe-Etxebarria (1997.2000). etc.

[4] In Kratzer's analysis, the Aspect head mediates between events and times by introducing a running time function. (7a) is in the perfective aspect, which is why the running time of the event must be included within the reference time.

[5] (11) is in the perfective aspect; the apparent imperfectivity of the English translation 'Mary is walking' results from restrictions peculiar to the English present tense. See below for discussion.

[6] Wiltschko (2001, to appear) argues that Halkomelem Salish lacks a T node. Matthewson (in prep.) argues that this proposal is not right for St'át'imcets.

[7] The issue of which is chosen when is independent of the semantics of the morphemes themselves, and goes beyond the bounds of this paper,

[8] The reader may wonder about (24) – how *can* there be a sub-event of Charlie building a doghouse, when he has not yet completed it? The *answer* lies in the different lexical properties of accomplishment predicates in St'át'imcets; see Davis and Matthewson (to appear).

[9] If a sentence whose main verb possesses the subinterval property is true at some interval I, 'then

the sentence is true at every subinterval of I including *every* moment of time in I' (Bennett and Partee 1978:14).

[10] See Matthewson (in prep.) for justification; see also e.g. Déchaine (1993).

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Possessive *with* and Locative *with* in Event Semantics

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1. Some Pacts about English *with* and *without*

For some categories of use of English with, negation of the with-phrase is possible by substituting without for with in the sentence. The sentences in (1) to (10) illustrate ten categories of use of with, based on observations in Nilsen (1973), Quirk et al. (1985), and Schlesinger (1995). The *with/without* contrast was pointed out by Tremblay (1996).

(1)	Kim ate pizza **with/without** a fork.	Instrument
(2)	Kim ate pizza **with/without** her **friend.**	Accompaniment
	Kim ate pizza withlwithout a side salad.	
(3)	Kim ate pizza withlwithout enthusiasm.	Manner
(4)	**Kim** ate pizza **with/without** the lights on.	Absolute
(5)	Kim ate pizza **with/without** pesto sauce.	Attribute
(6)	He argued **with/*without** Sandy about that issue.	Opposition
(7)	Kim left his keys **with/*without** his wallet.	Proximity
(8)	Kim needed help **with/*without** that problem.	Reference
(9)	Kim was paralysed **with/*without** fear.	Cause
(10)	The garden swarms **with/*without** bees.	Locatum
	They provided the homeless **with/*without** blankets.	
	Off **with/*without** his head!	

In this paper, I focus on the uses of with that fit the categories Instrument, Accompaniment, Manner, Opposition, Proximity, Reference, and Cause. In other words, my proposal covers the type of uses illustrated in (1), (2), (3), (6), (7), (8), and (9). Absolute with in (4) differs from the rest in that it takes a clausal complement. Attribute with in (5) is different in that it heads a phrase that modifies a noun rather than a verb (phrase). The uses of with in (10) are different in that either alternations are involved (Bees swarm in the garden, They provided blankets to the homeless) or the type of use is idiomatic (*Off with* his head! To the rack with him!).

2. Two *withs* in English

My proposal is that the without facts follow if we assume there are two withs in English -- a Possessive with and a Locative with -- and that without expresses the negative counterpart of Possessive with but not Locative with. This proposal is similar to Tremblay's (1996) suggestion that English has a preposition with (category P) and a dummy case assigner with (category K). Without is the negative form of the preposition with, but there is no negative counterpart of the case assigner with. My proposal is different in that the two withs contrast in terms of semantic representation, and not in terms of syntactic category. In Davidsonian event semantics (Davidson 1967, Parsons 1990, 1995), Possessive with denotes a three-place predicate, taking the event argument, the possessor, and the possessed as its three arguments. Locative with, on the other hand, denotes a two-place predicate, taking the event argument and the location as its two arguments. The logical representations for the two types of with are given in (11), where $with_1$ corresponds to Possessive with and $with_2$ corresponds to Locative with.

(11) $with_1$: $\lambda y \lambda x \lambda e.\mathrm{WITH}(e, x, y)$
$with_2$: $\lambda x \lambda e.\mathrm{WITH}(e, x)$

The idea of a three-place with in event semantics differs from Parsons (1990, 1995). For example, Parsons (1995) gives the translation in (13) for the sentence in (12).

(12) Brutus stabbed Caesar violently in the back with a knife in the agora.
(13) $(\exists e)$[Stabbing(e) & Agent(e,Brutus) & Theme(e,Caesar) & Violent(e) & $\mathrm{In}_{\mathrm{TARGET}}$(e,the back) & With(e,the knife) & $\mathrm{In}_{\mathrm{LOCATION}}$(e,the agora)

The predicate calculus representation in (13) contains the proposition 'for some event e, e was with the knife." My proposal is to make the logical form say something more: "for some event e, Brutus was with the knife in e" or "Brutus had the knife in e". The logical representation would be $(\exists e)$[...With(e,Brutus,the knife)...].

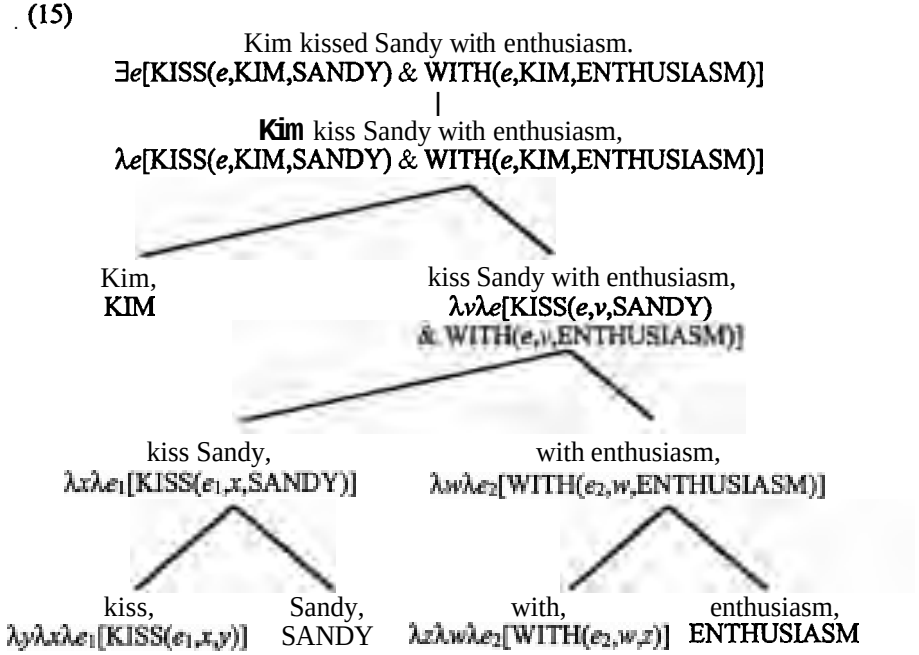
Subject-oriented modifiers expressed by manner with-phrases provide a particularly compelling case for a three-place with. In a sentence such as (14), the with-phrase expresses the state-of-mind that a participant in the event bears.

(14) Kim kissed Sandy with enthusiasm.

Assuming function application for combining the meanings of a verb and its object and for combining a verb phrase and its subject, function application for combining a preposition and its object, lambda conjunction for combining modifiers with their arguments, and default existential closure over the event

argument, we arrive at the derivation in (15) for the sentence in (14).

(15)



It is worth comparing the result in (15) with Wyner's (1998) theory of subject-oriented modifiers. Wyner translates the adverb reluctantly as in (16). I assume this meaning is comparable to the meaning Wyner would assign to the adverbial PP with reluctance.

(16) $\lambda P^{}\lambda e[P(e) \& \exists s[\text{reluctant}(s) \& \text{Experiencer}(s) = \text{Volition}(e)]]$, where P is a predicate of events, and s is a state.

Applying the meaning of reluctantly in (16) to the meaning of Kim hit Sandy, gives the formula in (17):

(17) $\exists e[\text{hitting}(e) \& \text{Ag}(e) = \text{kim} \& \text{Volition}(e) = \text{kim} \& \text{Th}(e) = \text{sandy} \& \exists s[\text{reluctant}(s) \& \text{Experiencer}(s) = \text{Volition}(e)]]$

What (17) says is (i) there is an event of hitting with Kim as its agent and Sandy as it theme, (ii) Kim is a volitional participant in the hitting event, and (iii) there is a state of reluctance and (iv) the experiencer of the reluctant state is the same as the volitional participant in the hitting event. Wyner is forced to make an additional assumption --temporal overlap of Kim's state of reluctance

and the event of Kim hitting Sandy.

> Reluctantly is a combinator with respect to events much like other Adverbs in Event Theory. It contributes to the truth-conditions that there is a state of reluctance, which has an experiencer, and which, we assume, temporally overlaps with the event the Adverb modifies. (Wyner, 1998:345)

The truth conditions in (17) are too weak, even with the additional assumption of temporal overlap, since if Kim is reluctant about something else at the same time that she hits Sandy, then Reluctantly, Kim hit Sandy is true.

Strigin (1995) addressed the question of subject-oriented modifiers in event semantics in his work on German mit-phrases. **Strigin** proposed that mit-phrases introduce into the discourse representation structure the relation ***cmt*(e,v),** read as **'v** is concomitant with **e'.** He described the relation ***cmt*(e,v)** as the "underspecified/general/context-invariant meaning of ***mit*"** (Strigin, **1995:314).** The context specific meaning of ***cmt*(e,v,)** comes about by abductive inference. For a sentence such as (18) where there is a subject-oriented modifier, **Strigin** used a mechanism of "semantic descent" where the object of mit is construed as a property of the agent rather than the situation.

(18) John schneidet Fisch mit Vergnugen
John cuts fish with delight

Similarly for accompaniments, **as** in **(19),** there is semantic descent: "since situations do not put bathing caps on, but their agents sometimes do, we need a kind of semantic descent from situations to their agents" (Strigin, **1995:321)**

(19) Sie **schwimmt** mit der Badekappe
she swims with the **bathing** cap

The mechanism of semantic descent would also be needed for instruments, since they are under the control of the agents who use them.

Under the analysis of Possessive with **as** a three-place predicate, a mechanism of semantic descent is not required. Possessive with − which subsumes Instrument, Accompaniment, and Manner uses as illustrated in (1) to (3) •• is a predicate that expresses a relation between a possessor, a possessed object, and the event argument. The possessive relation needs to be sufficiently broad to include accompaniments, in the same way that possession expressed by the genitive, **as** in ***Kim's friend*,** does not express that Kim owns her friend (see Heine 1997 on possession). Possessive with also seems to be appropriate for absolute with, though in this case it is an accompanying circumstance, presumably with its own event argument, that a participant in some event has. In the case of attribute with, the with-phrase expresses a possessed attribute of the referent denoted by the noun phrase. Unless the noun introduces an event argument into the logical form, attribute with would not include an event argument. Overall, the idea of a Possessive with could extend to absolute ***with-***

phrases and attribute with-phrases, once the differences in the syntax of these phrases are taken into account.

What about the two-place Locative with? I propose that this is the right one for opposition, proximity, reference, and causes uses of with. Notice that opposition with *can* be replaced by the locative preposition against --fight *with/against*, struggle *with/against*, argue *with/against*, etc. Proximity with can also be replaced by a more specific locative preposition. Reference with refers to an abstract location, as illustrated in (20).

(20) What do you want with me? [in regards to]
Jaime is unpopular with his teachers. [in the opinion of]
Brain activity increases with body temperature. [in proportion to]

Finally, cause with introduces a source, and since a source is a type of location, Locative with *can* be taken to be a supertype of cause with. In the next two sections, I provide cross-linguistic and diachronic support for two withs in English.

3. Cross-linguistic Support for two withs in English

Does this proposal of two withs make sense cross-linguistically? If Possessive with and Locative with are homonyms in English, then we do not expect the same homonymy cross-linguistically. This is in contrast to systematic, iconically motivated polysemy, where we expect to the see the same "homonymy" in a range of typologically distinct languages (Chapin 1971, Croft 1990).

Stolz's (1997) work on comitative/instrumental case syncretism is relevant here. Stolz set out to see if Lakoff and Johnson were right about the universality of their Companion Metaphor:

> With few exceptions, the following principle holds in all languages of the world:
>
> The word or grammatical device that indicates ACCOMPANIMENT also indicates INSTRUMENTALITY.
>
> Since the experiences on which the metaphor AN INSTRUMENT IS A COMPANION are based are likely to be universal, it is natural that this grammatical principle holds in most languages (Lakoff and Johnson, 1980:135).

In his survey of 323 languages (24% from the Americas, 20% each from Asia, Africa, and Oceania, and the remaining 16% from Europe), Stolz found that in 25% of the languages (791323) Lakoff and Johnson's "universal principle" held. Though comitative/instrumental syncretism is far from universal, it is also not uncommon. Relevant for present purposes is syncretism of locative with

instrumental/comitative markers. Out of 448 syncretistic patterns, just 17 (3.8%) were comitative + instrumental + locative.

In **German,** for example, ***mit*** marks both accompaniments and instruments, and so shows a **comitative/instrumental** syncretism. However, ***mit*** does not mark proximity or cause, as illustrated in (21) and (22).

(21) Kim **legt ihr** Schlussel **neben/*mit ihre Brieftasche. [Proximity]**
Kim laid her keys **next.to/*with** her wallet
'Kim left her keys with her wallet.'

(22) Kim **erstarrte vor/*mit** Angst. [Cause]
Kim **paralysed for/*with** fear
'Kim was paralysed with fear.'

Persian provides another example where the **comitative/instrumental** case marker is not used to mark proximity, as illustrated in (23).

(23) Kim kelidash ra **pishe/*ba** kifash **gozasht.** [Proximity]
Kim **his.key DIR.OBJ proximity.of/*with his.wallet he.put**
'Kim put his keys with his wallet.'

To summarize, markers of instrument and accompaniment are not necessarily markers of location. The prediction is that cross-linguistically, notions of opposition, reference, and cause are frequently marked by something other than the **comitative/instrumental** case marker.

4. Diachronic Support for two withs in English

Does this account make sense in terms of the history of English ***with?*** In Old English, there were two prepositions: ***wid*** and ***mid. wid*** meant 'against, alongside' while ***mid*** conveyed instrument and accompaniment meanings.

> The most remarkable development in the signification of ***with*** consists in its having taken over in the ME. period the chief senses belonging properly to OE. mid (cognate with Gr. *meta* with). These senses are mainly those denoting association, combination or union, instrumentality or means, and attendant circumstance. (Oxford English Dictionary)

During the Middle English **period (1100 to 1500), *mid*** was rapidly superseded by ***with*** and was obsolete by the end of the 14th century. Several cognates of ***mid*** exist in other Germanic languages: Dutch ***met,*** German ***mit,*** and Danish, Swedish, and Norwegian ***med.*** The only remnant of ***mid*** in modem English is in the word ***midwife*** (Traugott, **1983:518).** The fact that present day ***with*** comes **from** two prepositions supports the proposal that there are two homonymous ***withs*** -- Possessive ***with*** and Locative ***with.***

5. Notes

I thank the audience at WECOL 2002 at University of British Columbia, as well as the Syntax Project Group at University of Toronto, for helpful comments and suggestions. For assistance with the German examples, I thank Chris Bodenbender and Bettina Spreng, and for help with the Persian, I thank Shahrzad Saif and Arsalan Kahnemuyipour.

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Optional Head Movement in Comparatives and Exclamatives*

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1. Introduction

The main concern of this paper is optional head movement in English comparatives and exclamatives, as shown in (1-2).

(1) a. She spoke more convincingly than Harry did
b. She spoke more convincingly than did Hany
(2) a. What a nice person John is!
b. What a nice person is John!

As shown in (1), subject-Aux order, in addition to Aux-subject order, is possible. The same situation can be observed in exclamative sentences, as exemplified in (2). Following the standard analyses (cf. Emonds (1970)), we will assume that (lb) is derived fiom (la) via subject-Aux inversion (SAI), or I-to-C movement.

If we consider this phenomenon under the minimalist perspective, we face (at least) two interesting issues. The first question concerns optionality, which is problematic under the minimalist assumptions. If SAI generates (lb) from (la), we have to explain why SAI is optional. The second question concerns the treatment of head movement. It has been suggested that head movement occurs within narrow syntax. However, recently Chomsky (2000. 2001a,b) and Boeckx and Stjepanović (2001) propose that head movement is a PF operation, so that we can avoid the problems with head movement (such as the Extension Condition).

In this paper, we would like to argue that head movement in English comparatives and exclamatives is a PF operation. More specifically, we show that SAI in comparatives and exclamatives interacts with ellipsis and sentence stress assignment. The implications of the analysis are as follows: first, we can draw a line between SAI in comparatives and exclamatives, on the one hand, and SAI in yes/no questions, on the other hand. This is predicted, since SAI in yeslno questions is not affected by sentence stress assignment. Second, only if head movement is treated as a PF phenomenon can we account for the

interaction among ellipsis, stress rule and head movement.

The organization of this paper will be as follows: In section 2, we will observe the properties of SAI in comparatives and Merchant's (2001) analysis. In section 3, we would like to point out the problems with his analysis. Then, we will propose an alternative analysis in section 4. In section 5, we will discuss that the proposed analysis can also handle SAI in exclamatives. Section 6 is a summary of this paper.

2. Comparatives

In this section, we now examine the phenomena of SAI in comparative clauses more carefully. First, as noted by Merchant (2001), VP must be elided under SAI in comparatives. However, VP does not have to be elided if SAI does not apply to the structure. This is shown in (3-4).

(3) a. Abby can play more instruments than can her father (*play)
    b. Abby can play more instruments than her father can play
(4) a. Abby has been awarded more accolades than has her father (*been awarded)
    b. Abby has been awarded more accolades than her father has been awarded.

Second, pseudogapping is prohibited when SAI is applied in comparative clauses, as shown in (5-6).

(5) a. *Abby plays the flute better than does her father the trumpet
    b. Abby plays the flute better than her father does the trumpet
(6) a. *Abby can play more sonatas than can her father concertos
    b. Abby can play more sonatas than her father can concertos

Based on the data above, Merchant (2001) made the following generalization:

(7) I-to-C movement in comparative clauses can occur only if VP-ellipsis has deleted the VP complement to I^0.

In other words, the condition for SAI in comparatives is VP-ellipsis. In order to account for the generalization (7), Merchant relies on the notion 'the ECP at PF,' as defined below[1]:

(8) The Empty Category Principle (ECP) at PF
    At PF, a trace of A'-movement must either be i) PF-head-governed, or ii) PF-antecedent-governed.

According to (8), A'-traces must be head-/antecedent-governed at PF by the element which has phonetic contents. More specifically, neither traces nor null operators can be proper governors at PF since they are phonetically null elements, by definition.

With this in mind, let us consider how (8) accounts for the **ungrammaticality** of **(3a),** which is repeated below for convenience:

(9) a. *Abby can play more instruments than can her father play
b. … than [$_{CP}$ OP_1 can [$_{IP}$ her father t_{can} [$_{VP}$ t_1' [$_{VP}$ t_{SU} play t_1]]]]

Merchant (2001) assumes that a null operator moves from the complement of play to the Spec CP, on the way to the VP-adjoined position. Let us focus on the intermediate trace t_1'. Notice that the candidate for the head-governor of this trace is the trace of can, which is not PF-visible. Therefore, t_1' cannot be **PF-**head-governed. This trace cannot be PF-antecedent governed either, since the possible antecedent is the null operator in [CP, Spec] position of the comparative clause. Thus, it violates the ECP at PF, and the sentence (9a) is ungrammatical, as predicted.

Let us consider how Merchant (2001) explains the **grammaticality** of (3).

(10)a. Abby can play more instruments than can her father
b. … than [$_{CP}$ OP_1 can [$_{IP}$ her father t_{can} [$_{VP}$ t_1' [$_{VP}$ t_{SU} play t_1]]]]

(10b) is the same as (9b) except that the whole VP is elided in **(10b).** Thus, the intermediate trace t_1' is at issue. Following the logic of **Lasnik** (1995, 1999) and Merchant **(1999),** Merchant (2001) argues that ellipsis can save violations due to the ECP at PF. In particular, Merchant claims that when the offending trace **(t_1')** in **(10b)** is deleted by VP-ellipsis, then it is not subject to the ECP any longer at PF. The repair of the ECP violation by ellipsis in (10) is analyzed on a par with the repair of the Subjacency violation by ellipsis in **(11b),** which Merchant (2001) claims obtain at PF:

(11)a. *John knows the person who bought something, but I don't know **what$_1$** [John knows [$_{island}$ the person who bought t_1]].
b. John knows the person who bought something, but I don't know **what$_1$** [John knows [$_{island}$ the person who bought t_1].

3. Problems

Even though his analysis is quite interesting, there are three pieces of counter-evidence against Merchant's (2001) analysis. First, as noted by **Emonds (1970:9),** pronouns cannot appear at the end of the sentence where both VP ellipsis and SAI occur. However, it turns out that weak pronouns cannot appear

at the end of the comparative clause, as illustrated below:

(12)a. *John likes Beethoven more than do I
b. John likes Beethoven more than I do
(13)a. *Abby can play more sonatas than can he
b. Abby can play more sonatas than can HE

If Merchant's analysis were correct, then the structures would be the same for (13a) and (13b). Hence his analysis would expect that there should be no contrast, contrary to the fact:

(14)a. *... than [$_{CP}$ OP_1 can [$_{IP}$ he t_{can} [$_{VP}$ t_{can} t_1 play t_1]]]
b. ... than [$_{CP}$ OP_1 can [$_{IP}$ HE t_{can} [$_{VP}$ t_{can} t_1 play t_1]]]

Second, the expletive ***there*** cannot appear at the end of the sentence, as shown in (15).

(15)a. There are over 830,000 more jobs in Australia than there were.
b. *There are over 830,000 more jobs in Australia than were there.

Let us suppose that expletives do not have any semantic content, hence it cannot receive nuclear stress. If so, the data (13) and (15) suggest that SAI in comparatives is affected by stress assignment.

Third, Potts (2002) notes that more than one head can appear before the subject in comparatives, as shown in (16). Notice that in yes/no questions, more than one head cannot move to the C position, as in (17). This tells us that there is some operation that is not the same as syntactic head movement:

(16) Eddie has been flying longer than has been Chuck.
(17) *Have been Chuck flying longer?

In short, we pointed out the counterevidence with Merchant (2001), which suggests that we have to look for the alternative analysis of SAI in comparatives.

4. An Proposed Analysis

As shown in the previous section, we have to account for the two facts, namely, the interaction of head movement with stress assignment and the possibility that more than one head can move to the C position. In this section, we would like to explore an alternative analysis for optional SAI in comparative clauses in English.

Before presenting our analysis on optional SAI, we would like to observe

Reinhart's (1997) and Reinhart and Neelman's (1998) analysis of scrambling in Dutch. Reinhart (1997) and Reinhart and Neelman (1998) argue that scrambling in Dutch interacts with stress assignment which brings about focus effects. In (18), the scrambling of the direct object is impossible when the direct object receives stress. On the other hand, it is possible when the verb is stressed:

(18)a. Ik heb nog niet DE KRANT gelezen, maar ik
I have not yet the newspaper read, but I
heb al wel HET BOEK gelezen.
have already indeed the book read

b. *Ik heb DE KRANT nog niet gelezen, maar ik heb HET BOEK al wel gelezen.

(19)a. Ik heb het boek gisteren GELZEN en niet ERSCHEURD.
I have the book yesterday read and not tom up

b. *Ik heb gisteren het boek GELZEN en niet VERSCHEURD.

Based on this contrast, Reinhart (1997) and Reinhart and Neelman (1998) argue that scrambling makes it possible to dmploy unmarked/neutral sentence stress, avoiding marked sentence stress. Hence scrambling is regarded as a PF phenomenon in that it is affected by sentence stress assignment.

Note that scrambling in Dutch and SAI in English comparatives share the same properties. First, both phenomena affect sentence stress assignment. Second, it is considered that both operations are optional. Thus, we would like to propose, following Reinhart (1997) and Reinhart and Neelman (1998), that English has an option of moving a head element at PF when it makes a structural context for the application of the unmarked stress assignment rule rather than the marked one. In particular, head movement in comparative clauses makes it possible for the subject NP to receive unmarked neutral stress rather than marked stress. According to our analysis, the derivation for the sentence (20a) is derived by the PF-head movement of the auxiliary can:

(20)a. Abby can play more instruments than can her father

b. … than [$_{CP}$ OP_1 can [$_{IP}$ her father t_{can} [$_{vp}$ t_4 [$_{vp}$ t_{can} play t_4]]]]

4 movement at PF

After I-to-C movement, the subject ***her father*** counts ***as*** the most embedded (right-most) element which is assigned neutral sentence stress (cf. Cinque (1993)). That means that I-to-C movement in comparative clauses is triggered when it makes a subject receive neutral sentence stress, avoiding marked one.

Under our analysis, the contrast in (21) is not a unexpected one; only the stressed strong pronoun can occur in the clause-final position because SAI here makes it possible for the right-most element to receive neutral sentence stress:

(21)a. *Abby can play more sonatas than can he
b. Abby can play more sonatas than can HE

Notice that in order for the subject to be assigned neutral sentence stress, the whole VP must be elided, as shown in (20b). If, as standardly assumed, VP-ellipsis and sentence stress assignment are PF operations and if head movement is also a PF operation, then it is expected that there is an interaction among them. The phenomenon of SAI in comparative clauses in English clearly points to this interaction[2].

Let us now consider how to account for the ungrammaticality of (22a). The relevant structure would be in (22b).

(22)a. *Abby can play more instruments than can her father play
b. … than [$_{CP}$ OP_1 can [$_{IP}$ her father t_{can} [$_{VP}$ t_1' [$_{VP}$ t_{SU} play t_1]]]]
movement at PF

Economy at PF can explain the ungrammaticality of (22a) along the line of argument by Reinhart (1997), who claims that scrambling in Dutch applies only when it is needed to derive a different word order with a concomitant different focus structure; otherwise it cannot be applied, because of economy at PF[3]. Given this assumption, let us look at (22a). The rightmost element of this sentence is the verb play, whether SAI applies or not. That is, SAI in (22a) does not change the focus structure of the sentence since the unmarked stress falls on the sentence-final element. That is why SAI in (22a) results in a violation of economy at PF. If our analysis is on the right track, we do not have to worry about intermediate trace of the null operator which Merchant is concerned with and we can dispense with the ECP at PF:

(23) Abby can play more instruments than her father can play

In this sense, SAI in comparatives is not optional, because it applies only when it makes a context for the application of the unmarked stress assignment rule; in other words, SAI is constrained by the focus structure of the resulting sentence. This is why pronouns must be strong when they appear in the sentence-final position of the comparative clause.

Now, let us consider the following example, where more than one head appears before the subject:

(24) Eddie has been flying longer than has been Chuck.

Under our analysis, the verb cluster moves to the C position at PF and the subject is realized at the end of the sentence, as shown below:

(25) … than [$_{CP}$ has been$_i$ [$_{IP}$ Chuck t_i [VP flying longer]]]
movement at PF

There is some good reason to believe that only the heads moves to the pre-subject position in (25). The relevant data would be shown below:

(26) *Eddie has been flying longer than has probably been Chuck.

If, as standardly assumed, the adverb adjoins to the maximal projection, such as VP or TP, then the ungrammaticality of (26) is expected, since only heads move to C at PF[4].

If our analysis presented so far is correct, then we can also draw a line between SAI in comparatives and SAI in yes/no questions. This is so because SAI in comparatives is constrained by sentence stress assignment which affects focus structure, but SAI in yes/no question is not. As noted in (27), in the case of yes/no question, the rightmost element is identical, but it is still grammatical[5].

(27)a. John will leave
b. Will John leave?

To sum, we have proposed that SAI in comparatives is a PF operation. More specifically, SAI in comparatives is triggered when the subject gets to receive neutral sentence stress, avoiding marked one.

5. Exclamatives

Let us consider the following data:

(28)a. What a nice person John is!
b. What a nice person is John!
(29)a. What a nice car John bought!
b. *What a nice car did John buy!
c. [What a nice truck Bill bought!] And what a nice car did John buy, too![6]

As shown in (28-29), we can see the optional head movement in exclamatives, which is quite similar to SAI in comparatives, as discussed above. Let us take a look at the data more closely to see if SAI in exclamatives shares the same property with SAI in comparatives. First, it is the case that weak pronouns cannot appear in the sentence-final position of English exclamatives. If there is no inversion, then weak pronouns are possible:

(30)a. *What a nice person is he!

b. What a nice person is HE!
c. What a nice person he is!

Second, it has been noticed that the pronoun it cannot receive any focus. The ungrammaticality (31a) shows that there is some interaction of the head movement with sentence stress assignment:

(31)a. What a nice car it is!
b. *What a nice car is it!

(30) and (31) clearly indicate that SAI in comparatives and exclamatives shares the same property. If so, then Merchant's (2001) analysis would also explain SAI in exclamatives, too. However, his analysis predicts that the ungrammatical sentence (31b) is predicted to be grammatical, contrary to the fact:

(32)a. *What a nice car did John buy!
b. $[_{CP}$ [what a nice **car**]$_1$ did $[_{IP}$ John t_{did} $[_{VP}$ t_1' $[_{VP}$ t_{John} buy $t_1]]]$
-> t_1' is PF-antecedent-governed by the element in Spec CP.

Let us assume, following Oda (2002), that in exclamatives, the element containing the wh-phrase overtly moves to Spec of CP. If so, the apparently offending trace t_1' is PF-antecedent-governed by the element in Spec CP. This is so because the element in Spec CP has a phonetic content, hence the intermediate trace satisfies the ECP at PF. However, it is not acceptable, contrary to the fact.

In order to account for SAI in exclamatives, we would like to propose that head movement in exclamatives also occurs in the phonological component. As a result, the subject appears in the sentence-final position, so that neutral stress is assigned to the subject. This is the reason why pronouns cannot be weak ones when they appear in sentence-final position:

(33)a. What a nice person is HE!
b. $[_{CP}$ [what a nice person], is $[_{IP}$ HE t_{is} t_1]]
movement at PF

Now, let us go back to the ungrammaticality of (32a). The reason why (32a) is ungrammatical is due to economy at PF. Notice that even though SAI does not apply to the structure as in (34), the element that appears at the end of the sentence is the verb buy. This means that SAI does not change the focus structure of the resulting sentence. In other words, SAI in exclamatives is possible only when the subject put at the sentence-final position after SAI comes to receive neutral stress. Hence, SAI in (32a) is excluded because of economy at PF:

(34) What a nice car John bought!

6. Summary

To summarize this paper, we have shown that there is an interaction among VP-ellipsis, stress assignment rule and head movement in English comparatives and exclamatives. In order to account for this, we have proposed that head movement in these constructions is best described as an instance of PF movement, which is different from head movement in yes/no questions. This is predicted, since head movement in yes/no questions does not affect the focus structure of the resulting sentence. Thus, our analysis partially constitutes evidence for Chomsky (2000, 2001a,b).

Notes

* We would like to thank Klaus Abels, Željko Bošković, Barbara Citko, Howard Lasnik, and Bum-Sik Park for suggestions, comments, and criticism of our analysis. Also, we are indebted to the audience at ling-lunch talk at University of Connecticut, at the workshop Triggers at Tilburg University, and at the WECOL at University of British Columbia

1. The definitions of PF-head-government and PF-antecedent-government are shown below:

(i) a ***PF-head-governs*** β iff i. a) α is a head, and b) α c-commands β, and c) α respects Relativized Minimality wrt β, and ii. α is PF-active.

(ii) A link α_i, in a chain $<\alpha_1, \ldots \alpha_n>$ is ***PF-active*** iff α_i is the link at which lexical insertion occurs.

(iii) a ***PF-antecedent-governs*** β iff i. a) α and β are co-indexed, and b) α c-commands β, and c) α respects Relativized Minimality wrt β, and ii. α is PF-visible.

(iv) An expression α is ***PF-visible*** iff α has phonetic exponence.

2. Peter Svenonius (personal communication) points out to us that there is a contrast in terms of adverb placement:

(i) Abby monthly imported more shellfish than (??did) Sam (did) annually (did)

This is expected under our analysis, since the adverb annually is placed at the end of the sentence when SAI occurs. Hence, SAI does not change the focus structure of the resulting sentence, so that it results in a violation of economy at PF.

3. See Fox (1995) for economy at LF.

4. The interesting question that arises is when 'more than one' head movement is possible in English. Chris Collins and Marcel den Dikken (personal communication) point out to us that 'more than one' heads can occur before the subject in locative inversion and quotative inversion, as shown below:

(i) Down the hill had rolled John

(ii) "I am so happy" have thought John

It seems that the same pronoun restriction arises in these constructions. In these constructions, weak pronouns cannot appear at the end of the sentence:

(iii) Down the hill had rolled HE/*he

(iv) "I am so happy" have thought HE/*he

The difference between head movement in comparatives lexclamatives and in locative inversion/quotative inversion is that in comparatives and exclamatives, VP-ellipsis is a necessary

condition for head movement, while it does not apply to locative inversion/quotative inversion. We will leave this open for a future research topic.

5. It reminds us of Emonds (1970), who suggests that there might be the case that SAI in yes/no question is different from SAI in comparatives. According to him, SAI in yes/no question is a root transformation, but SAI in comparatives is a 'minor movement rule'.

6. Some speakers do not accept the sentence (26c). It seems that SAI in exclamatives are archaic forms, and that could be the reason why they judged it as ungrammatical. We thank Arthur Bell (personal communication) for the clarification of this point.

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Greek Reflexives and the Syntax/Lexicon parameter[i]

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1 Aim

Taking Reinhart's (1996, 200011) work on the Theta System as a starting point, Reinhart & Siloni (to appear) argue that reflexivization taken as an arity reduction rule applies either in the syntax or in the lexicon. In this paper I provide evidence that Greek forms reflexives in the syntax.

I will further argue that certain differences between Greek and other syntactic type languages, namely French and Italian, should be attributed to the type of the reflexive marker: a reflexive suffix obligatorily absorbs only the Accusative, while a reflexive clitic absorbs the Accusative or the Dative.

2 The Framework

2.1 The theta system

I assume here, following Reinhart (200011):

> "The theta system (what has been labelled in Chomsky's Principles and Parameters framework 'Theta theory') is the system enabling the interface between the systems of concepts and the computational system, syntax (and, via the syntactic representations, with the semantic inference systems). The Theta system consists of (at least):
> a. Lexical entries, which are coded concepts, with formal features defining the theta-relations of verb-entries.
> b. A set of arity operations on lexical entries, which may generate new entries, or just new options of realization.
> c. Marking procedures, which 'prepare' a verb entry for syntactic derivations: assign an ACC(usative) feature to the verb in the relevant cases, and determine merging properties of arguments (technically obtained by indices)."

Each verb-concept is taken to correspond to a single lexical entry and different forms of the same entry are the outcome of arity operations, which determine if (and how) theta-roles are realized. Two arity operations (reduction and saturation) eliminate the ACC feature.

2.2 The syntax / lexicon parameter

Reinhart (1996, 200011) argues that reflexive predicates are formed by application of internal reduction, along the lines of Chierchia (1989):

(1) Internal Reduction / Identification: Reflexivization
a. $V<\theta_1, \theta_2> \rightarrow R_I(V)<\theta_1>$
b. $R_I(V)(x) \leftrightarrow \lambda x\,[\,V(x, x)]$

Reinhart & Siloni (to appear) suggest that internal reduction applies either in the lexicon or in the syntax. If internal reduction applies in the lexicon, it reduces the internal argument of the verb and it eliminates the Accusative feature. If internal reduction applies in the syntax, the internal argument of the verb is identified with its external co-argument. The Accusative feature is not eliminated by the arity operation. A reflexive marker is inserted to take care of Case. They provide a number of diagnostics that distinguish syntactic type languages from lexicon type languages.

i. In syntactic languages (French, Italian, German), reflexivization is a productive operation. In lexicon languages (English, Hebrew), on the other hand, reflexivization is limited. Only a subset of verbs with an agentive transitive variant can reflexivize.

ii. Syntactic languages allow reflexive ECM predicates (2a), while lexicon languages disallow them (2b).

(2a) Jean se considère intelligent (French)
Jean SE considers clever
'Jean considers himself clever'[7]

(2b) *dan mitxašev intiligenti (Hebrew)
Dan self-considers intelligent
'Dan considers himself clever'

iii. Syntactic languages allow dative reflexivization (3a). On the other hand, lexicon languages disallow this (3b).

(3a) Jean s' est envoyé une lettre (French)
Jean SE is sent a letter
'Jean sent a letter to himself

(3b) *dan hištale'ax mixtav (Hebrew)
Dan self-sent letter
'Dan sent a letter to himself'

I will show that Greek is a language of the syntactic type: any transitive verb has a reflexive variant in the relevant contexts (not only agentive transitive verbs). This is illustrated by the choice of adjuncts (section 3.2). Further

the syntactic type (section 3.4). However, Greek does not allow reflexivization of the dative (benefactor). This will be attributed to the reflexive suffix, which obligatorily absorbs only the Accusative.

3 Greek Reflexives

In this section, I will challenge the view that Greek is a lexicon language (Tsimpli 1989, Holton, Mackridge & Philippaki-Warburton 1998). I will argue that there is enough evidence to identify Greek as a language of the syntactic type.

3.1 The problem: 'the many functions of –TE'

Greek uses the same morpheme to mark reflexives (4a), passives (4b), (some) unaccusatives (4c), middles (4d) and reciprocals (4e) (cf. Tsimpli 1989, Rivero 1992, Alexiadou & Anagnostopoulou 2001). I will call this suffix –TE, although it changes form depending on tense, aspect, mood, person and number.

(4a) I Maria plenete
the-Maria-nom wash-TE-3sg
'Maria washes'

(4b) To vivlio dhiavas*tike* hthes
the-book-nom read-TE-3sg yesterday
'The book was read yesterday'

(4c) To plio vithize*te*
the-ship-nom sink-TE-3sg
'The ship sinks'

(4d) To vivlio dhiavaze*te* efkola
the-book-nom read-TE-3sg easily
'The book reads easily'

(4e) O Yanis ke i Maria . filiu*nde*[ii]
the-Yanis-nom and the-Maria-nom kiss-TE-3pl
'Yanis and Maria are kissing'

Some tests are required in order to identify the reflexive use of a predicate.

3.2 Ambiguity

The different functions of –TE give rise to ambiguities (cf. Alexiadou & Anagnostopoulou 2001). Example (5) is ambiguous between (at least)

(5) 1 jineka kaike
the-woman-nom burnt-TE-3sg
i. 'The woman was burnt' (passive)
ii. 'The woman burnt herself (reflexive)

It is possible to disambiguate the different readings by the choice of adjuncts.

i. The adverbial 'on her / his own' appears with reflexives (6a) and unaccusatives (6b) but not with passives (6c) (Chierchia 1989, Alexiadou & Anagnostopoulou 2001).

(6a) Ksirist*ike* monos tu (Greek)
shaved-TE-3sg own-nom his-gen
'He shaved on his own' (English)

(6b) Irthe moni tis (Greek)
came-3sg own-nom her-gen
'She came on her own' (English)

(6c) *Thavmast*ike* moni tis (Greek)
admired-TE-3sg own-nom her-gen
'*She was admired on her own' (English)

Note that verbs like ajapo 'love', *miso* 'hate', *latrevo* 'adore' do not reflexivize in Greek or in Serbo-Croatian (another language of the syntactic type). Although there is no explanation for this, the suffix -TE always gives rise to passive interpretation. The adverbial is excluded:

(7) *Latreft*ike* monos tu
adored-TE-3sg own-nom his-gen
'*He was adored on his own'

ii. Reinhart (2000) points out that instruments always appear with agentive arguments. As illustrated below, instruments appear with reflexives (8a) and passives (8b) but not with unaccusatives (8c).

(8a) Ksirizete me tin ilektriki mihani (Greek)
shaves-TE-3sg with the-electric-raisor-acc
'He shaves with the electric raisor' (English)

(8b) To ktirio ka*ike* (apo tus anarhikus) (Greek)
the-building-nomburnt-TE-3sg (by the-anarchists-acc)
me dhio varelia petreleo
with two- barrels-acc petrol-acc
'The building was burnt (by the anarchists)

(8c) *Epese me ena ksilo (Greek)
fell-3sg with a- stick-acc
'*She / he fell with a stick' (English)

iii. The adverbial moni *tis* 'on her own' and the instrumental phrase appear simultaneously. In (9a), the unaccusative reading is excluded, due to the instrumental phrase. The passive reading is also excluded, due to the adverbial 'on her own'. Hence, the verb can only be reflexive[iii].

(9a) I jineka kaike moni tis me ta spirta[iv] (Greek)
the-woman-nom burnt-TE-3sg own-acc her-gen with the-matches-acc
'*The woman burnt herself on her own with the matches' (English)

As Reinhart & Siloni (to appear) point out, in lexicon languages, only a subset of the set of the agentive verbs can reflexivize.

The transitive verb keo 'burn' does not always take an agent as its subject. It also allows an instrument (10a) or a cause (10b).

(10a) M' ekapse to spirto
me-acc burnt-3sg the-match-nom
'The match(es) burnt me'

(10b) M' ekapse o *ilios*
me-acc burnt-3sg the-sun-nom
'The sun burnt me'

The reflexive variant is allowed only in the presence of an agentive subject:

(11a) I jineka kaike moni tis me ta spirta (Greek)
the-woman-nom burnt-TE-3sg own-acc her-gen with the-matches-acc
'*The woman burnt herself on her own with the matches'

(11b) *I varka kaike moni tis me ta spirta (Greek)
the-boat-nom burnt-TE-3sg own-acc her-gen with the-matches-acc
'*The boat burnt on its own with the matches'

3 3 Slang language and reflexive ECM predicates

Further evidence against the claim that Greek is a lexicon language is derived from slang language and reflexive ECM predicates.

a. Slang language: The claim that Greek reflexives are formed in the syntax, and thus they are productive, is further supported by data from every day language. People who take drugs seem to randomly take any verb and reflexivize it in relevant contexts:

(12a) Tripiete = he pinches himself / herself

b. Reflexive ECM predicates: Greek lacks ECM predicates, in the sense that all embedded predicates manifest subject agreement and thus take nominative subjects (for a discussion on Greek ECM constructions cf. Alexiadou & Aanagnostopoulou 1997 and references mentioned there). Hence, it is hard to check whether reflexivization into ECM constructions is possible or not. Partial evidence comes from (13).

(13a) Theorise eksipnos?
consider-TE-2sg clever-m-nom
'i. 'Are you considered clever?'
'ii. 'Do you consider yourself clever?'

The passive reading is usually preferred, but the reflexive reading can be forced in the relevant contexts, especially in spoken language. For example:

(13b) Ti ine afta pu les tora?
what are these that say-2sg now
'What are you saying now?'

Theorise eksipnos ke ta les?
consider-TE-2sg clever-m-nom and them say-2sg
'Do you consider yourself clever by saying this?'

3.4 Reciprocals

Siloni (2001) argues that, in syntactic languages, there is ambiguity between reflexives and reciprocals (14a). In lexicon languages, only one reading is available (14b). Ambiguity is attested in Greek, when –TE is used in plural. Example (14c) is ambiguous between reflexive and reciprocal reading. The same argument could be extended to other ambiguities. For example, (14d) is ambiguous between reciprocal and middle interpretation.

(14a) Pierre et Jean se sont lavés (French)
Pierre and Jean SE are washed
i. 'Pierre and Jean washed (themselves)'
ii. 'Pierre and Jean washed each other'

(14b) dan ve- ron hitraxcu (Hebrew)
Dan and Ron washed-*refl*
'Dan and Ron washed (themselves)'

(14c) Ta pedhia vrehondan me ta lastiha
the-children-nom wet-TE-3pl with the-hoses-acc
i. 'The children were throwing water to themselves'

(14d) I Maria ke o Yanis ajapiunde (efkola)
the-Maria-nom and the-Yanis-nom love-TE-3pl (easily)
i. 'Maria and Yanis love each other'
ii. 'People love Maria and Yanis easily'

Thus far I dealt with Greek reflexives formed by attachment of a suffix. I now turn to 'self-reflexives'.

4. Self-reflexives

In order to give a complete picture of the Greek case I will briefly discuss constructions of the type:

(15) I Maria *afto-* katastrefe*te*
the-Maria-nom SELF- destroy-TE -3sg
'Maria destroys herself

Rivero (1992) argues that, in the above example, (part of the) the reflexive anaphor afio 'self incorporates into the verb via the process of syntactic Incorporation. Furthermore, researchers often distinguish between reflexives formed in the syntax (i.e. 'self-reflexives') and reflexives formed in the lexicon (with the suffix *–TE*).

However, example (15) has a reflexive reading even without *afto-* 'self, in the relevant contexts (cf. also section 3.2 for discussion of other verbs).

Moreover, verbs with afio- 'self are listed in dictionaries; verbs with –TE are not listed in dictionaries. This possibly indicates that there is a pattern underlying the formation of reflexive predicates with –TE but not with *afto-*.

5. The Benefactor

In this section I will explain why the benefactor is reflexivized in French (also Italian and German), but not in Greek.

5.1 The problem

Reinhart & Siloni (to appear) argue that reflexivization can target the benefactor in syntactic languages (example 3a repeated here as 16a). This is not true for Greek (16b).

(16a) Jean *s'est envoyé* une lettre
Jean SE sent a- letter-acc
'Jean sent a letter to himself

(16b) *O Yanis stalth*ike* ena jrarna
the-Yanis-nom sent-TE-3sg a- letter-acc
'Yanis sent a letter to himself

5.2 Hypothesis

In this section I pursue the hypothesis that Greek uses a reflexive *suffix* that obligatorily absorbs only the Accusative.

Note here that Tsimpli (1989) makes a similar observation for Greek, from a different theoretical perspective. In particular she has suggested that reflexives should not be able to admit an accusative NP object since the internal position does not project, the internal theta-role having been saturated by the suffix. Example (17) is taken to support this claim

(17) *O Yanis plithike to prosopo tu
the-Yanis-nom washed-TE-3sg the-face-acc his-gen
'Yanis washed his face'

In the following sections, I provide further evidence in support of this hypothesis[v].

5 3 Evidence from possessives

Greek does not allow inalienable possession structures with -TE (18a). The situation is different in French (18b).

(18a) *O Yanis plith*ike* ta heria
the-Yanis-nom washed-TE-3sg the-hands-acc
'Yanis washed the hands (i.e. his hands)'

(18b) Jean s'est lavé les mains
Jean SE washed the hands
'Jean washed the hands (i.e. his hands)'

5.4 Evidence from passives

a. Greek lacks passivization of the dative / genitive[vi] (Anagnostopoulou 1999). This follows from an analysis in which –TE obligatorily absorbs the Accusative:

(19) *O Yanis dhothike ena pinaka
the-Yanis-nom given-TE-3sg a- picture-acc
'Yanis was given a picture'

b. Some passive verbs may appear with a DP in Accusative:

(20a) O Yanis pliroforithike ti dholofonia tis apo tin tileorasi
the-Yanis-nom **informed-TE-3sg** the-murder-acc hers by the-TV-acc
'Yanis was informed (about) her murder **from** the TV'

As illustrated below, there is only one available transitive variant:

(20b) I astinomia pliroforise to Yani ya ti dholofonia tis
the-police-nom **informed-3sg** the-Yani-acc about the-murder-acc hers
'The police informed Yani about her murder'

(20c) *I **astinomia pliroforise** tu Yani ya ti dholofonia tis
the-police-nom **informed-3sg** the-Yani-gen about the-murder-acc hers
'The police informed Yani about her murder'

(20d) *I astinomia pliroforise to Yani ti dholofonia tis
the-police-nom **informed-3sg** the-Yani-acc the-murder-acc hers
'The police informed Yani about her murder'

In the grammatical example (20b), only one DP appears in Accusative, namely the one that is passivized in (20a), to Yani 'Yani'. The DP ti dholofonia ***tis*** 'her murder' is obligatorily preceded by a Preposition. This leads to the assumption that a (phonological null) Preposition is also present with the passive variant (20a) (although I do not know why it is null).

5.5 Evidence from impersonals

Impersonal constructions with an argument in Accusative are attested in Italian (21a) (Cinque 1988, Dobrovie 1998:403), but not in Greek (21b).

(21a) Qui li si mangia **spesso**
here them-acc SI eats often
'One eats them often here'

(21b) ***Edho** ta trojete **sihna**
here them-acc **eats-TE-3sg** often
'One eats them often here'

5.6 Evidence from reciprocals

Reciprocation targets the benefactor in French (Italian and German) (22a). An argument in Accusative is realized. Greek lacks such examples (22b).

(22a) Jean et Marie s' **écrivent** des lettres
Jean and Marie SE **write-3pl** letters-acc
'Jean and Marie write letters to each other'

(22b) *O Yanis ke i Maria jrafonde jramata
the-Yanis-nom and the-Maria-nom write-TE-3pl letters-acc
'Yanis and Maria write letters to each other'

5.7 Summary

We saw evidence from reflexives, reciprocals, passives and impersonals that the suffix –TE in Greek obligatorily absorbs only the Accusative.

Suppose we relate this property that Greek has, absorbing Accusative, which makes it different from, for instance, French, with the nature of the affix. If that would be so, we would predict that Russian –SJA would impose the same restriction.

6 Russian

Russian uses a suffix with reflexives (Schoorlemmer 1996) and recirpocals.

It is predicted that reflexivization and reciprocation does not target the benefactor. This is borne out:

(23a) *John posylajetsja pis'mo[vii]
John-nom sent-SJA letter-acc
'John sent a letter for himself

(23b) *Vanja i Masha pishutsja
Vanja-nom and Masha-nom write-imp-pres-3pl-SJA
'Vanja and Masha write (to each other)'

Another prediction is that impersonal constructions with S J A and an argument in Accusative are ruled out. This is true, as shown below:

(23c) *Zdes' ih est*ja* často
here them-acc eat-3sg-SJA often
'Here one eats them often'

7 Conclusion

It has been argued that Greek reflexives are formed in the syntax. The reflexive marker, being a suffix, obligatorily absorbs only the Accusative.

8 Notes

[i] The suffix is found with 'deponent' verbs, which behave like transitives (Mackridge 1987):

(i) Metahirizome to leksiko
use- TE -1sg the-dictionary-acc
'I use the dictionary'

[ii] Verbs with –TE and (obligatorily) reflexive reading:

(iia) I jineka travmatistike moni tis me to maheri
the-woman-nom injured-TE-3sg own-f-nom cl-f-gen with the-knife-acc
'The woman injured herself on her own with the knife'

(iib) To ajori dhethike mono tu me to shini
the-boy-nom tied-TE-3sg own-n-nom cl-n-gen with the-rope-acc
'The boy tied himself on his own with the rope'

(iic) To koritsi lerothike mono tu me ti laspi
the-girl-nom dirtied-TE-3sg own-n-nom cl-n-gen with the-mud-acc
'The girl dirtied herself on her own with the mud'

(iid) I Maria skepastike moni tis me tin kuverta
the-Maria-nom covered-TE-3sg own-f-nom cl-f-gen with the-blanket-acc
'Maria covered herself on her own with the blanket'

(iie) O trajudhistis sistithike monos tu me to mikrofono
the-singer-nom introduced-TE-3sg own-m-nom cl-m-gen with the-microphone-acc
'The singer introduced himself on his own with the microphone'

(iif) I jineka paradhothike moni tis me mia aspri simea
the-woman-nom surrendered-TE-3sg own-f-nom cl-3sg-gen with a- white-flag-acc
'The woman surrended herself on her own with a white flag'

(iig) I jineka kopike moni tis me to maheri
the-woman-nom cut-TE-3sg own-f-nom cl-f-gen with the-knife-acc
'The woman cut herself on her own with the knife'

[iii] We also find examples of the type:

(iii) I Maria irthe moni tis me to aftokinito
the-Maria-nom came-3sg own-acc her-gen with the-car-acc
'Maria came on her own with/by the car'

The phrase me *to aftokinito* 'with / by the car' is not an instrument but a 'manner' phrase.

[iv] Note here that one way of marking reflexives in the Salish dialect, Halkomelem, is with a suffix (Gerdts 2000). Reflexivization of the benefactor is ruled out:

(vi) *niʔ can qʷəl-əlc-θət
aux sub bake-ben-refl
'I cooked it for myself

[vi] Dative is no longer used in Modem Greek. Genitive is used instead.

[vii] The Russian data are due to Olga Borik and Galina Gordishevsky.

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On the Structural Position of Topics*

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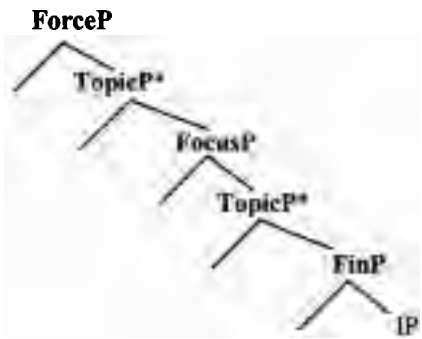
1 Introduction

Rizzi (1997) proposes an expanded CP structure, with a focus position sandwiched between two topic positions. He considers data from Romance, such as the following example from Italian:

(1) A Gianni QUESTO domani **gli dovrete** dire.
'To Gianni, THIS, tomorrow, you should tell him.'

The structure that **Rizzi** proposes is illustrated in the tree in (2), where * indicates a potentially reiterating XP.

(2)



In this paper, I look at Malagasy as a test case to answer the following question: What does the left periphery look like in a verb-initial language? Interestingly, Malagasy allows for precisely the same order of **topic>focus>topic.** This ordering can be seen in (3).

(3) [Ny **lovia maloto**]$_{topic}$ dia **[isan'andro]**$_{focus}$ **[Rabe]**$_{topic}$ no **manasa** azy **ireo.**
DET dish dirty **TOP** each'day Rabe N o AT.wash 3(ACC) PL
'As for the dirty dishes, it's every day that Rabe washes them.'

On closer inspection, however, Rizzi's structure leaves unexplained certain restrictions on the string in (3). First, the lower topic position is only available when there is a focused element. Second, the lower topic is always the (grammatical) subject. Third, focus (and wh-questions) is formed by a cleft, not by simple fronting. Thus although Rizzi's structure accounts for the basic word order, it does little more. In fact, I will argue that the layered CP is absent in Malagasy and therefore not a universal property of languages. For the purposes of this paper I focus on the lower "topic" Rabe in examples such as (3).

2 Malagasy

Malagasy is a western Austronesian language spoken in Madagascar. The word order is strictly VOS. Important for this paper is the restriction on A-bar movement. Only subjects and certain adjuncts may undergo A-bar movement (Keenan 1972, 1976).[1] (4) and (5) provide examples of wh-movement, which is a kind of cleft.

(4) a. Iza no nanasa ny lovia maloto? [Jsubject]
who NO PST.AT.wash DET dish dirty
'Who washed the dirty dishes?'

b. Oviana no nanasa ny lovia maloto i Soa? [Jadjunct]
when NO PST.AT.wash DET dish dirty Soa
'When did Soa wash the dirty dishes?'

In order to question (or cleft) an object, the verbal voice is changed, promoting the object to subject, as in (5b) (similar to passive).

(5) a. *Inona no nanasa i Soa? [Xobject]
what NO PST.AT.wash Soa
'What did Soa wash?'

b. Inona no nosasan'i Soa. [Jsubject]
what NO PST.TT.wash.GEN.Soa
'What did Soa wash?'

This restriction plays an important role in topic and focus constructions.

3 Focus

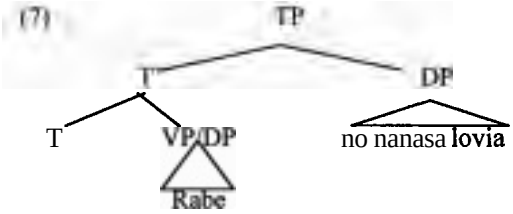
In focus constructions a single XP appears preverbally, followed by the particle no.

(6) a. Rabe no **manasa lovia.**
Rabe NO **AT.wash** dish
'It is Rabe who is washing dishes.'

b. (Ny) ariana no antonona azy.
(DET) **TT.throw-away** NO suitable 3(ACC)
'It is to be thrown away that it is suitable.' [Dahl 1986: (31)]

In Paul (2001), I draw on work by Dahl (1986) and argue that the clefted element is in fact the main predicate and the remainder of the clause (no + predicate) is a headless relative in subject position. According to this analysis, no is in fact a determiner, not a focus marker. A more accurate translation of (6a) would therefore be 'The one who is washing dishes is Rabe'. The tree below gives the basic structure for (6a).

(7)



I will assume the structure in (7) without further motivation, but refer the reader to the above papers for discussion. Crucially, if (7) is correct, focused elements in Malagasy do not appear in the CP field. This analysis raises important questions about the nature of wh-movement as the only movement per se is empty operator movement in the headless relative. I set aside these issues for future research.

4The "Highn Topic

Similar to focalization, topicalization appears to be a fronting operation. Note, however, that topicalization bears none of the hallmarks of extraction in Malagasy: it violates the Malagasy subject-only constraint on movement and island constraints. (8) provides some illustrative examples: long-distance object topicalization (8a); topicalization out of a complex NP (8b); topicalization out of a wh-island (8c). The resumptive pronoun in base position is in boldface.[2]

(8) a Ny radara dia Rabe no **nilaza** fa Rasoa no nanao **azy**.
DET radar TOP Rabe NO **PST.AT.say** C Rasoa NO **PST.AT.do** 3(ACC)
'As for the radar, it was Rabe who said that Rasoa built it.'

b. Ny radara dia Rabe no namangy ny olona izay **nanao azy**.
DET **radar** TOP Rabe NO **PST.AT.meet** DET person REL **PST.AT.do 3(ACC)**
'As for the radar, it was Rabe who met the person who built it.'

c. Ny radara dia Rabe no **mahafantatra** izay nanaovana **azy**.
DET **radar** TOP Rabe NO **AT.know** REL **PST.CT.do 3(ACC)**
'As for the radar, it's Rabe who knows why it was **built/its** use.'

This unboundedness clearly violates the Malagasy restrictions on extraction mentioned at the beginning of this paper. Moreover, resumptive pronouns are not found in other A-bar dependencies. Thus the outermost topic in Malagasy appears to be base generated in the clausal domain – perhaps simply adjoined to CP. Again, I see no empirical evidence in favour of a special functional projection in the CP domain for topics.

5 The "Low" Topic

Keenan (1976) describes what he calls the "bodyguard" construction. Descriptively, when a non-subject is fronted in a cleft, the subject may optionally be **carried** along ("guarding" the non-subject). The examples in (9) are of simple clefts: subject and adjunct.

(9) a. Rabe no nanasa ny **lovia maloto** omaly.
Rabe NO **PST.AT.wash** DET dish dirty yesterday
'It was Rabe who washed the dirty dishes yesterday.'

b. Omaly no nanasa ny **lovia maloto** Rabe.
yesterday NO **PST.AT.wash** DET dish dirty Rabe
'It was yesterday that Rabe washed the dirty dishes.'

In a bodyguard construction, the adjunct appears clause-initially, followed by the subject (the bodyguard) and the particle no. (Throughout the remainder of this paper the bodyguard is marked with bold font.)

(10) a. Omaly Rabe no nanasa ny **lovia maloto.**
yesterday Rabe NO **PST.AT.wash** DET dish dirty
'It was yesterday that Rabe washed the dirty dishes.'

b. **Tamin'ny** **taona** lasa ity radara ity no **nataon-dRasoa.**
PST.P.GEN.DET year gone this radar this NO **PST.TT.do.GEN.Rasoa**
'It was last year that this radar was built by **Rasoa.'**

Although Keenan states that some speakers prefer agent subjects as bodyguards, my consultants readily accept examples such as (10b), which have a derived subject as the bodyguard.

In what follows, I explain the structure and pragmatic interpretation of the bodyguard construction. In particular, I argue that the bodyguard is not a multiple cleft.

5.1 Bodyguard properties

In this section, I give an overview of the basic properties of the bodyguard construction. The first observation is that the ordering seen in (10) is strict: the first element must be an adjunct, the second must be the subject. Reversing the two leads to the ungrammatical example in (11).

(11) * Rabe omaly no **nanasa** ny **lovia maloto.**
Rabe yesterday NO PST.AT.wash DET dish dirty
'It was Rabe who yesterday washed the dirty dishes.'

Second, the first element is typically new information while the second is old information. For example, the first element may be indefinite, but the second may not (but see (19b) for a counterexample):

(12) a. **Zazavavy** no nilalao baolina tany an-tokotany.
girl NO PST.AT.play ball PST.there ACC-yard
'It was girls who were playing ball in the yard.'

b. Tany an-tokotany ***(ny) zazavavy** no nilalao baolina.
PST.there ACC-yard (DET) girl NO PST.AT.play ball
'It was in the yard that the girls were playing ball.'

Moreover, the first element may be the answer to a question, but the second may not. (13c) is an appropriate answer to (13a), while (13b) is not.

(13) a. **Iza** no nanapaka bozaka oviana?
who NO PST.AT.cut grass when
'Who cut grass when?'

b.# Omaly **Rasoa** no nanapaka bozaka.
yesterday Rasoa NO PST.AT.cut grass
'It was yesterday that Rasoa cut grass.'

c. Rasoa no **nanapaka** bozaka omaly.
Rasoa NO PST.AT.cut grass yesterday
'It was Rasoa who cut grass yesterday.'

In fact, the bodyguard is often a pronoun, coreferential with a name mentioned earlier in the discourse:

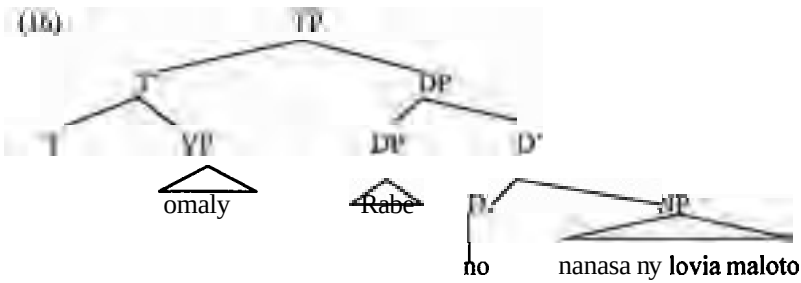
(14) a. Taiza no nandeha fiara i Soa?
PST.where NO PST.AT.go car Soa
'Where did Soa go by car?

b. Tany Antananarivo izy no nandeha fiara.
PST.there Antananarivo 3(NOM) NO PST.AT.go car
'It was to Tananarive that she went by car.'

Summing up, in a bodyguard construction the first element patterns with focus (as in simple clefts), while the second (the bodyguard) has non-focus properties.
Recall now the discussion of focus constructions in section 3. If the structure proposed in (7) is correct, however, this raises a problem for the bodyguard. I repeat a typical example below:

(15) Omaly **Rabe** no nanasa ny **lovia maloto.**
yesterday Rabe NO PST.AT.wash DET dish dirty
'It was yesterday that Rabe washed the dirty dishes.'

If ***omaly*** 'yesterday' is the predicate and no ***nanasa...*** is the subject, where is ***Rabe?*** In what follows, I argue that ***Rabe*** is in the specifier of the subject. In other words, the bodyguard is a possessor of the headless relative. The structure of (15) is given in (16).[3]



5.2 Bodyguard: focus

An initial alternate hypothesis might state that the bodyguard is in fact a focused element, either amalgamated with the adjunct or in a different specifier of a multiple specifier head (e.g. FocusP). There are several reasons, however, to believe that the bodyguard forms a constituent not with the adjunct, but with the remainder of the clause. First, recall that the bodyguard does not have focus interpretation, unlike the adjunct. Second, it is possible to interrupt the adjacency between the adjunct and the bodyguard. (17a) illustrates a parenthetical inserted between the adjunct and the bodyguard, showing they do not form an amalgamated unit. (17b) shows that it is possible to coordinate the bodyguard with the remainder of the clause, to the exclusion of the adjunct. In (17b), the adjunct scopes over both conjuncts.

(17) a. Omaly hono Rasoa no nanapaka bozaka.
yesterday so-they-say Rasoa NO PST.AT.cut grass
'It was yesterday, so they say, that Rasoa cut grass.'

b. Omaly Rasoa no nivarotra hena ary Rakoto no nividy vary.
yesterday Rasoa NO PST.AT.sell meat and Rakoto NO PST.AT.buy rice
'It was yesterday that Rasoa sold meat and Rakoto bought rice.'

(17b) is an example of DP coordination under the present analysis.

5.3 Bodyguard/subject

A second alternate hypothesis might be that the bodyguard is simply a pre-verbal subject (ignoring for the moment the status of no). Since the bodyguard always corresponds to the surface subject, perhaps it is the subject. It can be shown, however, that the bodyguard is more restricted than clause-final subjects. For example, although event nominals can be subjects (the XP marked with a dotted underline in (18a)), they can't be bodyguards (18b).

(18) a. Natombon-dRabe ny...nitondra.....fiara omaly.
PST.TT.start.GEN.Rabe DET PST.AT.drive car yesterday
'Rabe started to drive a car yesterday.'
(lit.) 'The driving of the car was begun by Rabe yesterday.'

b. *Omaly ny nitondra fiara no natombon-dRabe.
yesterday DET PST.AT.drive car NO PST.TT.start.gen.Rabe
(lit.)'It was yesterday that the driving of the car was begun by Rabe.'

Moreover, under certain (poorly understood for the moment) circumstances the bodyguard may be indefinite (19b). This contrasts with regular subjects (19a).

(19) a.*Nandeha tany an-tsena zanako.....roa.
PST.AT.go PST.there ACC-market child.1SG(GEN) two
'Two of my children went to the market.'

b. Omaly zanako roa no nandeha tany an-tsena.
yesterday child.1SG(GEN) two NO PST.AT.go PST.there ACC-market
'It was yesterday that two of my children went to market.'

The bodyguard is therefore not simply a pre-verbal subject.

5.4 Bodyguard=possessor

Taking into account the structure of the cleft, in particular the position of the bodyguard immediately preceding no (a determiner), I suggested above that the bodyguard is a possessor in [Spec, DP]. As a possessor, the bodyguard obeys restrictions other than those imposed on subjects. For example, possessors cannot be event nominals, as shown in (20).

(20)a.* ny fotoan'ny mamono ny filoha
DET time.GEN.DET AT.kill DET director
'the time of the killing of the director'

b.* ny toeran'ny mamono ny filoha
DET place.GEN.DET AT.kill DET director
'the place of the killing of the director'

The ungrammaticality of (20) parallels that of (18b).

Positing a possessor in [Spec, DP], however, runs into difficulty in face of the normal position of possessors in Malagasy. In general, possessors remain "low", perhaps in [Spec, NP], never preceding the determiner *ny*.

(21)a. ny bokin-dRabe
DET book.GEN.Rabe
'Rabe's book'

b. ny kiraro fotsy kely teloko
DET shoe white small three.1SG(GEN)
'my three small white shoes'

In order to account for the special possessor position, I propose that the D° *no* exceptionally licenses a specifier, while *ny* (the regular determiner) does not.

A second problem for the present analysis is morphological case: possessors in Malagasy are typically marked with genitive case, which surfaces as "n-bonding" with the proper name in (21a) and as a special series of pronouns, as illustrated in (21b) and (22a). It has been noted, however, that sometimes possessors appear with nominative rather than genitive (Paul 1996). When a third person pronoun is "augmented" in some way, it surfaces as nominative (22b,c). With the head noun *trano* 'house', we find the following forms:

(22)a. tranony
house.3(GEN)
'his/her house'

b. tranon'izy ireo
house.GEN.3(NOM) PL
'their house'

c. tranon'izy mivady
house.GEN.3(NOM) spouse
'their (the spouses) house'

Similar facts obtain with coordinate possessors.

Summing up, although the bodyguard is not formally marked as a possessor, syntactic and pragmatic data suggest that it occupies [Spec, DP] of the headless relative in the subject position of a cleft. Moreover, other plausible accounts (multiple focus, preverbal subject) can be shown to be inadequate.

6 Other languages

At this point, the bodyguard may appear to be an obscure quirk of Malagasy. A similar construction occurs in some related languages, however. Seiter (1979) describes what he calls the RC possessive construction (RC for "relative clause") in Niuean, a Polynesian language (see also Hawkins 2000 for similar data from Hawaiian). In relative clauses formed on non-subjects, the subject of the highest verb in the relative clause optionally becomes a possessive modifier of the head noun. (23a) illustrates a relative clause, with *mena* 'thing' as the head. In (23b), the embedded subject *koe* 'you' appears as a possessor *haau* 'your'.

(23)a. e mena ne tunu **ai** e **koe** e moa
ABS thing NFT cook **in=it** ERG you ABS chicken
'the thing you cooked the chicken in'

b. e mena haau ne tunu ai e moa
ABS thing your NFT cook **in=it** ABS chicken
'the thing you cooked the chicken in' [Seiter 1979: **97**]

Seiter points out that the RC possessive surfaces in clefts (24) as well as *wh*-questions (25).[4]

(24) **Ko** e ika **nī** ha **mautolu** ne fā kai he **aho** Falaile.
PRED ABS fish only of us, **PL.EX** NFT HAB eat on day Friday
'Fish is what we used to eat on Friday.' [Seiter 1979: **105**]

(25)a. **Ko** hai ne lagomatai e koe?
PRED who NFT help ERG you
'Who did you help?'

b. **Ko** hai haau ne lagomatai?
PRED **who** your NFT help
'Who did you help?' [Seiter 1979: **114**]

As in Malagasy, wh-questions in Niuean involve a cleft construction. Moreover, the **cleft,** as argued by Seiter, has the same structure as the Malagasy **cleft:** a nominal predicate (marked by *ko*) and a headless relative subject. In other words, clefts share certain properties of relative clauses. Note, finally that the possessor in (24) and (25b) is modifying the empty head of the relative clause, not the clefted element. It is therefore expected to find RC possessive in clefts and exactly in this position: between the **clefted** element and the relative.

The Niuean RC possessive construction is only possible in relative clauses formed on non-subjects. In general, it is impossible to relativize non-subjects in Malagasy. The only exception is in headless relatives (**e.g.** clefts). Therefore if one were looking for the RC possessive in Malagasy, one would only expect it to obtain in non-subject clefts, not in headed relatives. And this is precisely the environment where the bodyguard surfaces. The fact that the RC possessive is overtly marked as possessive in Niuean lends support to the analysis of the bodyguard in Malagasy as a special type of possessor.

Beyond Austronesian, constructions similar to the bodyguard can also be found: ga-no conversion in Japanese (Harada 1971) and nominative-genitive alternations in Turkish and other languages (see **Krause** 2001 for a recent survey). What these facts show us is that there is a special genitive **Case**-licensing position available for subjects in certain languages. Whether a unified

analysis of these diverse constructions is possible is the subject of future research.

7 Conclusion

Beginning with an unusual construction in Malagasy, this paper has addressed the question of the position of topic and focus in the clause. It is often argued that some languages (e.g. Italian and Hungarian) resort to functional categories which host topicalized and focused elements. It is also clear that other languages (e.g. English) can map particular prosodic structures onto topic and focus. What I have shown is that for the most part, topic and focus in Malagasy can be read directly off the basic syntactic structure. The structure of clefts gives rise to the focus reading (see Paul 2001 for detailed discussion); the bodyguard has topic-like properties due to its base position (grammatical subject). In sum, Malagasy syntax does not appear to instantiate the type of layered CP structure proposed by Rizzi (1997). It remains to be shown whether or not this structure is indeed universal (and hence the null hypothesis for the child) or a special feature of Italian (and perhaps other languages) that must be learned based on positive evidence. Interestingly, Massam (2002) presents data from Niuean that indicate that the CP field lacks TopicP and FocusP (among other projections). Whether or not this is a property of verb-initial languages remains to be determined. Finally, Lopez (2002) also argues against an expanded CP, drawing on data from Catalan. This line of research suggests that functional projections associated with semantic/pragmatic features need to be carefully motivated on a language-by-language basis. If topic and focus are indeed discourse notions and therefore sensitive to linear order rather than structural hierarchy, it is not surprising that different languages resort to different linguistic means to encode topic and focus.

Notes

I would like to thank Saholy Hanitriniaina for her help with the Malagasy data and the participants at WECOL 2002 for their input I have also greatly benefitted from discussions with Lisa Travis, Norvin Richards and Diane Massam. Any remaining errors are my own. Unless otherwise indicated, all Malagasy examples are from my own fieldwork.

[1] In fact, as noted by Keenan (1972), relativization is strictly limited to subjects.

[2] All the examples in (26) have a cleft as well as topicalization. It is possible, however, to have a resumptive pronoun even in simple topicalization, although it is less acceptable.

(i) ? Ny reniny dia manaja azy i Koto.
DET mother.3(GEN) TOP AT.respect 3(ACC) Koto.
'As for his mother, Koto respects her.'

Resumptive pronouns are never associated with subjects, however.

[3] I leave for future research the precise structure of the headless relative.

[4] **In fact, Seiter claims that RC possessive in clefts is not possible, in spite of (21). Diane Massam (p.c.) informs me that her consultants freely accept RC possessive in clefts.**

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Kikuyu Prenasalisation and Deletion: Implication for Local Conjunction

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1. Introduction

This article investigates consonant mutation in Kikuyu, a Zone E Bantu language spoken in Kenya. Like other **Bantu** languages, Kikuyu has a complex system of root-initial consonant mutation caused by the affixation of a placeless nasal prefix, marked by /N-/. Kikuyu mutation consists of six separate patterns. We summarise the six patterns in (1), highlighting the outcomes of mutation. In (1), [-nas] and [+nas], specified as the condition triggering mutation, refer to the [nas] specification of the onset of the following syllable. For instance, an input such as /Nr/ in (1a) surfaces as [nd] only if the onset of the next syllable is [-nasal].

(1) Six patterns of consonant mutation in Kikuyu

a.	prenasalisation:	/Nt, Nc, NW	→ [nd, pj, ŋg]	/ __ [-nas]
		/Nβ/w,Nr,Ny,Nɣ/	→ [mb, nd, ɲj, ŋg]/	__[-nas]
b.	Nasal deletion:	/Nθ, Nh/	→ [θ, h]	/ __ [-nas]
c.	Anti-gemination:	/Nm,Nn,Nɲ,Nŋ/	→ [m, n, ɲ, ŋ]	
d.	Fusion:	/Nβ/w,Nr,Ny,Nɣ/	→ [m, n, ɲ, ŋ]	/ __[+nas]
e.	Anti-fusion:	/Nt, Nc, Nk/	→ [nd, ɲj, ŋg]	/ __ [+nas]
		/Nθ, N-h/	→ [θ, h]	/ __ [+nas]
f.	Epenthesis:	/NV/	→ [njV]	/ —[-nas]
	(V=Vowel)	/NV/	→ [ɲV]	/ __[+nas]

In this study, we analyse only the prenasalised and nasal deletion patterns for reasons of space. Interested readers should consult Peng (2002) for a thorough analysis of all six patterns of mutation. The patterns considered here exhibit five featural changes and two distinct strategies to respond to the structural demands imposed by the language. We show that an optimal-theoretic analysis not only reduces the surface effects of mutation to a set of independently motivated universal constraints but also captures the functional unity of prenasalisation and nasal deletion. Moreover, we demonstrate that local conjunction, first proposed in Smolensky (1993), is necessary to an account of nasal deletion.

2. Prenasalisation and Nasal Deletion

This section presents the data for the prenasalised and nasal deletion patterns and highlights the directions of our analysis. The data reported here are taken mostly from Armstrong (1967), supplemented and cross-checked with the data from McGregor (1905), Barlow (1960), Benson (1964), Bennett et. al. (1985) and my own field work with one Kikuyu speaker.

Kikuyu consonant mutation is seen in verbs, nouns and adjectives. In verbs, mutation occurs when the /N-/ prefix denoting the 1st person singular subject or object abuts the verbal root. In nouns and adjectives, mutation is found in the plural prefixation for classes 9/10 nouns and adjectives. The patterns of consonant mutation are identical in all three classes of words. In what follows, we present the data with the /N-/ prefix in the second column, juxtaposed with the data in the first column. We use "-" to signal the morphemic boundary.

Consider the two prenasalised pattems first. As the data in (2a) show, root-initial voiceless stops /t, k/ and affricate /c/ undergo voicing under the /N-/ prefixation, while root-initial continuants /β, w, r, y, ɣ/ are hardened into stops [b, d, g] or affricate [j]. The result of voicing or hardening is a prenasalised segment. In addition, the prefix /N-/ assimilates to the root-initial consonants, appearing as [m], [n], [ɲ], or [ŋ].

(2) The two prenasalised pattems

a. Roots with initial voiceless stops or affricate

a-tɛ-ɛt-ɛ	n-de-et-e	'He/I has/have thrown away'
ro-cuθe	ɲ-juθe	'backbone-backbones'
ro-ko	ŋ-go	'piece-pieces of firewood'

b. Roots with initial voiced fricatives

o-βuθu	m-buθu	'rottenness-rotten'
ro-wɔra	m-bɔra	'sting-stings of bees'
a-re-et-E	n-de-et-e	'He/I has/have eaten'
mo-yur-i-a	ɲ-jur-i-a	'to let him/me fill'
ro-yiri	ŋ-giri	'fence-fences'

Note that the second syllable onset of the root cannot be a nasal or prenasalised segment. When a nasal or prenasalised segment occupies this onset, root-initial voiced continuants fuse with /N-/, illustrated schematically in (1d).

We follow Herbert (1977, 1986), Feinstein (1979), Clements (1987), Steriade (1993) and Trigo (1993) in representing the prenasalised segments as consisting of two root nodes. Specifically, we analyse [mb, nd, ɲj, ŋg] as comprising nasal stops followed by oral stops or affricate. The implication of this representation for the analysis is that postnasal voicing and hardening should not be analysed as the result of segment-internal co-occurrence

restrictions such as *[+nasal, -voiced] or *[+nasal, +continuant], because prenasalised segments are not phonologically single segments represented by one root node. Under our analysis, the preference for the prenasalised voiced segments results from the restrictions on consonant sequencing such as *NÇ (Pater 1995, 1999,2001).

With regard to the nasal deletion pattern, we see that two types of roots surface with the nasal deletion in Kikuyu: θ-initial and h-initial roots.

(3) The nasal deletion pattern

a.	a-θɛk-ɛɛt-ɛ	θɛk-ɛɛt-ɛ	'He/I has/have laughed'
	o-θɛru	θɛru	'brightness-bright'
b.	a-he-st-e	hɛ-ɛt-ɛ	'He/I has/have given'
	ro-hio	hio	'knife-knives'

As [θ] and [h] do not appear to form a natural class, the question is whether the nasal deletion seen in 0-initial and h-initial roots results from one or two separate constraints. We show that the deletion of /N-/ in these two types of roots is not accidental, with the identical pattern following from the claim that /θ/ and /h/ are the only two voiceless continuants in Kikuyu.

3. Analysis

We present the analysis of the prenasalised and nasal deletion patterns in this section. As prenasalisation and nasal deletion are directly responsible for the asymmetric surface distribution of consonants in Kikuyu, we will start with a description of Kikuyu consonant inventory before proceeding to the analysis of the prenasalised and deletion patterns.

3.1. Explaining Kikuyu consonant inventory

Kikuyu has the surface consonant inventory in (4):

(4)

	Lab	Den	Alv	Pal	Vel	Glot
Voiceless		θ	t	C	k	H
Voiced	β, w		r	Y	ɣ	
Prenasalised	mb		nd	ɲj	ŋg	
Nasal	m		n	ɲ	ŋ	

According to (4), Kikuyu has four series of surface consonants. It has five voiceless segments with two stops [t, k], one affricate [c] and two fricatives

[0] and [h]. Kikuyu has 5 voiced consonants: two glides [w, y], one liquid [r] and two fricatives [β, y], which we classify as one natural class characterised by three features: [+voiced], [+continuant] and [+sonorant]. In addition, Kikuyu has four pure nasals and a series of four prenasalised segments.

The classification of [0] and [h] as continuants is not problematic. But the classification of [0] and [h] as voiceless calls for an explanation. Both [0] and [h] are described as having both voiced and voiceless variants according to Barlow (1960: 1-2), Benson (1964: xii), Armstrong (1967: 36-37), and Bennett et. al. (1985: 20-21). We treat [θ] and [h] as voiceless for two reasons. First, voicing is not contrastive in Kikuyu. Kikuyu does not have voiced obstruents. The voiced bilabial and velar fricatives [β] and [y], we argue, are not obstruents, either. The most straightforward contrasts, say, between [b] and [p], between [t] and [d], between [c] and [ɟ] or between [k] and [g] do not exist because Kikuyu does not have [p] and because it does not have [b, d, ɟ, g] independently of the preceding nasal. If we were to analyse [0] and [h] as voiced, we would have to explain why voiceless fricatives do not exist. Second, as we show in section 3.3, /N-/ is routinely elided when it attaches to roots with initial voiceless fricatives in Bantu languages with similar consonant mutation. As /N-/ is deleted in θ-initial and h-initial roots in Kikuyu, the analysis of [0] and [h] as voiceless fricatives brings Kikuyu in line with other Bantu languages.

The classification of [β, y] as sonorants also requires some explanation. There are three reasons for this classification. First, we see in (2b) that they pattern like the sonorants [w, r, y]. Second, the classification of [β, ɣ] as sonorants suggests that postnasal hardening targets only sonorant continuants in Kikuyu. This claim finds support in Bantu languages such as Kinyarwanda. In Kinyarwanda, the bilabial fricative [β] patterns like a sonorant liquid [r] and unlike the voiced obstruent fricative [v] and [z] in undergoing postnasal hardening. Unlike Kikuyu, Kinyarwanda distinguishes voiced from voiceless obstruents. Contrasts between [f] and [v] and [s] and [z] exist in Kinyarwanda. When [β] appears after a nasal, it patterns like [r] in undergoing hardening: /in-βeβa/ → [imbeβa] 'rat', /in-rúurú/ → [índúurú] 'scream', /ni-a-n-βona/ → [náambóna] 'if he sees me', and /n-ri-ii-iib-a/ → [ndiiyiβa] 'I rob myself. It does not pattern like the voiced obstruent fricatives, which remain immune to hardening: e.g. /in-zoka/ → [inzoka] 'snake', /ba-a-n-vug-aga/ → [baámvugaga] 'they were talking about me' (Kimenyi 1979: 17-25). As [β] shares with [v] features such as voicing and continuancy, the way to distinguish [v] from [β] is through the feature [sonorant]. The classification of [β] as sonorant and [v] as an obstruent accounts not only for why [β] patterns like a liquid sonorant [r] but also for why it behaves differently from true obstruents such as [v]. In addition to Kinyarwanda, Tumbuka, a Bantu language spoken in Malawi, reveals identical patterns of postnasal hardening, according to Salting (1990). The

third argument for analysing [β, ɣ] as sonorants comes from the consideration of the gap in the surface consonant inventory of Kikuyu: namely, voiced obstruent segments [b, d, j, g] are not found in any position other than the post-nasal position in Kikuyu. If we classify [β, ɣ] as voiced obstruents, the issue that this classification poses for the analysis is why voiced obstruent segments like [b, d, j, g] are not found in non-postnasal environments. According to the proposed classification, Kikuyu would have voiceless stop obstruents such as [t, k] and voiced fricative obstruents [β, ɣ]. As these segments appear in non-post-nasal positions, we must explain why voiced segments [b, d, j, g] cannot appear in similar environments.

Under our analysis, the explanation of the gap in the surface consonant inventory proceeds as follows. Kikuyu does not distinguish voiced obstruents from voiceless obstruents. It has only voiceless obstruents, which are [t, k, c, **0,** h]. Kikuyu has two types of oral voiced consonants: a) voiced sonorants [β, w, r, y, ɣ] and b) voiced obstruents [b, d, j, g]. As the voiced obstruents [b, d, j, g] appear only in post-nasal position and voiceless obstruents [t, k, c, **0,** h] are never found in this position, obstruent voicing is not contrastive. The absence of the voicing contrast follows from the ranking of two constraints, which we may formulate as: a) *VOICED-OBSTRUENT (*VO) and b) IDENT-IO (voiced) (ID (vc)). In Kikuyu, the anti-voicing *VO outranks the faithfulness constraint ID (vc). This ranking wipes out the voicing contrast and provides an account of the lack of voicing contrast in obstruents.

If voiced obstruents are not permitted by *VO » ID (vc), the questions become: a) how the voiced obstruents [b, d, j, g] emerge on the surface at all and b) why they are restricted to the postnasal setting. Our response, to be developed in section **3.2,** is that *VO, while dominating ID (vc), is outranked by consonant sequencing constraints: sequencing constraints » *VO » ID (vc). These sequencing constraints are responsible for the emergence of the voiced obstruents in postnasal position. In section **3.2,** we will elaborate on what these sequencing constraints are and how they interact with faithfulness constraints to produce the prenasalised segments.

3.2. The two prenasalised patterns

The mapping from the /N-C/ inputs to the prenasalised outputs involves five featural changes, which are illustrated in (5).

(5) The changes to be accounted for in the two prenasalised patterns

a.	Nasal place assimilation:	[ ] → [pl] /N/	→ [m, n, ɲ, ŋ]
b.	Postnasal voicing:	[-vc] → [+vc] /t, c, k/	→ [d, j, g]
c.	Postnasal hardening:	[+ct] → [-ct] /β-w, r, y, ɣ/	→ [b, d, j, g]
d.	De-sonorantisation:	[+sn] → [-sn] /β-w, r, y, ɣ	→ [b, d, j, g]
e.	Consonantisation:	[-cs] → [+cs] /w, y/	→ [b, j]

As (5c) shows, we view the change from the palatal fricative /y/ to a palatal affricate [j] as the result of hardening, involving the change from [+continuant] to [-continuant]. The alternative is to conceive the y→j alternation as an affrication process. The affrication view of the y→j alternation involves the addition of a [-continuant] specification, not a change in the [continuant] specification. The reasons for viewing the y→j change as a hardening process are three-fold. First, apart from the y→j, there is no evidence in support of the affrication view. The changes such as from /β, w/ to [b] or from /r/ to [d] all involve the change from [+continuant] to [-continuant]. If affrication were involved, we would expect /β, w/ to emerge as [bv] in postnasal position, as is the case in other Bantu languages with similar postnasal mutations such as Venda, Yaka and Suku (See i.e. Herbert (1986) and Steriade (1993)). Second, by treating the y→j as a hardening process, we can unify this change with the /β, w/→[b], /r/→[d], and /ɣ/→[g] changes, making possible a unified analysis of postnasal hardening. Lastly, as Kehrein (2002) argues on the basis of a survey of 281 languages, affricates are exclusively stops in so far as matters of phonological contrasts and natural classes are concerned. They are not contour segments made up of [stop] and [continuant]. For these reasons, we treat the y→j alternation as part of postnasal hardening.

Now that we have clarified the changes to be accounted for in the two prenasalised patterns, let's consider the analysis of the five processes in (5). In (6), we lay out the constraints that are responsible for the five featural changes:

(6) Constraints responsible for the changes in (5)

a. Nasal place assimilation: [ ] → [pl]
   i. AG (pl): Adjacent consonants must agree in place.
   ii. ID (pl): Corresponding input and output segments are identical in their place specifications.
   iii. Ranking: AG (pl) » ID (pl)

b. Postnasal voicing: [-vc] → [+vc]
   i. *NÇ (Pater 1995, 1999,2001)
   ii. ID (vc): Corresponding input and output segments are identical in their voicing specifications.
   iii. Ranking: *NÇ » ID (vc)

c. Postnasal hardening: [+ct] → [-ct]
   i. *NF: A nasal must not be followed by a [+continuant] consonant.
   ii. ID (ct): Corresponding input and output segments are identical in their continuant specifications.
   iii. Ranking: *NF » ID (ct)

d. De-sonorantisation: [+sn] → [-sn]
   i. *C/S: If [-continuant], then not [+sonorant]
   ii. ID (sn): Corresponding input and output segments are identical in their sonorant specifications
   iii. Ranking: *C/S » ID (sn)

e. Consonantisation: [-CS] → [+cs]
   i. *C/C: If [-continuant], then not [-consonantal]
   ii. ID (cs): Corresponding input and output segments are identical in their consonantal specifications
   iii. Ranking: *C/C » ID (cs)

In (6a), we analyse nasal place assimilation as the result of the interaction of two constraints: AG (pl) and ID (pl). In Kikuyu, AG (pl) dominates ID (pl), forcing adjacent consonants to agree in place of articulation. According to (6ai), root-initial consonants could in principle assimilate to the place of articulation of the preceding nasal in order to satisfy AG (pl). This option, however, is not available in Kikuyu because /N-/ lacks the place specification. Thus, short of deletion, insertion or fusion, etc., the way to comply with the requirement of AG (pl) is for /N-/ to assimilate to the place of articulation of the root-initial consonant.

We view postnasal voicing as stemming from the domination of *NÇ over ID (vc), as shown in (6b). *NÇ is a markedness constraint that bans nasal-voiceless consonant sequences. It was first proposed by Pater (1995) and followed up in a number of subsequent works including Hayes and Stivers (1995), Pater (1995, 1999, 2001), etc.

Turning now to postnasal hardening, we propose that this process results from the ranking of *NF over ID (ct). Like *NÇ, *NF targets nasal-oral sequences. It prefers nasal-stop or nasal-affricate clusters to nasal-fricative sequences. Like *NÇ, there are various ways such as deletion, fusion, etc. to meet the demands of *NF. Apart from postnasal hardening, languages may opt for consonant epenthesis (English), nasal deletion (Kikuyu in some cases), fusion (Kikuyu, Setswana), etc. to avoid nasal-fricative sequences. *NF unifies these seemingly unrelated outcomes, uncovering their functional unity without dictating a specific outcome.

In addition to nasal place assimilation, postnasal voicing and hardening, we see Kikuyu has de-sonorantisation and consonantisation that transform sonorants into obstruents and glides to non-glides. We analyse these two processes as the results of feature co-occurrence restrictions. Following Archangeli and Pulleyblank (1994), we express these restrictions in terms of implicational statements. We analyse de-sonorantisation as the result of the requirement that if a segment is -continuant, then it is not +sonorant. The only exceptions to this feature co-occurrence restriction are the nasals [m, n, ɲ, ŋ], which are both sonorant and non-continuant. The sonorancy of nasal stops is protected by a high-ranking co-occurrence restriction: If +nasal, then not -sonorant. Under our analysis, consonantisation emerges from the

pressure for [-continuant] segments to be [+consonantal], not [-consonantal] via ***C/C** in (6ei). As glides and vowels are [-consonantal] and [+continuant], ***C/C** is never violated in Kikuyu. Under our analysis, **de-sonorantisation** and consonantisation result from the change from [+continuant] to [-continuant] in a segment. As this continuancy change is driven only by a high-ranking *NF in Kikuyu, the effects of **de-sonorantisation** and consonantisation are restricted to **sonorant** continuants and glides in **postnasal** position.

Now that the constraints responsible for the **featural** changes are clarified, let's consider the ranking of the proposed constraints. In section 3.1, we point out that *VO must dominate ID (vc) because obstruent voicing is not contrastive. But in order for voiced obstruents to emerge in postnasal setting, ***NÇ** must dominate ***VO;** otherwise, voiced obstruents may never surface. This suggests that *VO is sandwiched between higher ranked constraints such as ***NÇ** and the faithfulness constraints such as ID (vc), as shown by the constraint hierarchy in (7).

(7) AG(pl),*NÇ,*NF,*C/C,*C/S » *VO » ID(pl),ID(vc),ID(ct),ID(cs),ID(sn)

To understand the reasons for this constraint hierarchy, consider the two tableaux for /N-tɛ-ɛt-ɛ/ → [ndɛɛtɛ] 'I have thrown away' and /N-yur-i-a/ → [ɲjuria] 'to let me fill'

(8)

a.

/N-tɛ-ɛt-ɛ/	AG (pl)	*N Ç	*V O	ID (pl)	ID (vc)	ID (cs)	ID (sn)
a. mtɛɛ.tɛ	*!	*		*			
b. ntɛɛ.tɛ		*!		*			
☞c. ndɛɛ.tɛ			*	*	*		

b.

/N-yur-i-a/	*N F	*C/ C	*C/ S	*V O	ID (ct)	ID (cs)	ID (sn)
a. ɲyu.ria	*!						
b. ɲyu.ria		*!			*		*
c. ɲju.ria			*!		*	*	
☞d. ɲju.ria				*	*	*	*

The tableau in (8a) provides an example of how root-initial voiceless obstruents emerge as voiced obstruents under the /N-/ prefixation. The pressure for voicing comes from ***NÇ,** which must dominate ***VO,** as shown by the comparison between the (b) and (c) candidates. The tableau in (8b) illustrates how **sonorant** continuants evolve into obstruent stops. The option

for root-initial sonorant continuants to retain their input feature specifications is illustrated in the (a) output. But as the comparison between (a) and the optimal output in (d) shows, this option is ruled out by the ranking of *NF over *VO. To avoid the *NF violation, we must change the input /y/'s continuant specification from [+continuant] to [-continuant]. The three candidates in (b), (c) and (d) contain a palatal segment whose continuant specification has been altered from [+continuant] to [-continuant]. The underlined y in (b) represents a palatal segment whose continuancy specification is altered to [-continuant] but whose specifications for [consonantal] and [sonorant] remain unchanged, that is, [-consonantal] and [+sonorant]. This candidate is eliminated by *C/C. The underlined j in (c) represents an output segment whose specifications for [continuant] and [consonantal] are altered to [-continuant] and [+consonantal] but whose [+sonorant] specification remains intact. This candidate is not optimal if *C/S outranks *VO. These two tableaux demonstrate that *NÇ, *NF, *C/C and *C/S must outrank *VO.

We have demonstrated how output voiced obstruents [b, d, j, g] can evolve from input voiceless obstruents /t, c, k/ and voiced sonorant continuants /β, w, r, y, ɣ/. The pressures come mainly from two sequencing constraints, *NÇ and *NF, which make it impossible for these input segments to remain unchanged if they appear in postnasal position. While postnasal voicing and hardening can produce outputs in compliance with *NÇ and *NF, these are clearly not the only ways to meet the demands of these two constraints. We show next that Kikuyu exploits deletion as a strategy under the pressures of *NÇ and *NF.

33. The nasal deletion pattern and local conjunction

In Kikuyu, the nasal deletion pattern is seen in θ-initial and h-initial roots: e.g. /N-θɛk-ɛɛt-ɛ/ → [θɛk-ɛɛt-ɛ] 'I have laughed' and /N-hɛ-ɛɛt-ɛ/ → [he-et-ɛ] 'I have given'. At first sight, the dental [θ] and the glottal [h] do not appear to form a natural class. The decision to characterise these two segments as a natural class in terms of [-voiced] and [+continuant] is motivated by the Kikuyu data and by the data from the Bantu languages with similar mutation. In Kikuyu, the evidence that these two segments pattern alike comes from consonant mutation where both segments are seen to trigger the elision of /N-/ in (3) and resist fusion in (1d). The anti-fusion pattern show that [θ] and [h] behave like [t, c, k] in resisting fusion, which we take to be evidence they are identical in the [-voiced] specification. We are also aware that the actual anti-fusion outputs of θ-initial and h-initial roots in (Id) are different from t-/c-/k-initial roots in (Id), with the former surfacing with the nasal deletion and the latter with prenasalisation. This output distinction follows in our analysis from the claim that [θ] and [h] are fricatives while [t, c, k] are either stops or affricates.

Apart from Kikuyu consonant mutation, the grouping of [θ] and [h] into one natural class comes from consideration of the data in other Bantu languages. Two types of data bear directly upon our analysis. First, the phenomenon of the nasal deletion in roots with initial voiceless fricatives is widespread in Bantu languages. Some examples are Venda, Yaka, Suku, Bafanji and Gitonga, to name a few. Take Venda for instance. According to Steriade (1993: 415), when /N-/ abuts a voiced fricative such as [z] or [v], the two emerge as a prenasalised affricate: e.g. /N-ziamedzo/ → [ndziamedzo] 'place onto' and /N-vuledzo/ → [mbvuledzo] 'finishing'. But if the root-initial segment is a voiceless fricative such as [s] or [f], /N-/ is elided, leaving an affricate in its wake: e.g. /N-sengo/ → [tsengo] 'court hearing' and /N-fulo/ → [pfulo] 'pasture'. Second, there is evidence from Bantu languages such as Tswana that /h/ can pattern like the voiceless fricatives [s, š] in triggering postnasal hardening/affrication: e.g. /N-hụmisa/ → [ŋkhụmisa] 'enrich me', /N-sixa/ → [ntshixa] 'cut me', and /N-šapa/ → [ntšhapa] 'thrash me' (Dickens 1984: 100). But when /N-/ abuts voiced segments or voiceless stops, the outcomes are different: e.g. /N-bona/ → [mpona] 'see me', /N-luma/ → [ntuma] 'bite me', /N-palamịsa/ → [mpalamịsa] 'give me a lift', and /N-taxịsa/ → [ntaxịsa] 'make me drunk' (Dickens 1984: 100, 102). These two types of data provide support for classifying [θ] and [h] as sharing [-voiced] and [+continuant] and for linking the nasal deletion to their voicing and continuancy status.

Now that the rationales for grouping [θ] and [h] together are clarified, consider the formal mechanism responsible for the deletion of /N-/. As the /N-/ deletion output is optimal in θ-initial and h-initial roots, the anti-deletion MAX-I0 is involved here. Clearly, it can be violated to satisfy higher ranking constraints. The questions are: how MAX-IO is ranked with the rest of the constraints in (7) and whether the ranking of MAX-IO below say, *NÇ and *NF is sufficient to cause deletion. With respect to the firsrt question, the postnasal voicing data suggest that MAX-IO must rank above the anti-voicing constraint *VO. This is demonstrated in the tableau for /N-tɛ-ɛt-ɛ/ → [ndɛɛtɛ] 'I have thrown away'.

(9)

/N-tɛ-ɛt-ɛ/	*NÇ	MAX-IO	*VO	ID (vc)
a. ntɛɛ.tɛ	*!			
b. tɛɛ.tɛ		*!		
☞c. ndɛɛ.tɛ			*	*

The comparison between the nasal deletion candidate in (9b) and the postnasal voicing output in (9c) is crucial here. (9b) violates MAX-I0 while (9c) *VO. Ranking MAX-I0 above *VO correctly predicts that voicing is preferred to deletion in this type of roots.

Regarding the second question, the answer is no. As the tableau in (10) shows, our existing proposal predicts incorrectly that deletion cannot be optimal in θ-initial and h-initial roots, as the tableau for /N-θɛk-ɛɛt-ɛ/ → [θɛ.kɛɛ.tɛ] 'I have laughed' shows.

(10)

/N-θɛk-ɛɛt-ɛ/	*NÇ	*NF	MAX-IO	*VO	ID (vc)	ID (ct)
a. ŋθɛ.kɛɛ.tɛ	*!	*				
☹b. ŋɖɛ.kɛɛ.tɛ				*	*	*
c. θɛ.kɛɛ.tɛ			*!			

The problem lies with the candidate in (10b) in which /θ/ is transformed into a voiced dental stop represented by [ɖ]. The ranking of MAX-I0 above *VO predicts wrongly that this output marked by ☹ is more harmonic than the correct candidate in (10c).

In describing the deletion pattern, the challenge is to explain why [ŋɖ] is less optimal than the deletion of /N-/. Re-ranking MAX-I0 and *VO is not an option, as (9) shows. The alternative is to introduce a constraint that ranks above MAX-I0 and that only (10b) violates. To understand what constraint is needed, the key lies in the recognition that a voiceless fricative must undergo voicing and hardening to become a voiced stop while a voiceless stop or a voiced fricative needs voicing or hardening, but not both. According to our analysis, postnasal voicing and postnasal hardening result from the domination of ID (vc) and ID (ct) by *NÇ and *NF. A prenasalized voiced stop [nd] originating from /N-t/ or /N-r/ violates ID (vc) or ID (ct). In contrast, if a voiceless fricative /N-θ/ is to become a voiced stop [ŋɖ], it must violate both ID (vc) and ID (ct). What distinguishes [ŋɖ] from [nd] is the extent to which these outputs may deviate from their inputs. In Kikuyu, an output may deviate from its input in either the [voice] or [continuant] specification, but not both.

Now that we understand how [ŋɖ] differs from [nd], it is not hard to see why local conjunction is necessary to block [ŋɖ]. Local conjunction is a formal mechanism first introduced in Smolensky (1993) and followed up in a number of subsequent works including Smolensky (1995, 1997), Alderete (1995), Kirchener (1996), It6 and Mester (1998, 2001) and Fukazawa (2001). Local conjunction allows two constraints – say, C_1 and C_2 – to be joined together to form a new constraint, $C_1\&C_2$. $C_1\&C_2$ does not replace either C_1 or C_2. It is an independent constraint, which is ranked separately and violated only if C_1 and C_2 are both violated. It is shown to be necessary to the analyses of a host of phenomena including the chain shift effects in vowel harmony systems (Kirchener 1996), dissimilation (Alderete 1995) and counter-feeding ordering phenomena (It8 and Mester 1998, 2001). It is needed to explain the deletion pattern here.

In Kikuyu, to block [ŋd̪] requires conjoining ID (vc) with ID (ct) to form ID(vc)&ID(ct). As long as this conjoined constraint dominates MAX-IO, the [ŋd̪] output can be eliminated in favor of deleting the nasal as a solution.

(11)

/N-θɛk-ɛɛt-ɛ/	*N Ç	*N F	ID(vc)& ID(ct)	MAX -IO	*V O	ID (vc)	ID (ct)
a. ŋθɛ.kɛɛ.tɛ	*!	*					
b. ŋ̪tɛ.kɛɛ.tɛ	*!						*
c. ŋðɛ.kɛɛ.tɛ		*!				*	
d. ŋd̪ɛ.kɛɛ.tɛ			*!		*	*	*
☞e. θɛ.kɛɛ.tɛ				*!			

Note that the candidate in (11d) is the only one that violates both ID (vc) and ID (ct); therefore, it alone incurs a violation of ID(vc)&ID(ct). Ranking this conjoined constraint above MAX-IO predicts correctly that deletion is preferred in roots with voiceless continuants. Like its non-conjoined counterparts, the function of ID(vc)&ID(ct) is to limit the degree to which an input segment must differ from its output counterpart. But unlike its non-conjoined counterparts, local conjunction of faithfulness constraints makes it possible to describe linguistic phenomena in which only some degree of departure from the input is tolerated.

4. Conclusion

We have shown that the complex patterns of prenasalisation and nasal deletion in Kikuyu can be reduced to a set of independently motivated universal constraints. These constraints are ranked as in (12):

(12) AG(pl), *NÇ, *NF, *C/C, *C/S, ID(vc)&ID(ct) » MAX-IO » *VO » ID(pl), ID(vc), ID(ct), ID(cs) ,ID(sn)

Our analysis reveals postnasal voicing/hardening and nasal deletion as two strategies with one functional objective, namely, to respond to the requirements imposed by *NÇ and *NF. This analysis captures the functional unity of voicing/hardening and nasal deletion. In addition, it succeeds in explaining the asymmetric Kikuyu consonant inventory – that is, the absence of voiced obstruents in non-postnasal position and provides additional motivation for local conjunction, a mechanism that is seen to play an important role in explaining an increasing range of linguistic phenomena.

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On Multiple Wh-Fronting: Wh-Topics and Wh-Foci in Basque*

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1 Introduction

In this paper I will provide a comprehensive analysis of Multiple Wh-Fronting in Basque.[1] More specifically, I will try to find out where Basque fits in the cross-linguistic typology established by Bošković (1999). I will show that Basque is different from Slavic. As shown by Bošković, wh-phrases in Slavic move to the beginning of the sentence only if they are inherently focused. I will show that wh-phrases in Basque front for discourse-related purposes. That is, wh-phrases in Basque front not only for focus but also for topic purposes.

The paper is organized as follows. First, I will introduce Bošković's (1999) theory. Second, I will introduce the data to be accounted for. As shown below, wh-phrases move overtly to the front of the sentence in Basque. Third, I will provide an analysis which will reveal that all wh-fronting in Basque is not the outcome of focus movement. More precisely, I will propose that the wh-phrase immediately adjacent to the verb is focalized while the rest of the fronted wh-phrases are D-linked. Finally, I will offer some concluding remarks.

2 Theoretical Background

2.1 Focus

In a series of papers (Bošković 1997a, 1997c, 1998b, 1999, 2002), Bošković shows that all wh-phrases move to the beginning of the sentence in Serbo-Croatian (SC). In other words, SC is a Multiple Wh-Fronting language. A representative example is given in (1).

(1) Ko šta gdje kupuje?
who what where buys
'Who buys what where?'

When analyzing the driving force behind the movement of wh-phrases in SC, Bošković raises the following question: Are all wh-phrases undergoing wh-movement in SC? As will become clear below, the answer is a negative one. If we were dealing with wh-movement, the movement of one wh-phrase would suffice to check the strong +wh-feature of C. Since all wh-phrases must move overtly in SC (see (2) below), there must be something else motivating the movement of the wh-phrases.

(2) a Ko šta gdje kupuje?
who what where buys
'Who buys what where?'
b. *Ko kupuje šta gdje?
c. *Ko šta kupuje gdje?
d. *Ko gdje kupuje šta?

The next question that arises is the following: What is motivating the movement of SC wh-phrases? Bošković argues that wh-phrases in SC undergo focus movement. The main motivation for this approach comes from Stjepanović (1998). According to her, wh-phrases in SC behave like contrastively focused non-wh-phrases. As we have seen, SC fronts all wh-phrases. It also fronts non-wh-phrases, as shown in (3). (3a) is grammatical because the focused non-wh-phrase Jovan appears in sentence-initial position. If overt movement does not take place, the sentence is ungrammatical, as in (3b) where Jovan appears after the verb *savjetuje*. Based on this evidence, Stjepanović (1998) concludes that wh-phrases in SC are inherently focused and undergo overt movement for focus purposes.

(3) a JOVANA savjetuje
Jovan-ACC advises
'(S)he advises Jovan'
b. *savjetuje JOVANA
advises Jovan-ACC

2.2 Superiority

A curious property of focus fronting in SC is that it does not exhibit Superiority effects. The grammaticality of the examples below shows that wh-phrases are freely ordered in this language:

(4) a Ko je šta kupio?
who is what bought
'Who bought what?'
b. Šta je ko kupio?

Bulgarian, another language Bošković (1999) analyzes in depth, differs from SC in this respect. As shown in (5), Bulgarian conforms to the Superiority Condition.

(5) a Koj kakvo e kupil?
who what is bought
'Who bought what?
b. *Kakvo koj e kupil?

Bošković (1999) accounts for the Bulgarian pattern in the following way. First, he argues that Bulgarian, in contrast to SC, has wh-movement in these constructions. In order to capture this fact, Bošković (1999) adopts the Economy account of Superiority which requires that the +wh-feature of C be checked in the most economical way (i.e. through the shortest movement possible). Under this account, the Nominative wh-phrase *koj* must move to Spec CP before the Accusative wh-phrase kakvo since this is the most economical way to check the strong +wh-feature of C. From the evidence collected so far, it seems that wh-movement is sensitive to Superiority but focus movement is not.

The Bulgarian data raise several questions. If Bulgarian wh-fronting is an instance of wh-movement, why must all wh-phrases obligatorily move to the front of the sentence?

(6) *Koj e kupil kakvo?
who is bought what
'Who bought what?

Bošković (1999) takes this fact as evidence that focus movement is also involved in Bulgarian. More precisely, movement of one wh-phrase should suffice to check the strong +wh-feature of C. Wh-fronting of the remaining wh-phrases is an instance of focus movement This analysis makes a prediction. If wh-movement, which is subject to the Superiority Condition, affects only one wh-phrase, then the movement of the highest wh-phrase would satisfy the requirement that the +wh-feature of C be checked in the most economical way. If focus movement, which is not subject to the Superiority Condition (cf. (4)), is responsible for the fronting of the rest of the wh-phrases, then one would expect these wh-phrases to be freely ordered. The prediction is borne out by the Bulgarian data in (7).

(7) a Koj kogo kakvo e pital?
who whom what is asked
'Who asked whom what?'
b. Koj kakvo kogo e pital?

As the examples above make clear, the Nominative wh-phrase *koj* moves first to check the strong +wh-feature of C. The second and third wh-phrases are freely ordered since they are subject only to focus movement.

Bošković (1999) accounts for these facts by modifying Chomsky's (1995) Attract system. More specifically, Bošković (1999) proposes that the attractor for wh-movement is an Attract-1F head (Attract-1F implies that the formal inadequacy of the attractor is overcome by attracting 1 feature F). This entails that given two potential attractees, the Attract-1F head will always attract the highest wh-phrase. Attract-1F heads give us Superiority effects. In contrast, Bošković (1999) proposes that the attractor for focus movement in an Attract-all-F head (an Attract-all-Fhead is a head that has a formal inadequacy that can only be overcome by attracting all features F). Superiority effects are not expected in this case since the order in which wh-phrases move to the relevant head yield equally economical derivations. To put it clearer, the derivation in which kogo (cf. (7a)) moves first to the attracting head is equally economical as the derivation in which *kakvo* moves first (cf. (7b)). Since the same number of nodes are crossed in both cases to satisfy the relevant Attract-All property, both derivations yield equally economical outputs.

The Bulgarian pattern receives the following analysis in Bošković's (1999) system. According to Bošković (1999), C in Bulgarian has two features: Attract-1F +wh-feature and Attract-all-F +focus feature. Once C enters the derivation, the movement of the highest wh-phrase satisfies the formal inadequacies of C. After the highest wh-phrase moves, the order of movement of the remaining wh-phrases is free since focus movement is not subject to Superiority.

To summarize, wh-movement is subject to Superiority because the relevant head has an Attract-1F feature. Focus movement does not exhibit Superiority effects because focus movement has the Attract-all-F property.

3 Basque

As I explained at the very beginning of the paper, Basque has Multiple Wh-Fronting when it comes to multiple questions. (8a) is a representative example. As shown by the ungrammaticality of (8b), Superiority effects show up in this language.[7]

(8) a Nork zer erosi du?
who-ERG what-ABS buy AUX
'Who bought what?'
b. *Zer nork erosi du?

Now the following questions arise: Do wh-phrases in Basque move for focus purposes? In other words, is Basque similar to Slavic languages such as SC?

Ortiz de Urbina (1999) has extensively argued that wh-fronting in Basque is an instance of focus movement. One of the most important characteristics of focus movement in Basque is that the focused element lands in a position immediately adjacent to the verb. For example, Miren in (9) is the focus of the sentence. Any element preceding the focus functions as a topic in Basque. For example, in (10), the element preceding the verb, that is, Jonek, must be interpreted as the focus of the sentence. Miren in this sentence is separated from the focused Jonek by a pause and receives a topic interpretation.

(9) MIREN ikusi men Jonek.
Miren-ABS see AUX Jon-ERG
'Jon saw MIREN'

(10) Miren JONEK ikusi zuen.
Miren-ABS Jon-ERG see AUX
'As for Miren, JON saw her'

Due to space limitations I cannot go over the arguments proposed in the Basque literature, which indicate that wh-fronting is an instance of focus movement in Basque. For extensive discussion, I refer the reader to Ortiz de Urbina (1999).

4 Multiple Wh-Fronting

According to the Basque literature, wh-fronting in Basque is an instance of focus movement. In this respect, Basque is similar to Slavic. What I'm going to do now is to show that all wh-fronting in Basque is not the outcome of focus movement. In this respect, Basque is going to be very different from Slavic languages. The relevant example is (8a), repeated as (11).

(11) Nork zer erosi du?
who-ERG what-ABS buy AUX
'Who bought what?'

I will propose that in (11) *zer* is focalized and nork functions as a topic. The first part of my proposal is straightforward. As we have seen, those elements to the left of the verb are focalized in Basque. Let us examine the second part of the proposal in more detail. As Ortiz de Urbina (1999) points out, any element preceding a wh-word functions as a topic in Basque. If *liburua* in (12) is undergoing topic movement, it is reasonable to say that *nork* in our example (11) is undergoing the same type of movement.

(12) **Liburua nork** erosi du?
book-ABS who-ERG buy AUX
'As for the book, who bought it?'

In order to support my claims empirically, I will consider **Pesetsky's** (1987) 'the hell' test. As **Pesetsky** (1987) points out, there are elements which are good candidates for "aggressively non-D-linked" wh-phrases. In **an** English example such as **(13b),** there is a conflict between aggressively D-linked ***which*** and aggressively non-D-linked ***the hell.*** The conflict does not arise in **(13a)** since the nature of ***what*** is different from that of ***which.***

(13) a. What the hell book did you read that in?
b.*Which the hell book did you read that in?

To put it clearer, 'the hell' is a wh-modifier which expresses complete ignorance. As den **Dikken** and **Giannakidou** (2001, 2002) indicate, when 'the hell' combines with a wh-word, the speaker does not know what the value of the wh-word will be. Since the range of reference of D-linked wh-phrases is discourse-given, any attempt to attach **an** element which stands for **'non-givenness' (i.e.** 'the hell') to **an** element which is inherently D-linked, will result in **an ungrammatical** sentence (cf. **(13b)). (13a)** is perfectly grammatical because ***what*** is not inherently D-linked and is therefore free to combine with the "aggressively non-D-linked" ***the hell.***

This type of test helps us differentiate between those **wh-phrases** which are D-linked **from** those which are not. Now, I will apply the same line of reasoning to some Basque examples:

(14) *Nor **arraiok zer** erosi du?
who hell-ERG what-ABS buy AUX
'Who the hell bought what?'

(15) Nork zer **arraio** erosi du?
who-ERG what-ABS hell buy **AUX**
'Who bought what the hell?'

In (14) ***nor*** cannot combine with the aggressively non-D-linked ***arraiok*** indicating that ***nork*** is D-linked in this example. In **contras,** ***zer*** in (15) is non-D-linked since it ***can*** combine with ***arraio.***[3]

As **Bošković** (2002) points out, only non-D-linked wh-phrases in Slavic undergo focus **movement.** This is an intuitive correlation since non-D-linked wh-phrases do not refer to previously mentioned or contextually salient referents. Focus movement implies the notion of 'non-given'. Therefore, the semantic nature of non-D-linked wh-phrases allows them to undergo focus

movement With D-linked wh-phrases such as 'which man', the range of felicitous answers is limited by a set of men both speaker and hearer have in mind. The reference of D-linked wh-phrases is discourse given. This 'discourse givenness' property is reminiscent of the notion 'topic'. Topics refer to old, given information, something not new. Based on this intuitive correlation I will claim that being D-linked is equivalent to being topicalized. I am following Grohmann (1998) who claims that D-linking in the minimalist framework correlates with a topic feature. To summarize, ***nork*** is D-linked or topicalized whereas ***zer*** is non-D-linked or focalized.

4.1 Predictions

If ***nork*** is D-linked in (11) and ***zer*** is focalized, then we would expect inherently D-linked wh-phrases to be disallowed in the immediately preverbal position. In contrast, inherently D-linked elements should be allowed in the position ***nork*** occupies in the sentence under discussion The predictions are borne out, as shown below:

(16) ***?Nork** zein liburu **erosi** men?
who-ERG which book-ABS buy AUX
'Who bought which book?'

(17) (?)Zein ikaslek zer irakurri **zuen?**
which student-ERG what-ABS read AUX
'Which student read what?'

(16) shows that inherently D-linked wh-phrases such as ***zein liburu*** are not allowed in the position where focalized elements land. The incompatibility does not arise in (17) because ***zein ikaslek,*** being inherently D-linked, *can* freely land in the position D-linked or topicalized elements move to.

My analysis makes another prediction Sentences such as (18a)-(18b) should be ruled out. In these constructions, elements which cannot receive a D-linked interpretation are placed in the position for D-linked elements (according to Kiss (1993), 'why' and 'how' are such elements). The ungrammaticality of the examples is thus expected under my analysis.

(18) a *Nola zer irakurri **zuen** Jonek?
how what-ABS read AUX Jon-ERG
'How did John read what?'
b. ***Zergatik zer** irakurri **zuen** Jonek?
why what-ABS read AUX Jon-ERG
'Why did Jon read what?'

My analysis makes another prediction: 'why' and 'how' should be able to appear in the preverbal position since this is the position for non-D-linked elements. The prediction is borne out, as shown in (19).

(19) a Nori nola esplikatu dio Jonek ariketa?
who-DAT how explain AUX Jon-ERG exercise
'To whom did Jon explain the exercise how?'
b. Nork zergatik lapurtu ditu bitxiak?
who-ERG why steal AUX jewels-ABS
'Who stole the jewels why?'

4.2 Derivation

There are a number of questions that need to be answered before going into the details of the derivation. The first question I would like to raise is the following: are Topic and Focus licensed in the same projection? At first sight, it seems that they are licensed in different projections. This is so because the Topic-Subject-Verb order is possible (cf. (20)) whereas the order Focus-Subject-Verb is not, as shown in (21) (I assume that the subject is in Spec AgrSP).

(20) Mireni, Jonek muxu bat eman zion
Miren-DAT Jon-ERG kiss one give AUX
'Miren, Jon kissed'

(21) a *MIRENI Jonek eman zion muxu bat
Miren-DAT Jon-ERG give AUX kiss one
'Jon has kissed MIREN'
b. MIRENI eman zion Jonek muxu bat

However, if Topic and Focus land in different projections, why can no material intervene between the two wh-phrases in (22)?

(22) *Nork horretaz/beraz /Joni zer erranen dio?
who-ERG on that/ therefore/Jon-DAT what-ABS say AUX
'Who will say what to John/therefore/on that?'

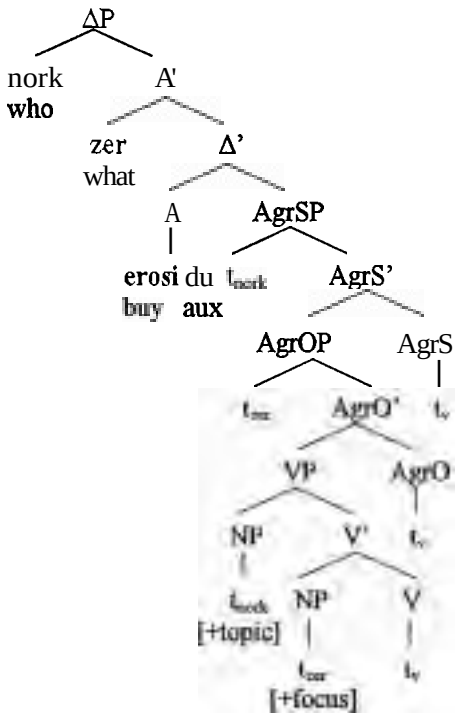
Based on the ungrammaticality of (22), I assume that nork and zer are located in the same projection, with multiple Spec structures.

At this point we are still left with some open questions: which head licenses the two features (i.e. Topic and Focus)? Why is the focused element lower in the structure? In order to answer the first question, we need to bear in mind that the relevant licensing head must license Topic and Focus despite the fact that Topic and Focus convey opposite communicative functions. Uriagereka (1995),

Boeckx & Stjepanović (1999) and Lambova (2001) have already dealt with this issue. Despite the differences, the three accounts basically argue for the presence of a functional projection capable of hosting discourse-related material. If this is possible, then there is no longer a problem in assuming that Topic and Focus can be licensed by the same head Since Topic and Focus are both discourse-related, they can be hosted in the same projection. For the sake of exposition I will assume that both topicalized and focalized elements land in the Spec of AP (Lambova 2001).

The derivation I propose for (11) is as follows (I discuss the exact position of the verb below. At this point I place it in A for ease of exposition):

(23)



Now let's try to answer our second question: why do we always end up with the order Topic Focus? I will follow Lambova (2001) and I will suggest that the focus feature in the wh-phrase is carried by a null affix, which is a verbal affix, and which is attached to the wh-phrase. As a consequence, the wh-phrase must be adjacent to the verb.[4] Relevant examples are given in (24) and (25).

(24) a *MIRENI Jonek eman zion muxu bat
Miren-DAT Jon-ERG give AUX kiss one
'Jon has kissed MIREN'
b. MIRENI eman zion Jonek muxubat

(25) a *Zer Mirenek eman zion Pellori?
what-ABS Miren-ERG give AUX Pello-DAT
'What did Miren give to Pello?'
b. Zer eman zion Mirenek Pellori?

For instance, example (25) is only grammatical when the wh-word is adjacent to the verb. (25a) is ungrammatical because *zer* is not adjacent to the verb *eman zion*. (25b) is the good example where the adjacency requirement is respected. The idea is that the adjacency between Focus and Verb is due to phonological rather than syntactic factors. Syntax can yield the Topic-Focus-Verb order or the Focus-Topic-Verb order. If syntax derives the unacceptable order Focus-Topic-Verb, PF will rule out the derivation since the focus feature in the wh-phrase will fail to attach to its host; namely, the verb.

Let's consider an alternative account for the data. In principle, a syntactic account could account for the data. Under this account, the verb *eman zion* raises to A obligatorily. In (25b), V-to-A has taken place and the sentence is grammatical. However, in (25a), V-to-A has not taken place and therefore the sentence is ruled out. There are additional data that show that the PF account is superior. Let us look again at the following sentences:

(26) Mireni, Jonek muxu bat eman zion
Miren-DAT Jon-ERG kiss one give AUX
'Miren, Jon kissed'

(27) a *MIRENI Jonek eman zion muxu bat
Miren-DAT Jon-ERG give AUX kiss one
'Jon has kissed MIREN'
b. MIRENI eman zion Jonek muxu bat

In (26) we have the topic *Mireni*. In (27) we have exactly the same sentence but this time *MIRENI* is the focus of the sentence. Let's see what the syntactic account has to say with respect to these data. Under the syntactic account, the topic *Mireni* in (26) and the focus *MIRENI* in (27a) are both located in Spec ΔP. Under this account the verb raises obligatorily to A. If we look at (27), we can see that (27b) is grammatical because V-to-A has taken place. (27a) is ungrammatical because the verb has failed to raise all the way to A. Once the verb raises to A, then there is no extra space between the verb and the topic/focus. If this is so, why is (26) grammatical? The topic *Mireni* is located in

Spec AP and the verb is in A Where is the extra material between the topic and the verb located? In conclusion, the verb is not located in A, otherwise (26) should be bad for the same reason that (27a) is bad. The focus-verb adjacency in Basque is not the result of V-to-A movement. The empirical evidence suggests that the adjacency requirement between focus and verb is the result of a PF process.

4.3 Three wh-phrases

In this section I present data with three wh-phrases. These data will give us further evidence for the idea that there is only one focus in Basque. The rest of the wh-phrases are topicalized in this language. In this respect, Basque is different from Slavic, where all wh-phrases move for focus purposes. The relevant example is given in (28). When it comes to Superiority, judgments are unclear and there are several interfering factors with the data. For relevant discussion on this issue, see Reglero (2002).

(28) Nork nori zer esan zion?
who-ERG who-DAT what-ABS say AUX
'Who said what to whom?'

As the data below indicate, the first two wh-phrases are D-linked/topicalized and the wh-phrase adjacent to the verb is focalized. In other words, we get a Topic-Topic-Focus pattern:

(29) *Nor arraiok nori zer esan zion?
who hell-ERG who-DAT what-ABS say AUX
'Who the hell said what to whom?'

(30) *Nork nor arraiori zer esan zion?
who-ERG who hell-DAT what-ABS say AUX
'Who said what to who the hell?'

(31) Nork nori zer arraio esan zion?
who-ERG who-DAT what hell-ABS say AUX
'Who said what the hell to whom?'

As shown in (29), the first wh-phrase, *nor cannot* combine with the aggressively non-D-linked *arraiok*. This indicates that the first wh-phrase is D-linked. In (30) the same happens with the second wh-phrase. Again, the sentence is ungrammatical suggesting that *nori* is D-linked. In contrast, the wh-phrase immediately adjacent to the verb is non-D-linked since it is able to combine with *arraio*. (31) is a grammatical sentence in Basque.

Is there a way to account for the Topic-Topic-Focus pattern in Basque? I will propose that in Basque there is a head with two features: Attract-alldiscourse and Attract-1-Topic. The consequences of this proposal are the following. First, all discourse-related elements are attracted. Furthermore, the highest wh-phrase is attracted first. This analysis gives us the Bulgarian pattern where the first wh-phrase is attracted first and the second and third wh-phrases are freely ordered. This is of course an idealization of judgments. Since the Basque data are not clear at this point, I will assume the Bulgarian pattern to be the representative one until clearer judgments emerge from the Basque data. Under my analysis there is only one focus. This claim follows from the adjacency requirement between the null affix and the verb. This analysis correctly rules out the order Topic-Focus-Focus. In this case the adjacency requirement between the focus feature of the second Focus cannot be satisfied and therefore the resulting sentence is ungrammatical.

5 Conclusions

In conclusion, in this paper I have offered an account of Multiple Wh-Fronting in Basque. We have observed that the wh-phrase closer to the verb is focalized while the remaining wh-phrases are topicalized. In order to account for this pattern I have proposed that in Basque there is a head which has the Attract-all-discourse and Attract-1Topic properties. I have shown that in Basque only one wh-phrase is focalized due to the adjacency requirement of a null verbal affix. Basque is a Multiple Wh-Fronting language which differs from Slavic in that there is only one focus. Let me finish this paper by including Basque in the typology of Multiple Wh-Fronting languages. So far we have languages where all focused elements move. This is Slavic. Now we have a different type of language in which all discourse-related wh-phrases move. As we have seen, Basque is such a language. In Basque wh-phrases front not only for focus but also for topic purposes.

Notes

* My deepest thanks go to my advisor, Željko Bošković. Without his help, this paper would have never been possible. For helpful comments and discussion, I would like to thank Sigrid Beck, Cedric Boeckx, Andrea Calabrese, Kleanthes K. Grohmann, Mariana Lambova, Howard Lasnik, Emma Ticio, Jon Ortiz de Urbina, Chris Wilder and the audience at WECOL 2002. Thanks to my informants: Xabier Artiagoitia, Arantzazu Elordieta, Gorka Elordieta, Ricardo Etxepare, Elena García, Estíbaliz Izagirre, Zurine Lekuona and Itziar San Martin for their comments and for their patience with the judgments.

This research has been funded by a scholarship From the Department of Education, Universities and Research of the Basque Government.

[1] In Basque there is a second strategy to form a multiple question such as 'who bought what?'. As shown in (i), one wh-phrase can front and the other one can remain in situ. In this paper, I will only focus on the Multiple Wh-Fronting strategy. For discussion on (i), see Reglero (2002):

(i) Nork erosi du zer?
who-ERG buy AUX what-ABS
'Who bought what?

[2] There are three main cases in Basque: the ergative *–k*, the absolutive **O**, and the dative *–(r)i*. I will use the following abbreviations: ERG = Ergative, ABS = Absolutive and DAT = Dative.

[3] The exact translation of *arraio* is 'lightning'. I will translate it as 'hell' in the text for ease of exposition

[4] I am assuming the affix hopping analysis of affixation (cf. Chomsky 1957), in which an affix and its host must be linearly adjacent in PF. See in this respect Bobaljik (1995), Halle and Marantz (1993) and Lasnik (1995).

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Bound-Variable Pronouns and the Semantics of Number

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1. Introduction

In sentences like (1a,b) the plural pronoun ***they*** appears to function semantically as a bound variable ranging over singular individuals rather than pluralities.[1] Both sentences are truth-conditionally equivalent to (2a) in which the pronoun is morphologically singular. This suggests that semantically they involve universal quantification over an individual variable, as in the logical representation (2b).

(1) a. All men, think they, are smart.
b. The men, all think they, are smart.
(2) a. Every $\mathbf{man}_1$ thinks he, is smart.
b. $\forall x[\mathbf{man}(x) \rightarrow \mathbf{x}$ thinks $\mathbf{x}$ is smart]

The idea that a plural bound pronoun can represent a singular variable appears to be supported by examples such as (3) and (4a) in which the property predicated of the bound pronoun can only be true of one individual, either because of certain contingent facts (only one candidate can win a presidential election), or for logical reasons (only one person can be the smartest person in the world). Note that the embedded clause of (4a) is odd when used as an independent sentence in which they is not a bound variable, as in (4b).

(3) All candidates thought they could win the presidential election.
(4) a. All men think they are the smartest person in the world.
b. #They are the smartest person in the world.

The conclusion that is commonly drawn from such facts is that plural bound pronouns can be semantically singular, and that the morphological number of a bound pronoun is the result of purely syntactic number agreement of the pronoun with its binder.[2] Although this conclusion seems plausible enough, I will argue that it is in fact incorrect, and that number agreement between a

bound pronoun and its antecedent is a matter of semantics rather than syntax.

One important problem for a purely syntactic account of pronominal number agreement is posed by sentences in which ***they*** is bound by more than one singular antecedent (in such examples I will use a set index like {1,2} to indicate that the semantic value of the pronoun is the plurality consisting of the value of index 1 and the value of index 2):

(5) a. Mary_1 told John_2 that $\text{they}_{\{1,2\}}$ should invest in the stock market.
b. Every woman_1 told $[\text{her}_1 \text{ husband}]_2$ that $\text{they}_{\{1,2\}}$ should invest in the stock market.
c. Every man_1 told [each of his_1 girlfriends]$_2$ that $\text{they}_{\{1,2\}}$ were going to get married.

In (5a) ***they*** has two referential DPs as antecedents, so this example could be regarded as a case of accidental coreference; no such analysis is possible for (5b) and (c), however, in which one or both of the antecedents are quantifiers. A straightforward account of pronominal number based on purely syntactic agreement will fail in such cases, because in fact the bound pronoun "disagrees" in number with both of its antecedents.

2. Morphological Number and Semantic Number

In this paper I will propose a semantic account of pronominal number agreement based on the idea that the morphological number of a DP is transparently reflected in its semantics. In particular I will assume that singular DPs denote individuals, but plural DPs denote sets of individuals. (In the case of quantificational DPs or bound-variable pronouns, "denote" should be read as "quantify over" or "range over", respectively.) Here I am extrapolating from Winter (2001, 2002), who proposes a similar correlation between morphological number and semantic number at the level of predicates, including common nouns. Unlike Winter, however, I will not view the semantic distinction between singular and plural expressions as a difference in semantic type (see also Bennett 1974 and Hoeksema 1983 for earlier type-theoretic treatments of the singular/plural distinction). The problem for a type-based approach to number is that it leads to a rampant multiplication of types for many expressions in the language. Intransitive verbs, for instance, would have to come in two types, $\langle e,t\rangle$ and $\langle et,t\rangle$, depending on whether they take a singular or plural subject. This could be regarded as an advantage in that it would encode subject-verb agreement for number in the semantic type of the verb. Note however that the same multiplication of types would apply to all other argument positions of a verb. Transitive verbs, for instance, would have to have at least four different types ($\langle e,\langle e,t\rangle\rangle$ or $\langle e,\langle et,t\rangle\rangle$ or $\langle et,\langle e,t\rangle\rangle$ or $\langle et,\langle et,t\rangle\rangle$), and there

would be a similar increase in the number of types for other expressions such as adverbs, prepositions, adjectives, etc., none of which is motivated by overtly expressed number agreement.

To avoid this proliferation of types, I will make the **singular/plural** distinction one of sorts rather than types. Entities of type e come in two sorts: singular entities and plural entities, the latter being sets of singular entities. If SG is the set of singular entities, then the set of plural entities, PL, will be defined as the set of all non-empty subsets of SG; that is, PL = $\mathbf{Pow^{+}(SG)} = \mathbf{Pow(SG)} - \{\varnothing\}$. The domain of type e can then be defined as the set of all singular and plural entities; **i.e.** D_e = SG $\cup$ PL. Note that the set of plural entities PL includes singleton sets. This will be crucial for my explanation of why plural **bound-**variable pronouns may appear to be semantically singular.

This proposal avoids the type proliferation problem. Singular **DPs** denote elements of SG, whereas plural **DPs** denote elements of PL. Expressions that take **DPs** as arguments may be sensitive to the distinction between the two sorts (singular verbs, for instance, only take elements of SG as their subject argument, whereas plural verbs only accept elements of PL), or they may be indifferent to this distinction (transitive verbs, for instance, may take elements **from** both SG and PL as their object argument, and similarly for other expressions that do not show number agreement).

3. Plural Quantification

In the approach to the semantics of number just sketched, singular pronouns are treated as variables ranging over individuals (elements of SG), and plural pronouns are variables ranging over sets (elements of PL). But to account for the interpretation of sentences like (1a) we also need a semantics for plural quantifiers such as all men. In this I will again follow **Yoad** Winter's recent work (2001, 2002). There are two basic properties of plural quantification that need to be accounted for. First of all, in sentences with distributive predicates like be at the party, singular and plural quantifiers are equivalent. In (6)-(9) the (a) sentences have the same **truth** conditions as the (b) sentences.

(6) a. All students were at the party.
b. Every student was at the party.

(7) a. No students were at the party.
b. No student was at the party.

(8) a. Many students were at the party.
b. Many a student was at the party.

(9) a. At least two students were at the party.
b. More than one student was at the party.

Secondly, plural quantifiers can take collective predicates, but singular quantifiers can't (Morgan 1985, Winter 2001,2002). By "collective predicates" I mean those predicates which Winter calls "set predicates", such as ***swarm out of the stadium*** or ***meet after the game;*** like Winter, *I* assume that these are predicates which can be true of sets (elements of PL), without being true of any of the members of those sets.[3]

(10) a. All (the) / Many / No students swarmed out of the stadium / met after the game.
b. * Every / Each / Many a / No student swarmed out of the stadium / met after the game.
(11) a. At least two students met after the game.
b. * More than one student met after the game.

Winter proposes a semantics in which singular determiners denote relations between sets, whereas plural determiners denote relations between sets of sets. He points out that there is a systematic relation between the meaning of a plural determiner (Det_{pl}) and that of the corresponding singular determiner of standard generalized quantifier theory (Det_{sg}) which is expressed by the schema in (12).[4]

(12) $Det_{pl}(A, B)$ iff $Det_{sg}(\cup A, \cup(A \cap B))$

Take a sentence with a plural quantifier and a collective predicate such as ***meet.*** (13a) is true iff the condition specified in (13b) holds, where EVERY stands for the subset relation; these truth conditions are paraphrased in (13c).

(13) a. All students met.
b. EVERY($\cup$[[students]], $\cup$([[students]] $\cap$ [[met]]))
c. "Every student is a member of a set of students that met."

To illustrate this, consider a simple scenario in which there are three students, a, b, and c, as well as two non-students, d and e. Suppose furthermore that two meetings took place: a and b met, and separately c, d, and e met. Let's first calculate the first argument of the determiner relation EVERY in (13b). The denotation of the singular noun ***student*** is [[student]] = {a,b,c}. I will assume that a plural noun denotes the set of all non-empty subsets of the denotation of the corresponding singular noun; therefore [[students]] = Pow^{+}([[student]]) = {{a}, {b}, {c}, {a,b}, {a,c}, {b,c}, {a,b,c}}. So $\cup$[[students]] = {a, b, c} = [[student]]. Next, let's turn to the second argument of EVERY in (13b). In the scenario just described [[met]] = {{a,b}, {c,d,e}}. This means that [[students]] $\cap$ [[met]] = {{a,b}}, and therefore $\cup$([[students]] $\cap$ [[met]]) = {a,b}. In this scenario (13a) is false, because it is not the case that every student is a member of a set of students that met. However, in the same scenario the sentence ***Most***

students met will be true, because it is true that a majority of students participated in a student meeting.

Winter shows that with distributive predicates (or, to be more precise, "atom predicates" in his terminology), plural quantification is equivalent to singular quantification. For instance, (14a) and (14b) have the same truth conditions.

(14) a. All students were at the party.
b. Every student was at the party.

To see why this is so, again consider a simple scenario with students a, b, and c; this time, suppose that a, b, and d were at the party (and no one else was). So [[was at the party]] = {a, b, d}. The corresponding plural VP will denote the set of all non-empty subsets of its singular counterpart; that is [[were at the party]] = Pow^{+}([[was at the party]]) = {{a}, {b}, {d}, {a,b}, {a,d}, {b,d}, {a,b,d}}. Now the second argument of the universal quantifier will be $\cup$([[students]] $\cap$ [[were at the party]]) = $\cup${{a), {b}, {a,b}} = {a,b}. This means that (14a) is false, but ***Most students were at the party*** would be true in the same situation.

Winter (2001) adds a condition (the "witness condition") to the effect that for ***All/Most students met*** to be true there must be one meeting which involves all/most students. Although this does seem to be the preferred interpretation for sentences like (13a), this condition is too general, because of examples of plural quantification of the sort discussed by Link (1987) and Roberts (1987a):

(15) a. All competing companies have common interests.
b. Between many houses, there stood a picket fence.
c. Most students wore matching sweaters.

(15a), for instance, does not require that all companies which compete with any other company compete with each other and have common interests (which is what Winter's witness condition would come down to). Examples like (15a-c) seem to involve a partitioning of the set of companies/houses/students which is either induced by a symmetric predicate like ***compete*** or ***between*** in the restriction of the quantifier, or by context (see Roberts 1987a). I believe that the semantics in (12) does give the right truth conditions for (15a-c) as well as for (13a), but that there probably is a pragmatic preference for sentences with plural quantifiers to describe situations in which either the witness condition holds, or there is the kind of partitioning we see in (15a-c). I will leave this as an unresolved issue, and will continue to assume that (12) captures the truth conditions of plural quantifiers.

Above I assumed without argumentation that the denotation of a plural noun such as ***students*** includes not only sets of two or more members, but also singletons. Although this assumption may seem counterintuitive it is in fact necessary to get the right truth conditions for sentences with downward entailing

determiners (Roberts 1991, Schwarzschild 1996, Winter 2001, among others). Consider (16), and suppose that there is exactly one student and that he or she was at the party. If singleton sets were not included in the denotation of plural nouns, ***students*** would denote the empty set, and as a result (16) would come out as true, which surely is an unwanted result. As we will see in the next section the assumption that the range of plural quantifiers includes singleton sets is the key for explaining why ***they*** sometimes seems to behave as if it were a variable ranging over singular individuals.

(16) No students were at the party.

4. Plural Pronouns as Variables Ranging over Sets

Why does ***they*** appear to be an individual variable in sentences like (17)?

(17) All candidates thought they could win the election.

(18) $\cup[[\text{candidates}]] \sqsubseteq \cup([[\text{candidates}]] \cap [[\lambda X[X \text{ thought X could win}]]])$

According to the schema in **(12),** (17) has the truth conditions stated in (18). (As a typographical convention I use upper case letters for plural variables, i.e. variables ranging over sets of individuals.) To take a concrete example, suppose that three candidates ran in the election: Al, George, and Ralph. Furthermore, let's assume that each candidate thought that he could win, but of course no candidate thought that more than one candidate could win. We thus have the following facts: Al thought Al could win; George thought George could win; and Ralph thought Ralph could win; but not: Al and George thought Al and George could win, etc. Let's calculate the truth conditions of (18) in this scenario. $\cup[[\text{candidates}]] = \cup(\text{Pow}^+([[\text{candidate}]])) = [[\text{candidate}]] = \{a, g, r\}$. The denotation of the λ-term $\lambda X[X$ thought X could win] is $\{\{a\}, \{g\}, \{r\})$, because the singleton sets are the only ones of which the open predicate 'X thought X could win' is true. Thus, $\cup([[\text{candidates}]] \cap [[\lambda X[X \text{ thought X could win}]]]) = \cup(\text{Pow}^+([[\text{candidate}]]) \cap [[\lambda X[X \text{ thought X could win}]]]) = \cup\{\{a\}, \{g\}, \{r\}) = \{a, g, r\}$. Therefore, (18) is true. It is easy to see that (17) will in effect be equivalent to ***Every candidate thought he could win the election.***

The analysis can naturally be extended to sentences in which ***they*** is bound by a floated quantifier, such as (19). Following much of the literature (for instance, Roberts 1987a,b) I will assume that there is a silent counterpart to floated ***each*** in the form of a distributivity operator ***Dist*** which accounts for the distributive interpretation of sentences with plural subject. The semantics for the floated quantifier ***each*** and ***all*** as well as the implicit distributivity operator is given in (20). When applied to a VP, *each/all/Dist* first selects all the singleton sets from the denotation of the VP, and then applies closure under union.' The result is the

set of all sets S of individuals such that the property expressed by the VP is true of all singleton subsets of S.[6]

(19) The candidates (each/all/Dist) thought they could win the election.

(20) [[each/all/Dist VP]] = *([[VP]] ∩ SING)
where SING is the set of all singleton sets (i.e. $\{\{x\} \in PL \mid x \in SG\}$)
and * is closure under union.

To get the bound-variable interpretation of the pronoun in (19), the floated quantifier or distributivity operator has to be applied to the predicate obtained by A-abstraction over the variable corresponding to the pronoun (see also Roberts 1987b). In the situation just sketched, the resulting VP denotation will be [[each/all/Dist λX[X thought X could win]]] = *([[λX[X thought X could win]]] ∩ SING) = *{{a}, {g}, {r}} = {{a}, {g}, {r}, {a,g}, {a,r}, {g,r}, {a,g,r}}. Thus, assuming that ***the candidates*** denotes {a,g,r}, (19) will come out as true. Again ***they*** seems to be a variable ranging over individuals but in reality it ranges over sets, including singletons. In this case it is the floated quantifier or distributivity operator that forces the distribution of the predicate down to the singleton sets.

In addition to cases like the ones just discussed, there are also examples in which it is crucial that the plural pronoun ranges not just over singleton sets, but also over non-singleton sets. Consider (21), which is similar to the examples of plural quantification discussed by Link (1987) and Roberts (1987a).

(21) Most people who think they have common interests become friends.

The interpretation of the relative clause is λX[X think X have common interests]. Since the predicate ***have common interests*** can only be true of non-singleton sets, this A-term will denote a set of non-singleton sets.

Although the data in (17), (19), and (21) can be handled elegantly by a unified account which treats all plural bound pronouns as variables ranging over sets, they would also be compatible with an alternative analysis which treats ***they*** as ambiguous between a variable ranging over individuals (for cases like (17) and (19)) and a variable ranging over (non-singleton) pluralities (for examples like (21)). However, this ambiguity analysis would not only be less economical but also empirically untenable, because there are cases in which ***they*** must crucially be able to range over both singleton and non-singleton sets at the same time. Imagine a situation in which a class gets a homework assignment on which the students can work either individually or in groups. Now consider:

(22) None of the students think they can solve the problem.

This sentence should be false if there is one student, say Jane, who works on the assignment individually and who thinks that she by herself can solve the

problem. However, (22) would also be falsified by the existence of a set of students who work together and who believe that collectively they can solve the problem. Note that the truth conditions assigned to the sentence need to exclude both these possibilities at the same time, something which is captured nicely by the account I have proposed. The ambiguity analysis cannot adequately deal with (22). It would have to claim that in the situation where only Jane thinks she can solve the problem (that is, there are no other individual students or groups of students who think they can solve the problem), (22) would be false in one sense (the individual variable reading), but true in another sense (the plural variable reading). But that clearly does not capture the intuition that the sentence is plain and simply false in such a situation. We can conclude, then, that ***they*** is not ambiguous between a semantically singular reading and a semantically plural reading. ***They*** can be said to be "number neutral" in the sense that it ranges over both singleton and non-singleton sets.'

5. Binding by Multiple Antecedents

As pointed out in the introduction, examples such as (5b,c), repeated here as (23a,b), are problematic for any purely syntactic account of pronominal number agreement, because they contain a plural pronoun that is bound by two singular antecedents.

(23) a. Every woman, told [her, husband]$_2$ that they$_{\{1,2\}}$ should invest in the stock market.
b. Every man$_1$ told [each of his, girlfriends]$_2$ that they$_{\{1,2\}}$ were going to get married.

Such cases can be given a semantic treatment by providing an explicit semantics for set indices, which I have used so far only for expository reasons. So let us assume that the index of a plural pronoun can be a set expression such as {1, 2}, where 1 and 2 themselves are simple indices borne by singular DPs. However, at the same time we need to allow for plural pronouns to have a simple index in examples such as (24).

(24) All men$_{\underline{3}}$ think they$_{\underline{3}}$ are smart.

To make the indexing system semantically transparent, I will from now on underline the indices in examples like (24) to indicate that they stand for variables ranging over sets. Three kinds of indices should thus be distinguished:
- simple singular indices (non-underlined integers: 1, 2, 3, ...);
- simple plural indices (underlined integers: $\underline{1}$, $\underline{2}$, $\underline{3}$, ...);
- set indices, which consist of a sequence of simple (singular or plural) indices

that are separated by commas and enclosed in curly brackets { and }.
We can now regard the morphological number of a pronoun as something that is determined by the kind of index it has. Singular pronouns can only bear a simple singular index, while plural pronouns can bear either a simple plural index or a set index. Semantically, we will require that for any assignment g, simple singular index n, and simple plural index m, it be the case that $g(n) \in SG$ and $g(m) \in PL$. Singular pronouns have the usual semantics given in (25) (ignoring gender). The interpretation of plural pronouns with a simple plural index is also straightforward (see (26a)), but that of plural pronouns with a set index is bit more complicated; (26b) is a first attempt, restricted to cases in which the set index has two members, each of which is a simple singular index.

(25) Interpretation of singular pronouns: $[[\text{he/she/it}_n]]^g = g(n)$

(26) Interpretation of plural pronouns

a. with a simple plural index: $[[\text{they}_n]]^g = g(n)$

b. with a set index: $[[\text{they}_{\{n,m\}}]]^g = \{g(n), g(m)\}$ (to be revised)

(26b) has to be generalized in two ways. First, it is possible for a plural pronoun to have three or more singular antecedents, as in (27).

(27) Every woman, asked [one of her, children]$_2$ to tell [her, husband]$_3$ that they$_{\{1,2,3\}}$ should get together.

Secondly, an antecedent of a plural pronoun with multiple antecedents may itself be plural:

(28) Every man$_1$ told [all his, girlfriends]$_2$ that they$_{\{1,2\}}$ were going to get married.

A generalization of (26b) that will deal with such cases is given in (26b').

(26b') Interpretation of a plural pronoun with set index S:
$[[\text{they}_S]]^g = \{d \in SG \mid$ either $d = g(n)$ for some $n \in S$, or $d \in g(m)$ for some $m \in S)$

With this system of indices and their interpretation, there is no need for an additional purely syntactic rule requiring a pronoun to agree in number with its binder, because the relevant cases will automatically be excluded. Take for instance (29a). The quantifier and the pronoun cannot be coindexed, because the quantifier is plural and can therefore only have a simple plural index or a set index, whereas the pronoun is singular and can only have a simple singular index. This leaves only one theoretically possible indexing that needs to be taken into consideration, namely the one given in (29b).

(29) a. All men think he is smart.
b. All $men_{\{1\}}$ think he_1 is smart.

Does (29b) give rise to a bound-variable interpretation? The answer is no. Recall Winter's semantics for plural quantification, according to which a plural determiner denotes a relation between two sets of sets. To get a bound-variable interpretation, the second argument of this relation would have to be obtained by A-abstraction over the individual variable represented by the pronoun ***he.*** This would give us the property denoted by λx[*x* thinks x is smart], which is a set of individuals rather than a set of sets, and can therefore not be the second argument of all. Hence, (29b) is semantically uninterpretable.

It may seem that all cases of binding in which the pronoun and the binder differ in number will similarly be excluded by the proposed account. However, this is not the case, and the type of number "disagreement" that is predicted to occur is actually attested in English.

6. *They* with a Singular Antecedent

In colloquial registers of English, singular quantifiers can bind plural pronouns:

(30) a. %Someone left their coat on the table.
b. %Every student thinks they're smart.

At first sight this might appear to be a major problem for the account of pronominal number agreement I have proposed; however, this phenomenon can actually be accommodated without any adjustments to the analysis, if the plural pronoun is given a singleton set index as in (31).

(31) $Someone_8$ left $their_{\{8\}}$ coat on the table.

Abstracting over the variable with index 8 gives the property λx_8[x_8 left $\{x_8\}$'s coat on the table] to which the singular quantifier ***someone*** can perfectly well be applied. In fact, my account is in danger of being too successful at this point. If plural pronouns can have a singleton set index, then how can cases like (32) and (33) be excluded?

(32) * $John_8$ left $their_{\{8\}}$ coat on the table.
(33) * $They_{\{8\}}$ are sick. (referring deictically to a single person)

Moreover, there are varieties of English in which (30a) and (b) are ungrammatical (and if you think this might be due purely to the influence of

prescriptive grammar, consider the fact that there are languages like Dutch in which the equivalent of (30a,b) is always ungrammatical, no matter how informal the register). Some limits therefore need to be put on the use of singleton set indices. Dialects (or languages) in which sentences like (30a,b) are ungrammatical have a blanket prohibition against plural pronouns with singleton set indices.' (But of course a plural pronoun with a simple plural index must still be allowed to range over singleton sets, as argued in the preceding section.) In varieties which accept (30a,b) but reject (32) and (33), the situation is more complicated. One possible conjecture would be that singleton set indices are allowed for bound-variable pronouns, but not for referential pronouns. However, consider a situation in which several speech samples of three patients known only as A, B and C are analyzed. In such a context, a sentence like (34) would be perfectly natural for many speakers,[9] but this is clearly not a case of a pronoun bound by a quantifier.

(34) Patient A has a lot of pauses in their speech sample.

Another possibility is that *they* can only have a singleton set index if the gender of the individuals involved is unknown. But examples like (35), pointed out to me by Sarah Cummins (p.c.), show that this explanation is not tenable either.

(35) Someone left their jockstrap in the locker room.

What seems to tie cases like (34) and (35) together with bound-variable examples is that there is no single identified referent for the pronoun. Somewhat tentatively I therefore conclude that in dialects in which (30) is grammatical (but (32) and (33) are not), there is a constraint to the effect that a singleton set index is allowed only if the pronoun does not refer to an identified individual.

Notes

[1] My research on number is supported by the Social Sciences and Humanities Research Council of Canada (SSHRC), grant 410-2001-1545. Part of this paper was presented previously at the University of British Columbia (April 12, 2002), and at a meeting of the Canadian Linguistics Association (May 28,2002). For comments and questions, I thank the members of the audience on those occasions as well as at WECOL.

[2] I believe this is often assumed implicitly. Authors who have explicitly made this point include Roberts (1987b), Heim, Lasnik and May (1991), Carpenter (1997), and Beck and Sauerland (2000).

[3] Note however that these predicates may also be true of certain singular entities such as the groups ("impure atoms") denoted by DPs like the *crowd* or the *committee*.

[4] In Winter's account this systematic relation between plural determiners and their singular counterparts is the result of an operation that he calls "determiner fining", but that aspect of his theory is not crucial for our present purposes.

[5] (20) is equivalent to Roberts' semantics for the distributive operator. Thanks to Youri Zabbal for making me aware of that fact.

[6] For simplicity I ignore readings in which all does not distribute all the way down to singletons, but to larger subsets in a contextually determined cover of the subject denotation (Schwarzschild 1996).
[7] This conclusion finds additional support in recent work by Kanazawa (2001) who argues for much the same point on the basis of data involving donkey anaphora. McCawley (1968) has suggested for independent reasons that plural is the unmarked member of the singular-plural opposition.
[8] There may be a plausible explanation for the existence of such a constraint. A plural pronoun with a singleton index is for all intents and purposes equivalent to a singular pronoun with a simple singular index. The constraint may therefore be subsumed under a more general principle which requires linguistic expressions to have the simplest possible semantic type or sort.
[9] Many such examples were attested in an assignment I gave in an introductory linguistics class.

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Toward a Typology of Vowel Height Features

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Distinctive features describe the sub-segmental makeup of speech sounds. Evidence that segments are composed of smaller elements (features) can be found in linguistic phenomena such as consonant mutation, and vowel harmony, disharmony and coalescence. This paper suggests that distinctive features are not founded on notions of articulation or acoustics as the informing components, but rather they are motivated by a more abstract but highly constrained paradigm.

1. Theoretical Background

1.1 Existing Feature models

A goal of feature theory, and for that matter, of linguistics itself, is to offer comprehensive descriptions of linguistic phenomena. In vowel harmony analysis, this entails describing assimilations as the spreading / alignment / Identity" of a single feature or of a natural class of features (Height or Place).

The dominant feature models reference either articulatory or acoustic parameters as the motivation, if you will, for distinctive features. In (1) below are examples of two approaches. The SPE features have survived largely intact from SPE with the exception of [ATR] (see Stewart 1983 et al.) which, though descriptively different, serves the same phonological function as the SPE feature [tense]. Importantly, the entire feature set is based on specific articulatory (phonetic) gestures or locations.

In Element Theory, the primary features **[I,U,A]** reference perceptual (and articulatory) extremes. Unlike the SPE system, Element Theory allows for each of the three features to represent a sound singly as well: **[ɪ,ʊ,a]** respectively.

Both models share one important attribute, however. Because the features are phonetically motivated, a given segment will always have the same featural description regardless of its phonological behavior in a given language. This proves problematic when segments pattern differently in different languages. One example is seen in Basaa (Schlindwein-Schmidt 1996) where the segments /ɛ,ɔ/ function as [+low], while they function as [–low] in others. Another

example of featural ambiguity can be seen in Igbo where the phoneme /ɛ/ patterns as [+ATR] (Anyanwu (1998)).

(1) Phonetically Motivated Feature Systems.

a. SPE Features

	i	ɪ	e	ɛ	a	ɔ	o	ʊ	u
high	+	+	–	–	–	–	–	+	+
low	–	–	–	–	+	–	–	–	–
ATR	+	–	+	–	–	–	+	–	+
back	–	–	–	–	+	+	+	+	+
round	–	–	–	–	–	+	+	+	+

b. Element Theory[iii]

i [I]	ɪ [I]
e [A,I]	ɛ [A,I]
	a [A]
o [A,U]	ɔ [A,U]
u [U]	ʊ [U]

To account for cross-linguistic variation and anomalies, linguists have employed secondary strategies such as cleanup rules (Calabrese 1986, Chumbow 1982, Cahill & Parkinson 1997, et al.) and, with the advent of constraint–based approaches, feature co-occurrence constraints (Pulleyblank (1994), Beckman (1997), et al.).

However, it is possible that co-occurrence constraints are not reflections of universal grammar, but of the inability of phonetically based features to accurately account for or predict robust cross-linguistic phenomena without recourse to self-modification. In fact, one could argue that, the more frequent the occurrence of a given co-occurrence constraint,.the more inaccurate the feature combination. Further, the formalism of a feature cooccurrence constraint suffers the same unconstrained, and thus, unexplanatory weakness as rule based approaches. That is, the formalism of *[+RO,+LO] allows equally for a constraint such as *[-RO,+LO]. The most telling evidence against phonetically based features, however, occurs in chain shift systems, which I examine in the next section.

1.2 Height harmony types: scalar vs. non-scalar

Height harmony systems can be divided into two types: scalar and non-scalar. Scalar systems (also called chain-shift or degree-raising (or lowering) systems) are ones in which vowels will raise or lower one step along the phonetic continuum in the inventory of the ianguage. This phenomenon is perhaps most robust in Bantu languages: Nzebi, (Clements 1991), Esimbi (Clements 1991, Hyman 1988), and Basaa (Schlindwein-Schmidt 1996) but it also occurs in dialects of Arabic (Kirchner 1996). Significantly, phonetically motivated features such as in the SPE system and in Element Theory are inadequate for describing scalar harmony in any unified manner. An example of this

inadequacy can be seen in Nzebi. It has a seven-vowel inventory: /i,e,ɛ,a,ɔ,o,u/. When the tense marker /-i/ is added, the root vowel will raise one degree in height. Data are from Clements (1991:48).

(2) Nzebi Harmony with SPE Features

	Root	PR	Gloss	Raising	Feature Change
a.	-sal-	-sɛl-i	'work'	a → ɛ	[+low] → [–low]
b.	-ɓɔd-	-tood-i	'arrive'	ɔ → o	[–ATR] → [+ATR]
c.	-suɛm-	-suem-i	'hide self	ɛ → e	[–ATR] → [+ATR]
d.	-kolən-	-kulin-i	'go down'	o → u	[–high] → [+high]
e.	-bet-	-bit-i	'carry'	e → i	[–high] → [+high]

As (2) exemplifies, SPE features cannot account for vowel raising in Nzebi in any unified manner. However, when viewed at the segmental level, Nzebi harmony is a simple, straightforward process.

A major breakthrough in feature theory came in Clements (1991). To account for chain-shift systems like Nzebi, Clements (1991) presents the Aperture Node model in which the height component is viewed as a continuum. The grammar stratifies this continuum, and vowel heights are delineated by degrees of openness. The Aperture Node model allows for cross-linguistic variability – the number of heights is determined, in part at least, by the size of the phonemic inventory. Nzebi vowels as delimited by the Aperture Node model are presented in (3) below.

(3) Nzebi Vowels / Aperture Node Model Clements (1991)

a. Heights
Height 4: i,u
Height 3: e,o
Height 2: ɛ,ɔ
Height 1: a

b. Scalar Features

	i,u	e,o	ɛ,ɔ	a
open1	–	–	–	+
open2	–	–	+	+
open3	–	+	+	+

c. Underspecified

	i,u	e,o	ɛ,ɔ	a
open1	–	–	–	+
open2	–	–	+	
open3	–	+		

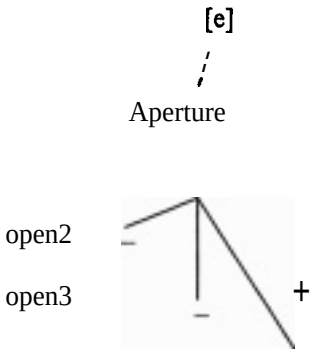
Notice in (3b) that, if a segment is [+open] on a given tier, it will be [+open] on all higher numbered tiers. Clements (1991:41) accounts for this with Redundancy Rules wherein ... "[+open1] entails both [+open2] and [+open3]." The Redundancy Rules allow for the underspecified representation in (3c). Harmony in Nzebi, then, is the spreading of [-open] to an appropriate tier such that a well-formed set of features obtains. Because this paper focuses on non-scalar systems, and for the sake of space, I do not offer a detailed description here. See Clements (1991:48) for a complete explication of this approach..

The features themselves are independent of each other, and, in a feature geometry format, would be individually linked to a superordinate Aperture node (analogous to Vowel Height in Odden (1991)) as in (4a) below.

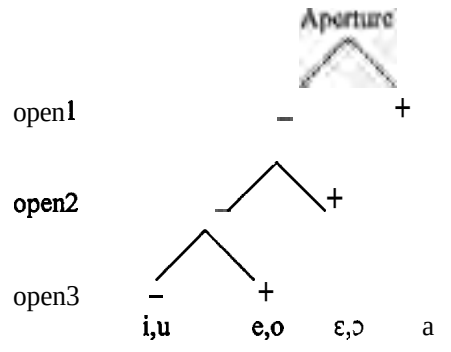
A more significant implication of the model is seen in (4b). Clements (1991:39) proposes a hierarchy of registers which divide and subdivide "an abstract phonological space." The principle notion here is that the phonology accesses a simple paradigm that is not motivated by articulation or acoustics, but which is nonetheless bound by phonetic parameters. The vowels of Nzebi are given in (4b) to exemplify this idea.

(4) Nzebi Vowels II

a. Feature Geometry



b. Register Hierarchy



The association lines in the paradigm in (4b) are not to be confused with association lines in feature geometry (4a). In the representation in (4b), the association lines delineate the organization of the phonological paradigm, but are not exhaustive. In other words, spreading of a higher node does not imply concomitant spread of any subordinate node. The association lines offer, if you will, a view of the parameters that the phonology uses to define vowel height.

It is the notions put forth in the register hierarchy that I will explore and expand on in this paper. In the next section, Iwill investigate a harmony system that is not scalar in nature. I will offer an alternate analysis based on a fundamentally different paradigm which utilizes the notions put forth in the Aperture Node model: that the phonology accesses a simple hierarchy of branching nodes as the organizational template for vowel height.

2. KiNande – Non-Scalar Harmony

KiNande is a Bantu language spoken in eastern Zaire. Unlike Nzebi, and like most height harmony languages, KiNande vowel harmony is not scalar. Rather, there appear to be two separate registers of height and the harmony accesses one or the other of these registers. It has seven phonemic vowels: /i ɪ ɛ a ɔ ʊ u/. In addition, the vowels [e,o][iv] will occur as the result of harmony.

(5) KiNande Data (Mutaka 1995)

ROOT	GLOSS	INFINITIVE	APPLICATIVE	CAUSATIVE
		eri- / ɛrɪ-	-ɪr- / -ɛr-	-ɪs-i- / -ɛs-i-
a. lim	'exterminate'	eri-lim-a	eri-lim-ira	eri-lim-is-i-a
b. huk	'cook'	eri-huk-a		eri-huk-is-i-a
c. hm	'work'	ɛrí-lɪm-a	ɛrí-lɪm-ɪr-a	eri-lim-is-j-a
d. tʊm	'send'	ɛrí-tʊm-a	ɛrí-tʊm-ɪr-a	eri-tum-is-i-a
e. hat	'peel'	ɛrí-hat-a	ɛrí-hat-ɪr-a	eri-hat-is-i-a
ROOT MID VOWELS 'LOWER' SUFF. V TO MID VOWEL				
f. hek	'carry'	ɛrí-hɛk-a	ɛrí-hɛk-ɛr-a	eri-hek-es-i-a
g. lɔg	'bewitch'	ɛrí-lɔg-a	ɛrí-lɔg-ɛr-a	eri-log-es-i-a

There are two separate harmony processes above. One common to Bantu languages can be seen in the Applicative and Causative suffixes in items (5f,g). When the root contains a mid vowel ([-hi]), the suffix will also surface with a mid vowel. The other harmony is defined by Mutaka (1995) and Hyman (1989) as [ATR] harmony. It can be seen in (5a,b) where both the Infinitive prefix and the Applicative suffix will surface as [+ATR] when attached to a [+ATR] root. In addition, the second element of the Causative suffix /-i-/ is pre-specified for [+ATR] and will spread it to all segments in the word. This is how the surface [e,o] occur in (5f,g) Causatives.

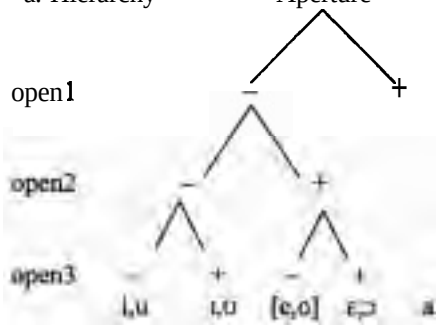
Using SPE features, the two types of harmony in KiNande described above can be described as the spreading of [–high] and [+ATR] respectively, and this is how Mutaka (1995) and Hyman (1989) treat it.

Based on the inability of SPE to describe scalar systems, and attempting a unified theory, Clements (1991:58) offers an alternate analysis of KiNande by positing the notion of subregisters within the framework of the Aperture Node model. In this analysis, vowel height is still viewed as a continuum with one point along that continuum subdivided. The inventory for KiNande following Clements (1991) is given in (6) below.

One can see in (6b) that, to account for the non-scalar nature of KiNande harmony, the specifications for **[e,o]** must violate Clements' Redundancy Rules (§1.2 above). An argument for modifying the system rather than positing a different paradigm is that the languages (Nzebi and KiNande), both being Bantu, are related and should therefore access the same paradigm at some level. I suggest that the configuration in (6) is suboptimal for several reasons. First, allowing violability of the Redundancy Rules undermines the highly constrained, and thus explanatory power of the Aperture Node model in its strictest interpretation (as in the Nzebi case). That power is further weakened by the fact that the subregister can theoretically be placed at any point along the continuum. A preferable paradigm would be one that was as equally constrained as the Aperture Node model and could account for all non-scalar harmony patterns.

(6) KiNande inventory: Aperture Node model

a. Hierarchy



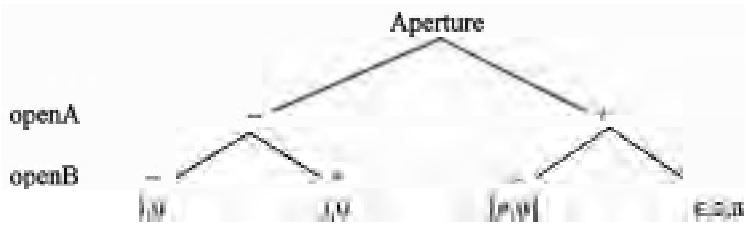
b. Features

	i,u	ɪ,ʊ	[e,o]	ɛ,ɔ	a
open1	–	–	–	–	+
open2	–	–	+	+	+
open3	–	+	–	+	+

It is here that I offer an alternate approach for non-scalar harmony systems. This approach borrows heavily from notions put forth in Clements (1991). Primarily, features are derived from an abstract, phonological paradigm that is not motivated by, but which is nonetheless highly bound by phonetics. Also, vowel heights are defined and delineated by registers hierarchically linked by non-exhaustive association lines. That said, I propose that, in non-scalar harmony systems, the phonology initially divides the vowel height continuum along a centerline determined in part by the language-specific inventory. The phonology then subdivides each 'half, given a total of four and only four possible heights. I also adopt the feature [open] from Clements **(1991),** but rather than delineating tiers with numbers ([openl], **[open2],** etc.), I distinguish registers with letters, the primary register being **[openA]** with **[openB]** defining the secondary register, or subdivision. The vowel inventory of KiNande is defined as in (7).

As with the hierarchy for **Nzebi** in (4b) above, the Nested Subregister model arrays the vowel **from** highest to lowest, left to right. Also following the Aperture Node model, the features of the Nested Subregister model are autosegmental, and in a feature geometry milieu would be independently linked to a superordinate Aperture or Vowel Height node. The **featural** specifications for KiNande vowels of are **as** in (8).

(7) KiNande Vowels with Nested Subregister Model



(8) **KiNande** Height Features

	i,u	ɪ,ʊ	[e,o]	ɛ,ɔ,a
openA	–	–	+	+
openB	–	+	–	+

With the above specifications, **KiNande** vowel harmony processes can be described **as** follows: Raising harmony: ***spread/align/Ident [–openB].*** Lowering harmony: ***spread/align/Ident [+openA].*** In the Nested Subregister (hereafter NS) analysis of KiNande, the feature **[openA]** is analogous to [high] and **[openB]** is analogous to [ATR]. Significantly, there is nothing in the NS approach analogous to [low].

The Nested Subregister model implies four possible heights as a universal. In KiNande, **harmony** creates a feature combination unattested in the segmental inventory, but predicted **as** a possible combination given the hierarchy and features. The compensating strategy employed by KiNande is to allow for "new" segments **([e,o]) as** defined by post-harmony feature combinations. This issue is explored **further** in §5 below.

3. Italian

In this section I examine the typological variation of vowel harmony in Italian dialects and suggest that the variation is of the same type **'as** found in Bantu. That is, some. languages exhibit scalar (chain-shift) harmony, while others exhibit harmony better described with the Nested Subregister model. I **further** suggest that the Italian typological variations can best be accounted for with the

two paradigms presented in the previous section. In both languages, harmony is triggered by the presence of a word final high vowel /i,u/.

3.1 **Italian scalar** harmony

The scalar form of harmony is referred to as ***Arpinate*** harmony in **Kaze** (1991). As with Nzebi, vowels raise one degree in height along the height continuum. Data from Servigliano are given in (9) below.

(9) Arpinate metaphony in Servigliano **(Kaze 1991)**[v]

		Gloss		Gloss	Change	
a.	**metto**	'I put'	**mitti**	'you put'	e ↔ i	[*high]
	kwesto	**'this'(n.)**	**kwistu**	**'this'(m.)**	e ↔ i	[*high]
b.	fjore	'flower'	fjuri	'flowers'	o ↔ u	**[±high]**
	sposa	'wife'	**spusu**	'husband'	o ↔ u	**[±high]**
c.	modesta	**'modest'(f.)**	modestu	**'modest'(m.)**	ɛ ↔ e	**[±ATR]**
	predoko	'I preach'	**prediki**	'you preach'	ɛ ↔ e	**[±ATR]**
d.	**mɔre**	'he dies'	mori	'you die'	ɔ ↔ o	**[±ATR]**
	mɔša	**'depressed'(f.)**	**mošu**	**'depressed'(m.)**	ɔ ↔ o	**[±ATR]**

When harmony in **Servigliano** is viewed at the segmental level, it is a simple process – segments raise one degree in height along the height continuum. But as can be seen in the rightmost column, harmony cannot be described as a unified process using SPE features. However, it can be described in a straightforward manner using the Aperture Node in Clements (1991). The analysis of Servigliano metaphony would be identical to that for Nzebi with the exception that /a/ does not participate. It is suggested that /a/ does not participate due to its marked Place (Color) rather than its lowness (Height). (See Salting **(1998a,b,** 2002) and **Riggle** (1999) for further discussion.)

3.2 Italian non-scalar harmony

The other type of Italian metaphony – ***Napoletano*** – exhibits a different pattern with mid-lax roots. In these dialects, a surface diphthong obtains. The first segment of the diphthong contains the harmonizing feature (here, SPE [+high]) in a segment that agrees with the target in Color, but in other height features ([ATR]) describes a phoneme. The second segment contains the [ATR] specification of the target with a default Color ([-bk, **-rd]**) and a specification for [hi] resulting in a phonemic segment.

(10) Napoletano metaphony in Northern Salentino (Calabrese 1986).

a. Tense Vowels

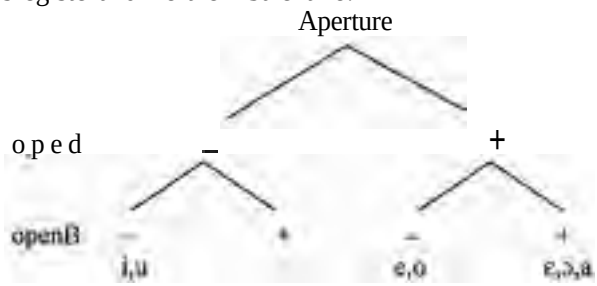
	Gloss		Gloss	Change
frédda	**'cold'(f)**	**fríddu**	**'cold'(m)**	**é ⟷ í [*high]**
pilósa	'hairy'(f)	**pilúsu**	**'hairy'(m)**	**6 → ú [*high]**
carósa	'young'(f)	**carúsu**	**'young'(m)**	**6 → ú [*high]**

b. **Lax** Vowels

	Gloss		Gloss	Change
lénta	**'slow'(f)**	**liéntu**	**'slow'(m)**	**é +if**
bɔ̃na	'good'(f)	buɛ̃nu	'good'(m)	ɔ → uɛ
mɔrta	'dead'(f)	muɛrtu	'dead'(m)	ɔ → uɛ

The data in **(10a),** given the phonemic inventory of Northern Salentino, could be viewed as either [+hi] harmony, or as scalar raising. However, were metaphony in Northern Salentino a case of scalar harmony, one would expect to see /ɛ,ɔ/ surfacing **as [e,o]** respectively in **(10b).** Both sets of harmony in (10) could be analyzed **as** the spread of SPE [+hi], but I discount SPE features based on evidence from scalar systems. I suggest that harmony in Northern Salentino is best analyzed using the same paradigm as that for **KiNande.** The phonological array of the phonemic inventory of Northern Salentino is given in (11). Harmony is the spread of **[–openA]:**

(11) Nested Subregister and Northern Salentino.



(12) Northern Salentino Height Features.

	i,u		**e,o**	**ɛ,ɔ,a**
o p e d	–	–	+	+
openB	–	+	–	+

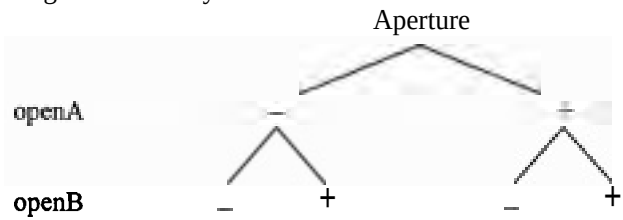
Harmony in Northern Salentino is similar to that in KiNande in that harmony creates a **featural** combination for which the inventory contains no segment, and that the language adopts a compensating strategy to address this combination.

Northern Salentino differs from KiNande in that, whereas KiNande allows for the creation of new segments as a product of harmony, Northern Salentino forces epenthesis, allowing the product of the harmony to maintain its [openA] status and also allowing the product to contain the assimilated feature [+openB]. The need for these strategies is predicted by the Nested Subregister hierarchy. As we will see in §4 below, the hierarchy in the Nested Subregister model can predict languages that will employ a compensating strategy.

4. Other Languages

In (13) below is a list of languages that exhibit non-scalar height harmony.

(13) Nested Subregister Hierarchy



5	**ChiChewa,** Luganda	i,u		e,o	a
5	Shona, **Thumbuka**	i,u		e,o	a
6	Obolo	i,u		e,o	a,ɔ
7	**KiNande**	i,u	ɪ,ʊ		ɛ,ɔ,a
7	N. Salentino	i,u		e,o	ɛ,ɔ,a
7	Lucanian	i,u		e,o	ɛ,ɔ,a
7	**Yoruba**	i,u		e,o	ɛ,ɔ,a
7	KiKuyu	i,u		e,o	ɛ,ɔ,a
7	**Braz.** Port.	i,u		e,o	ɛ,ɔ,a
7	**Khalkha** Mong.	i,u	ʊ	e,ɵ	a,ɔ
7	Ogori	i,u	ɛ,o	ɛ,ɔ	a
8	Igbo	i,u	ɪ,ʊ	ɛ,o	a,ɔ
8	**Wolof**	i,u		e,o,ə	ɛ,ɔ,a
9	**Maasai,** Turkana	i,u	ɪ,ʊ	e,o	ɛ,ɔ,a
9	Okpe	i,u	ɪ,ʊ	ɛ,o	ɛ,ɔ,a
9	Kɔnni	i,u	ɪ,ʊ	e,o	ɛ,ɔ,a
10	**Akan**	i,u	ɪ,ʊ	e,o,ə	ɛ,ɔ,a
10	Igede	i,u	ɪ,ʊ	e,o,ə	ɛ,ɔ,a
12	Lhasa Tibetan	i,u,ü	ɪ,ʊ,i	e,o,ö	ɛ,ɔ,a

The languages in (13) are arrayed in order of the number of phonemic segments in their inventory. In all cases, the Nested Subregister model has been able to account for harmony in these languages, and frequently, without recourse to cleanup rules or feature co-occurrence constraints necessitated by other feature systems.

The remainder of this paper will focus on inventory size and its implications for harmony and compensating strategies. In languages with smaller inventories, one might expect that there is a concomitant lower number of features operative, and thus little or no need for compensating strategies. That is, the active features in such a language would be unlikely to create an unattested feature combination. Specifically, in the 5-vowel Bantu languages listed below, [ATR] ([openB]) does not operate, eliminating the potential for a feature combination that would define the empty slot. This is indeed what we find in the 5-vowel inventories in (13). Conversely, in larger inventories, all possible feature combinations have corresponding segments, eliminating any need for compensating strategies. That is, any feature combination resulting from harmony will have a corresponding segment in the inventory, and this is what we find in the languages with 9-12 segments.

It is in the 7-8 vowel inventories that harmony can reference enough features to create a feature combination unattested in the phonemic inventory – a feature combination predicted by the hierarchy in the Nested Subregister model. That is, the feature combination created by harmony describes an unoccupied node in the hierarchy. And it is precisely in these languages that we encounter a variety of compensating strategies. In (14) I explicate the compensating strategies employed by the 7-8 vowel languages.

(14) Compensating Strategies for 7-8 vowel inventories.

a. OPACITY: Harmony does not apply and does not proceed to subsequent eligible segments. *Yoruba* (Archangeli & Pulleyblank 1994), *KiKuyu* (Peng 2000) /i,u/ block harmony in both cases.

b. TRANSPARENCY: Harmony does not apply but proceeds to subsequent eligible segments. *Wolof* (Ka 1993: 26). /i,u/

c. NEW SEGMENT: Harmony applies and new (non-phonemic) segments obtain. *KiNande* (Mutaka (1995) et al., §2 above). [e,o]

d. ADDITIONAL FEATURE CHANGE (CLEANUP): Harmony applies and triggers additional feature change so that output segment is a member of the phonemic inventory. ***Lucanian*** (Calabrese 1986: 89). (spread [+hi] to /e/ → [i]) ***Brazilian Portuguese*** (Wetzels 1995) (spread [-ATR] to /i/ → [ɛ].

e. EPENTHESIS: Harmony applies forcing epenthetic segment which contains the harmonizing feature. The epenthetic segment will be specified for its other features so as to be a member of the phonemic inventory. Northern *Salentino*. (Calabrese 1987: 81), §3.2 above)

In the above cases, analysis with the Nested Subregister model parallels analysis with SPE features in that the features [openA] and [openB] are analogous to [high] and [ATR] respectively. Were that always the case, it would be simple to eliminate [low] from the retinue of features and be done with it. However, harmony in Ogori and Igbo represent potential evidence that features are truly abstract and derived from a paradigmatic subdivision of the segmental inventory as presented with the Nested Subregister model. In Igbo, the phoneme /ɛ/ functions as [+ATR] (Anyanwu 1998, Salting 2002) resulting in a phonologically symmetrical distribution of segments. In Ogori, the inventory is arrayed so as to utilize the available phonological categories (Churnbow 1987, Salting 1998a,b). In both cases, harmony can be accounted for in a straightforward manner by superimposing a hierarchical template (the Nested Subregister model in these cases) onto the segmental inventory.

5. Conclusion

This paper offers evidence that, for vowel harmony, languages have access to one of two possible paradigms in the phonology of UG. Those paradigms are the scalar hierarchy of the Aperture Node model, and the bifurcating hierarchy of the Nested Subregister model. When one of these paradigms is employed, typological variation in harmony systems can be accounted for without recourse to theory self-modification such as feature co-occurrence constraints. Further, the *idée fixe* of four heights in the Nested Subregister model accurately predicts which languages will employ compensating strategies – strategies necessitated when harmony creates a feature combination that defines an empty slot in the hierarchy. An unexpected by-product of this approach is that closely related languages (Bantu languages and dialects of Italian) vary as to which paradigm they access. The universal they all access is a branching hierarchy.

The ability of the Aperture Node model to describe and explain chain-shift harmony systems, in concert with the ability of the Nested Subregister model to account for non-scalar systems gives strong evidence that phonological features are not primarily informed by universal phonetic events, but by the superimposing of a simple and constrained paradigm across "an abstract phonological space" (Clements 1991: 39) onto the segmental inventory.

Notes

[i] Portions of this paper appear in Salting (2002a) I am very grateful to Asaf Bachrach, Nick Clements, Alex Dimitriadis, Larry Hyman, Victor Manfredi, Lutz Marten, Fiona McLaughlin, Nina Pawlak, Bruce Peng and Doug Pulleyblank for comments and feedback. Any errors are mine. This gaper is dedicated to Britt Finley.

[ii] In this paper I will remain agnostic as to the mechanism of feature change. The focus here is on the featural description of the change. For the sake of consistency only, I will describe harmony as feature spreading unless otherwise stipulated.

[iii] From Polgárdi (1998). For variations on this model, see Hams & Lindsey (1995,2000) and Backley (1997,1998).

[iv] Hyman (1989:5) points out that /a/ can also participate in [ATR] harmony in KiNande, but that its surface form is phonetically indistinguishable from /a/ except in long form such as /o-mu-kaːli/ → [o-mu-kʌ:li] 'woman'. This does not affect our analysis, and it will not be included for the sake of space.

[v] Data from Camilli (1929). See also Walker (2000). For a similar pattern see also Southern Umbro in Calabrese (1986:87).

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The Structure of Clefts in Straits Salish

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1. Introduction'

In this paper I develop a formal analysis of clefts in Straits Salish. I claim that an analysis in the spirit of Percus' (1997) and Hedberg's (2000) treatment of English clefts can successfully be extended to Straits. I posit a covert pronominal ***pro*** in subject position, analogous to English it, which forms a discontinuous definite description with the extraposed cleft clause. The subject ***pro*** is linked to the cleftee object by the predicate ***nił*** which essentially functions as an identificational copula. This proposal and supporting evidence is presented in Part 2. In Part 3, I address the proper treatment of "bare clefts", used for nominal predication (3.1) and also the treatment of wh-clefts (3.2). In Part 4 I review Jelinek's (1998) analysis of clefting and predicate raising in Straits, and reject it in favour of my own proposal.

2. Data and Analysis

2.1 Data

A cleft is formed in Straits by using the predicate ***nił***, followed by the clefted DP and the cleft clause.

(1)	**nił**	kʷa?aE	kʷsa Jill	[xíč'-t kʷsa Richard]
	nił	evid	det Jill	scratch-tr det Richard
	I *guess it was Jill that scratched Richard*			

In this construction, *nił* appears sentence initially in the canonical predicate position in this VSO language, strongly suggesting that it is functioning as the main predicate in this construction.[2] As seen in the example in **(1),** ***nił*** can be separated from the clefted DP by second position clitics (in this example kʷa?aE). The clefted constituent and cleft clause have the same surface form of

a headed relative clause: that is, it is formed by a [determiner + the nominal head + the relative clause] (2).

(2) ʔəw̓ χč-i-t san kʷsa swəy̓qəʔ [t̓ə́m̓-ət tsa pus]
lnk know-prs-tr 1s.sbj det man hit-tr det cat
I know the man who hit the cat. *Saanich: Montler 1993: 257 (60)*

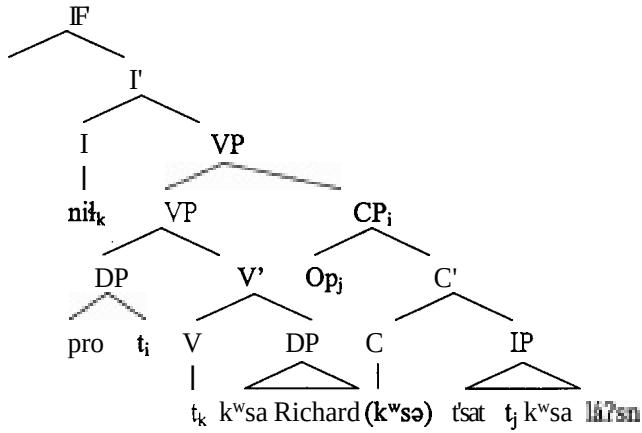
In this paper I will not address the range of extraction possibilities or issues surrounding subordinate inflection, but rather will focus on the syntactic relationship between the elements within the matrix clause. That is, the relationship between "*nił* + clefted DP + [cleft clause]". [3]

2.2 Analysis

I am proposing the structure in (3) for clefts.[4]

(3) a. nił kʷsa Richard[kʷsa t̓s-at kʷsa ƛ̓ʔsn]
cop det Richard DIC break-tr det plate
It's Richard that broke *a plate.*

b.



My analysis of clefts draws on the key insights of Percus (1997) and Hedberg (2000). My claim is that there is a covert pronominal pro present in subject position, corresponding to English it, which forms a discontinuous definite description with the cleft (relative) clause, which has itself been extraposed. This analysis reduces the function of *nił* to that of an (identificational) copula parallel to English be, following Kroeber (1999). In the following sections I will motivate this proposal.

2.2.1 Clefts contain concealed definite descriptions

Hedberg (2000) and Percus (1997) show that clefts and definite descriptions have parallel existential and uniqueness conditions. Percus demonstrates the presence of an existential presupposition in English clefts **(4a),** which is clearly lacking in the non-clefted focus construction **(4b).** In these examples, the existential presupposition in the cleft clause in (4a) contradicts the assertion of the first clause, resulting in anomaly.

(4) a. # Since nobody saw John, it follows that it isn't **[BILL]$_F$** that saw John.
b. Since nobody saw John, it follows that **[BILL]$_F$** didn't see John. Percus 1997: 340 (9)

Hedberg (2000) discusses the sentence in (5) in relation to the uniqueness condition. Here, given a contextually given set of individuals who potentially won, say {Clinton, Bush, Perot), the sentence in (5) identifies {Clinton) as the exhaustive subset of this set for which the phrase ***x won*** actually holds.

(5) It was Clinton who won. Hedberg 2000: 905

Turning to Straits, it appears that there is an existential presupposition involved in clefts in this language as well. In the following examples, the cleft in the second clause in (6a) was rejected, while the non-clefted variant in **(6b),** was accepted by **speakers.**[5]

(6) a. # **ʔə́wə** san s-i? **leŋ-nəx^w** **kəẇ** wet, s-a&
neg **1s.sbj** irr-prt see-tr anybody, so
ʔəwə-s nił k^{w}sa Bill len-n-an.
neg-irr nił det Bill **see-tr-1s.sub**
I *didn't see anybody, so it wasn't Bill that I saw.*

b. **ʔə́wə** san s-i? leg-nax^w ka& wet, **nə-s-əẇ**
neg 1**s.sbj** irr-prt see-tr anybody, 1**s.pos-nom-lnk**
ʔəwə s-iʔ len-nax^w k^{w}sa Bill.
neg irr-prt see-tr det Bill
I *didn't see anybody, so I didn't see Bill.*

This supports the claim that clefts in this language pack an existential presupposition.

As for the uniqueness condition, it too appears to be obeyed in Straits clefts. In a situation containing a contextually given set of individuals for which the predicate potentially holds, a cleft can only be used felicitously to identify the

complete subset of members for whom the predicate in fact does hold. The example in (7) illustrates this.

(7) nil **kʷsə** Richard t's-at kʷsa **lá?sn**
nil. det Richard break-tr det plate
It's Richard that broke a plate.
Context 1: *ACCEPTED*
3 individuals in domain {Peter, Jill, Richard); only Richard broke a plate.
Context 2: *REJECTED*
3 individuals in domain {Peter, Jill, Richard); Both Richard and Jill broke a plate.

This is the result predicted if the Straits cleft construction is subject to a uniqueness condition. If there were no such condition, then the sentence in (7) would be predicted to be acceptable in Context 2.

2.2.2 The source of definiteness
Having established the plausibility of the claim that there is a concealed definite description in clefts, it is time to analyze the structure. Both Percus and Hedberg take the subject *it* in English as functioning as a definite determiner of sorts. In Straits clefts, however, no overt pronominal subject is used. To account for this fact, I will assume that the subject position is occupied by a covert pro. Consequently, a cleft sentence has the form in (8).

(8) nil pro_i kʷsa Richard [t'sat kʷsa lá?sn]$_i$

Independent evidence that pro is used in this language comes from examples such as (9).

(9) **qʷíx̣-nəxʷ** pro pro
miss-tr pro_{obj} pro_{obj}
He missed it. **Galloway** 1990: 31

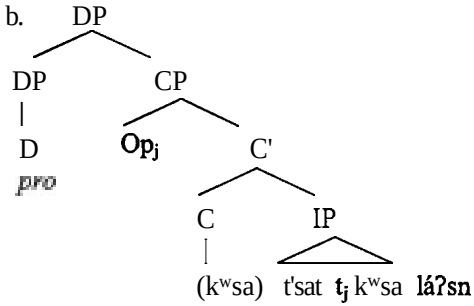
I will assume that this covert pro is in fact a pronoun akin to English that and will further assume that it is situated in the head of DP.[6] The presence of a covert pronominal subject is supported by examples such as (10) in which an overt pronoun may occupy the subject position.

(10) nil **kʷsəẇniɬ** kʷsa Richard t's-at kʷsa **la?sn**
nil him det Richard **break-tr** det plate
It's Richard that broke a plate.

I will follow Hedberg in assuming that this null-D takes a CP complement directly. The structure of the subject DP is given in (11).

(11) a. [$_{DP}$ *pro* [$_{CP}$ Op_j (kʷsa) [$_{IP}$ t's-at t_j kʷsa lá?sn]]]
pro DIC break-tr det plate
that broke a plate.

b.



2.2.3 The copula

This analysis essentially reduces the function of *nił* to that of a copula. The same conclusion was reached by Kroeber (1999: 370) in his discussion of this construction across the Salish family. His conclusion was based on the observation that, unlike other formally intransitive predicates, these predicates may take two non-PP arguments in identity statements (12).

(12) nił tiʔə sx̌ix̌əqł ta nə-ŋə́nəʔ
cop this child det 1s.pos-offspring
This child is my kid.

This copula can be analyzed as a verb. Support for this analysis comes from the fact that it may receive transitivity inflection (13).

(13) ʔa& nił-t-əl̓ ʔal̓ tiʔe sqəléxəʔ
Ink cop-tr-recip just dem dog[pl]
These dogs are identical ***Saanich***

I take the data in (13) as evidence for a verbal analysis of *nił*.

2.2.4 The extraposition of the cleft clause

So far *I* have argued that the cleft clause and the subject pronominal semantically form a discontinuous definite description, but I have not addressed the syntactic relationship between the cleftee and the cleft clause. Hedberg and Percus both claim that the cleft clause has been extraposed from the subject? and that the cleftee has not been extracted from the cleft clause. Hedberg,

following Heggie (1988), argues one can establish that no extraction has taken place if evidence can be found that the cleftee is not restricted by the cleft clause.

One argument that the cleft clause does not restrict the cleftee comes from examples involving proper names, which cannot normally be restricted by a relative clause (14b) but are freely followed by cleft clause (14a) (Hedberg 2000, Heggie 1988).

(14) a. It was John [that Mary saw].
b. * John [that Mary saw] was limping.

As seen in examples like (1) and (3) above, proper names can be freely clefted in Straits. However, when a non-clefted proper name is followed by a relative clause, this clause cannot be interpreted as a restrictive relative clause (15).

(15) * ye? san leg-nat kʷsa Richard ṯə́m̓-ət la? kʷsa sqʷəmə́y̓.
go 1s.sbj see-prp det Richard hit-tr past det dog
I'm going to see Richard (who) hit the dog.

Furthermore, although extraposition is the norm it is not obligatory. As seen in (16), the cleft clause may in fact optionally precede the cleftee, suggesting no extraposition has taken place.

(16) a. nił pro kʷsa Richard [t'ṣ-at kʷsa lá?sn]
cop pro det Richard break-tr det plate
It's Richard that broke aplate.

b. nił pro [t'ṣ-at kʷs la?sn] kʷs Richard
cop pro break-tr det plate det Richard
It's Richard that broke a plate.

As for the site of adjunction of the extraposed clause, I will follow Percus and take it to be VP.

This concludes my discussion of the structure of m'lclefts in Straits. The final structure I am proposing is giving above in (3).

3. Other Types of Clefts

In this section I explore some issues related to clefting in Straits. In 3.1, I examine so-called bare clefts in the language, and compare these to the m'lclefts. In 3.2, I turn to wh-clefts and argue they should receive the same analysis as bare clefts.

3.1 The proper treatment of bare clefts

The sentence in (17) is an example of what Kroeber (1999) calls a ***bare cleft***. Here, the "cleftee" is the sentence initial nominal predicate.

(17) Mary kʷsa t'sa-t kʷsa lá?sn
Mary det break-tr det plate
Mary broke the plate.

Should bare clefts receive an analysis similar to *nił* clefts? Recall that *nił* clefts have a uniqueness condition akin to definite descriptions. It turns out that this requirement is not met in the case of bare clefts (18).

(18) Richard kʷsa t's-at kʷsa lá?sn
Richard det break-tr det plate
It's Richard that broke a plate.[8]
Context: ***ACCEPTED***
3 individuals in domain {Peter, Jill, Richard); Both Richard and Jill broke a plate.

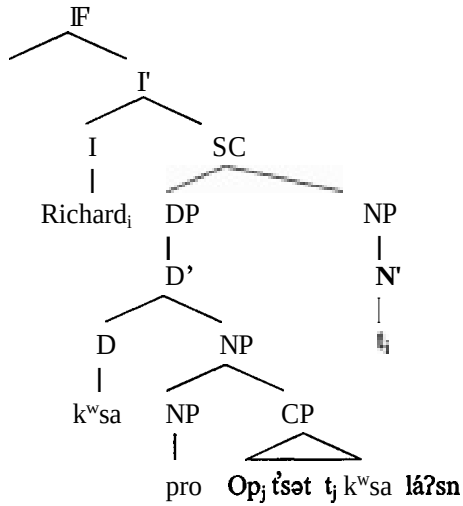
(7) nil kʷsa Richard t's-at kʷsa lá?sn
cop det Richard break-tr det plate
It's Richard that broke aplate.
Same Context: ***REJECTED***

The bare nominal predicate here is accepted even though the uniqueness condition is not met. This contrasts sharply with the near identical sentence in (7), where a *nił* cleft was rejected in the same nonunique context.

In order to account for this interpretive difference, a new formal analysis must be found for these nonunique bare clefts. The uniqueness conditions in *nił* clefts depended on there being a concealed definite description stemming from a covert ***pro*** in subject position. Clearly, to prevent this interpretation here one must not posit a similar structure underlying these nominal predicates. That being said, there is little reason to treat these nominal predicates as two place predicates like the copula *nił*. Rather, the simplest treatment is one where a nominal in predicate position takes a headless relative clause as its sole argument.[9]

(19) a. Richard [kʷsa t's-at kʷsa lá?sn]
Richard det break-tr det plate
It's Richard that broke aplate.

b.



3.2 The proper treatment of wh-clefts

Next I turn to the case of what have been called wh-clefts in Straits. Wh-questions are formed in Straits by using a wh-word as the main predicate, followed by a relative clause from which it appears to have been extracted. This structure has been analyzed as a cleft by Jelinek (1998) and Kroeber (1999).

(20) wet k^{w}sa q^{w}al-tx^w k^{w}sa swəy̓qəʔ
who det speak-tr det male
Who spoke to the boy?

Based on their apparent structural similarities, Kroeber has taken wh-clefts to be a type of his bare clefts, and I agree. Evidence that wh-questions should not be treated as a type of *nił* clefts comes from ungrammatical examples such as (21), where instead of a headless relative clause the wh-predicate takes a proper name as an argument followed by a relative clause. Recall that normally proper names cannot be restricted by relative clauses, yet they may be followed by extraposed cleft clauses (7).

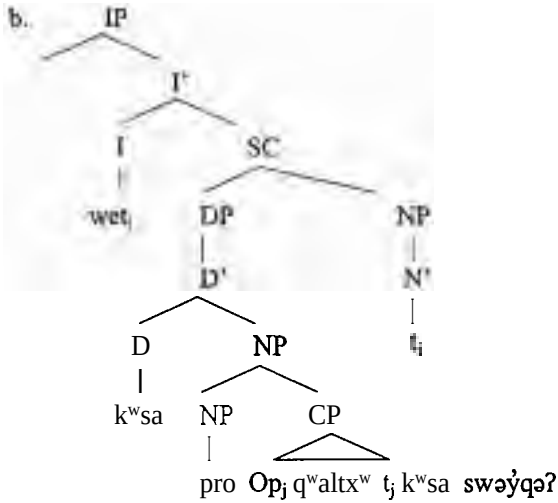
(21) * wet ʔaE k^{w}sa Richard t̓əm̓-ət la? k^{w}sa sq^{w}əmé y̓
who req.info det Richard hit-tr pst det dog.
Who ***is Richard that hit the dog?***

(7) nit k^{w}sa Richard fs-at k^{w}sa lá?sn
cop det Richard break-tr det plate
It's ***Richard that broke aplate.***

The ungrammaticality of (21) suggests that the relative clause cannot be interpreted as an extraposed cleft clause, which is grammatical in *nił* clefts like (7). If extraposition is blocked, then arguably this cannot be considered a type of *nił* cleft. Consequently, I will assume that wh-clefts are a type of nominal predicate, and will analyze them along the lines of other nominal predicates in the language. The following structure illustrates my proposal.

(22) a. wet kʷsa qʷal-txʷ kʷsa **swəy̓qəʔ**
who det speak-tr det male
Who spoke to the boy?

b.



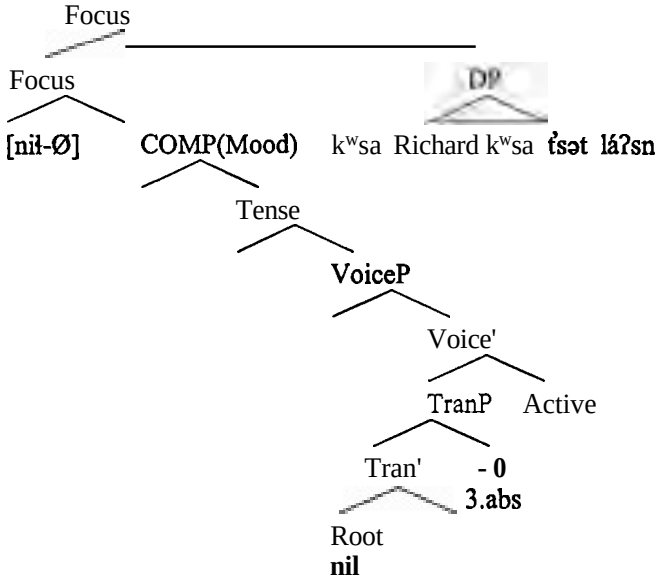
Interestingly, this proposal still denies the wh-word undergoes wh-movement. I leave this issue for future research.

4. Comparison with Jelinek (1998)

Jelinek (1998) provides an analysis of clefts in Straits, concentrating primarily on wh-clefts. For Jelinek, wh-predicates, like all predicates, raise to a focus position adjoining COMP. It is clear from Jelinek's discussion that she intends her theory to cover all cases of predication raising and focussing in the language. Crucially, no DP is ever focussed, but rather the main predicate which appears in the sentence initial focus position is focussed. Extrapolating her theory, the following structure for a *nił* cleft is predicted.[10]

(23) a. **nil** kʷsa Richard [kʷsa t's-at **lá?sn]**
cop det Richard det break-tr plate
It's ***Richard that broke a plate.***

b.



Davis (1997) has raised a number of problems with Jelinek's conception of predicate raising, which I will not address here. Rather, as my concern is *nil* clefts, I will attempt to show why Jelinek's analysis of predicate **raising/** focussing does not **straightforwardly** extend to this construction, and why I do not take (23) to be an adequate representation.

First, this theory does not automatically account for the difference **between** bare clefts and *nil* clefts with respect to the uniqueness condition. I derived these interpretive differences by positing a concealed definite description in *nil* clefts not found in nominal predicate bare clefts.

A bigger problem is,that in Jelinek's theory there is no room for non-predicate focussing in this language. Therefore, in a *nil* cleft it is not the DP which is being focused, but the ***predicate*** which has been raised to the Focus position because the **"cleftee"** is always the main predicate (similar to Kroeber's analysis of "bare clefts"). Consequently, her analysis **does** not predict that there would be any restrictions on what may appear as the DP argument of the focussed predicate, such as are found in English. In fact, there are just such restrictions. As seen in (24) and (25), in both English and Straits, clefting a universal quantifier is not perfectly grammatical.

(24) * It was everybody that Mary invited to her party.
É.Kiss 1998: 253 (20a)

(25) ? nił kʷs-əẇ məkʷ wet t̓s-at kʷsa lá?sn.
cop det-Ink all who break-tr det plate.
It's everybody that broke a plate.

5. Conclusion

To conclude, I have extended the analyses of Percus (1997) and Hedberg (2000) of the English cleft to Straits Salish *nił* clefts. I have argued that Straits cleft sentences contain a covert pro subject pronoun which forms a discontinuous definite description with an extraposed cleft clause, and treated the predicate *nił* as a copula. I compared this construction with so-called bare clefts in which no copula is found and a nominal is playing the role of the main predicate, and concluded that they are distinct syntactic construction. I argued against extending my treatment of *nił* clefts to wh-clefts in favour of a nominal predicate analysis. Finally, I discussed Jelinek's (1998) analysis of clefts in Straits, and also rejected its applicability to *nił* clefts.

6. Notes

[1] Thanks to Lucille Harry, Lena Daniels. Lisa Matthewson, Martina Wiltschko, Doug Pulleyblank, Henry Davis, Rose-Marie Déchaine and members of the LING 518 class and participants of CLA 2002 for helpful discussion. This research has been supported by the Jacobs Research Fund and SSHRCC grant # 410-951-519 to Henry Davis. All errors are my own.

[2] I will argue below that *nił* is functioning as a copula.

[3] See Gerdts (1988), Hukari (1977) for an account of the difference between subject, object and oblique extraction in Halkomelem Salish and Lushootseed Salish. Also, see Kroeber (1999) for a broad perspective on relativization in Salish generally, and Montler (1993) for an overview of relativization in Straits.

[4] I will not discuss the optional use of the complementizer which introduces the cleft clause.

[5] There was some variability on the unacceptability of (6a). Presumably, this is because this sentence is still easily understandable (as is the English (4a)) despite the infelicitous use of the cleft.

[6] Matthewson (1998) situates demonstratives in St'at'imcets (Lillooet Salish) in [Spec, DP], to distinguish them from the determiners occupying D°. A more recent analysis of the St'at'imcets DP by Davis (1999) situates demonstratives in D°.

[7] Hedberg adopts a non-movement analysis, and Percus a movement 'analysis to account for the extraposition.

[8] Perhaps a more literal gloss would be "One that broke the plate is Richard".

[9] Carnie (1997) also argues that nouns may head raise to Infl in Modern Irish.

[10] Jelinek (1998) did not give explicit tree structures for this construction, so the example here represents my interpretation of her theory. Note also that under her assumptions stemming from the *Pronominal Argument Theory*, no DP is situated in argument position, so they must all be adjoined.

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Event Composition and a Path in Japanese

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1. Introduction

This paper concerns the grammatical contrast exhibited in Japanese manner 'conflation' (Talmy (1985)), comparing it with its English counterpart. In Japanese, a locative marker *–ni* occurs in a sentence describing a motion, specifying its goal, as exemplified in (1).

(1) a John went to the park yesterday.
b. John -ga kinoo kooen -ni itta
-NOM yesterday park -LOC went

In the example above, the locative marker *–ni* can be viewed as a counterpart of to in (1a). However, the two locatives show a sharp difference in the following context:'

(2) a John walked to the park yesterday.
b. *John -ga kinoo kooen -ni aruita.
-NOM yesterday park -LOC walked

Given that the two verbs in the two languages are semantically equal, the disparity between the two sentences may be reduced either to the typological difference between the two languages, or to the semantics of the two locative phrases (i.e. to and *ni*). The former position apparently further assumes the semantic equivalence of the two locatives. This is the position that has been taken by many researchers (e.g. Talmy (1985), Yoneyama (1988), Levin and Rappaport Hovav (1995)). One of the goals of this paper, however, is to show that this presumption cannot be tenable and to argue for the latter theory. Specifically, we would like to propose that the grammaticality of (1)-(2) is governed by a constraint on Event Composition at Event Structure representation.

One of the motivations against the typological approach comes from the following

examples (see Tsujimura (1991)):

(3) a. John -ga muko gisi -made oyoida
-NOM the other side of shore -as far as swam
'John swam to the other side of the river.'

b. John -ga kooen -made hasitta /aruita
-NOM park -as has ran /walked
'John ran/walked to the park.'

In contrast with (2b), the sentences with *-made* 'as far as/until', are fully grammatical, expressing the similar situations as English prepositional construction such as in (2a).[2] The question is, then, why (3) is allowed The typological approach seems to fail to expect the existence of (3), for it assumes that Japanese does not exploit this type of 'conflation'.

The grammatical contrasts presented above comprise the issue on the event structure representation. Tenny (1994) has shown that in English, the following two sentences differ in the (lexical) aspectual property:

(4) a. John walked.
b. John waked to the park.

(5) a. John walked {for 30 minutes/*in 30 minutes).
b. John walked to the park {*for 30 minutes/in 30 minutes).

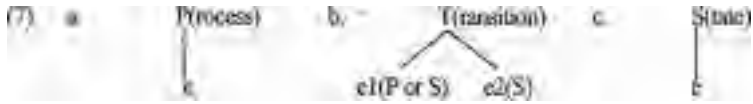
The sentence in (4a) is temporally 'unbounded' (or atelic), which means that the event has no intrinsic terminal point, as evidenced by the consistency with a durational adverb *for 30* minutes, and the inconsistency with a frame adverb in *30* minutes, as indicated in (5a). The example (4b), on the other hand, is temporally 'bounded', showing the inverse grammatical judgment. The temporal boundedness (or telicity) comes from the existence of a locational phrase, which bounds a spatial extent of a motion Japanese *–made* construction exhibits the same atelic-telic alternation:

(6) a. John *-ga* {30 pun-kan /*30 pun-de} aruita
-NOM {30 minutes-for /30 minutes-in) walked
'John waked {for 30 minutes/in 30 minutes).'

b. John *-ga* {?30 pun-kan /30 pun-de) kooen -made aruita
-NOM {30 minutes-for /30 minutes-in) park -as has walked
'John walked to the park {for 30 minutes/in 30 minutes).'

Given that the temporal constitution of an event is represented in event structure

representation, it is natural that the telicity should be reflected on it At least two kinds of analyses of (4b) can be identified The first is advocated by the researches such as Dowty (1979) and Pustejosky (1995), in which the boundedness is closely related to the complexity (or causativity) of an event More specifically, a complex event is telic, and a simple event is atelic. Following Pustejovsky(1995)'s notation, three types of events are represented:



Transitional events consist of two subevents, e1 and e2, where the former instigates the occurrence of the latter Stative event Processes and States are simple events, which are made up of homogeneous subevents. In telic events (Transition), the terminal point is specified by the second subevent (e2). In (4b), John's walking is identified with e1, which takes John to the final location, namely, the park (e2).

Another proposal to the event structure of (4b) is that it forms in fact a simple event structure, and the telicity of the event is not related to the causativity. This has been claimed by Rappaport Hovav and Levin (2001) and Hay, Kennedy and Levin (1999) (cf. Jackendoff (1996)). Rappaport Hovav and Levin(2001)'s observation that supports their position is the fact that in sentences like (4b) (in their terms, bare XP resultatives), 'the progress of the event denoted by the verb and the progress towards the achievement of the result state are temporally dependent; the event denoted by the verb begins when the progress towards the result begins, and it necessarily extends until the result is achieved'. Since they propose that the two subevents form a simple event and the two subevents are not necessarily in a causative relation, the origin of telicity is reduced to other factor than causativity. I argue in this paper that the single event theory should be on the right track in view of Japanese data presented above.

2. The Semantics of Locative Phrases

We will begin with tackling the typological approach to the problem of manner conflation in Japanese. Since the approach presumes that the two locatives in Japanese and English (i.e. *–ni* and to) function in the same way, we will first show that this assumption d m not capture the situation properly.

2.1 Licensing *-ni*

We first argue that the context in which the locative *–ni* phrase appears is conditioned by the event structural feature of verbs it co-occurs with. Specifically, it requires a state component in the event structure representation of a verb. This constraint cannot be observed with English prepositions (see Takezawa (1993)).

Let us recall the contrast between (1b) and (2b). One difference between them lies in the verbal types: the verb in (1b) is a change of location verb, and the one in (2b) is a manner of motion verb. In fact, -ni phrases are totally ruled out in the context of manner of motion verbs:

(8) a *John -ga mukoo-gisi -ni oyoida
-NOM the other side of shore -LOC swam
Intended meaning: 'John swam to the other side of the river.'
b. *John -ga kooen -ni hasitta
-NOM park -LOC ran
Intended meaning: 'John ran to the park.'

The above examples show that *–ni* phrase cannot be a goal marker with manner of motion verbs. It is also excluded in other Process-type verbs (see Nakau (1997), Takezawa (1993, 2000) and Ueno (2001)):

(9) John-ga kooen -{*ni / de} asonda
-NOM park -LOC played 'John played in the park'

The distribution of *–ni* is minimally contrasted with that of another locative, ***de***. This contrast is not like the one we observed between to and *in/at* in English. For -ni locative can appear with an existential verb, which usually resists 'dynamic' prepositions like to:

(10) John-ga niwa -{ni/*de} iru
-NOM garden -LOC be 'John is in the garden (now).'

Change of location verbs other than motion verbs also exclude *–de*, and allow only *–ni* to indicate a final location of a theme:

(11) a John -ga yuka-{ni/*de} hon -o oita/otosita
-NOM floor -{NI/DE} book -ACC put/dropped
'John put/dropped a book on/to the floor.'
b. hon -ga yuka -{ni/*de} otita
book -NOM floor -{NI/DE} fell

'The book fell off (from somewhere) to the floor.'

The aspectual property of these verbs is telic, as the adverbial test shows?

(12) a John -ga yuka -ni hon -o {??1byoo-kan/1 byoo-de}
-NOM floor -NI book -ACC { 1 second-for/ 1 second-in }
oita/otosita
put/dropped
'John put/dropped a book on the floor{for 1 second/in 1 second).'

b. hon -ga yuka -ni {?1 byoo-kan/1 byoo-de} otita
book -NOM floor -NI { 1 second-for/ 1 second-in) fell
'The book fell off to the floor {for 1 second/in 1 second}.'

These verbs do not tolerate the durative adverbial phrase I *byoo-kan* 'for 1 second' in the relevant sense.

From the contrasts presented above, we can generalize that *-ni* phrase is 'licensed in the context of Transitions and States. In those licensing verbs, the locative *–ni* phrases designates a state component (e2 in Transition), situating a theme.

A locative *–de* phrase, on the other hand, does not contribute to the event structural representation, and it is actually a modifier of an event as a whole. It need not be licensed by a predicate. Thus, it is able to appear even with change of location verbs, as in *kono-heya-de John-ga yuka-ni hon-o oita 'In* thii room, John put a book on the floor.'

The constraint on *–ni* phrase is not observed in English prepositions. They may serve either as -ni or –de in both State-comprising events (Transitions and States) and Processes.

2.2 *Ni* and *made*

Tsujimura (1991) notes that in light of the fact that *–made* phrase, not *–ni* phrase, delimits an atelic event, *-made* functions as a 'true' goal marker. Kageyama and Yumoto (1997), on the other hand, claims that *–made* phrase specifies the distance of a motion, whereby delimits an event, and that only *–ni* can mark a goal. Kageyama and Yumoto (1997:141) present the following contrast to support their claim:

(13) a (Fuji-san-no) gogoome -made basu-de itta ga
Mt. Fuji-GEN 5th point -as far as bus-by went but
soko -kara -wa, arui -te nobotta
there -from -TOP walk -GER climbed

b. #(Fuji-san-no) gogoome -ni basu-de itta ga,
Mt Fuji-GEN 5th point -LOC bus-by went but
soko -kara -wa, arui-te nobotta
there -from-TOP walk-GER climbed
'(I) went to the 5th point of Mt Fuji by bus, but climbed on foot from there.'

In (13b), where the destination is marked by *–ni*, the addition of the second sentence induces a contradiction, while in (13a), the discourse is coherent This is because the *–ni* marked location must be the 'final' location of the motion, and the motion cannot be further continued This contrast clearly shows that *–ni* is a goal, but *–made* is not.

The characterization of *–made* as a bounder of a distance of a path, following Kageyama and Yumoto(1997), expects the acknowledged difference in grammaticality between *–made* and *–ni* with motion verbs. Kawano (1999) points out that there are two types of change of location verbs: one co-occurs only with *–ni*, and another permits both -ni and *–made*, which are called Type A and B here respectively:

(14) a. Type A: *-ni/*-made*
tuku (arrive); *noru* (ride, get on); *deru* (exit, go/come out);
hairu (enter, go/come into) etc.
b. Type B: *-ni/-made*
iku (go); *kuru* (come); *modoru* (return, come/go back); *otiru* (fall);
korogaru (roll) etc.

Interestingly, the grouping of the two types of verbs coincides with the acceptability of *–o* marked path expression (see Kageyama and Yumoto(1997) and Tanaka(2002)).[4] Type A verbs totally resist the occurrence of an *–o* marked path phrase (as in (15a)), and Type B verbs allow an *–o* marked path phrase only when they do not take a *–ni* marked locational phrase:

(15) a *John -ga kono toori -o tuita
-NOM this street -ACC arrived
'John arrived (somewhere) by way of this street.'
b. *John-ga kono toori -o eki -ni tuita
-NOM this *street* -ACC station -NI arrived
'John arrived at the station by way of this street'

(16) a John -ga kono toori -o itta
-NOM this street-ACC went
'John went along this *street*'

b. John -ga kono toori -o eki -made itta
-NOM this street -ACC station -as far as went
'John went along this street to the station.'

c. *John -ga kono toori -o eki -ni itta
-NOM this street -ACC station -NI went
'John went along this street to the station.'

Given that *–made* phrase presupposes the existence of a path to be modified, the ability of verbs to take a path object is the necessary condition to satisfy that presupposition. If a verb cannot take a path, it cannot be used with *–made*.

The compatibility of a path expression with a verb indicates the 'durativity' of a motion: a motion associated with a path progress gradually along the path, taking some time to reach the final point. From this standpoint, *-made* only tolerates 'durative' verbs, while –ni is consistent with 'non-durative' or 'result-oriented' verbs.

2 3 The semantics of *–ni* and *–made*

In this section, we observe that *-made* itself includes a path in its meaning, while *–ni* does not, and claim that this is the property that *–made* and English dynamic prepositions share, and *–ni* does not.

First consider the following construction:

(17) kono kaidan -wa nikai -made /#-ni nan dan
this stairs -TOP second floor -as far as / -NI what *step*
ari-masu-ka
exist-POLITE-Q
Lit,: 'As for this *stairs*, how many steps does it have to/on the second floor?'
'How many steps are there to/on the second floor?'

In this construction (*how many steps* construction, hereafter), the use of *–ni* results in a weird interpretation. This is because the object like *stairs* inherently induces a path-like concept, which is a set of ordered 'points' to some direction. Only *–made*, which includes a path concept in its meaning, tolerates this construction. When such a locative phrase co-occurs with a singular individual which cannot form a path, the sentence will be infelicitous:

(18) a. #John -ga genkan -made iru
-NOM entrance hall -as far as be

'John is to the entrance hall.'

b. kodomo -ga genkan -made iru
child -NOM entrance hall -as far as be
'A line of children *can* be seen from here to the entrance hall.

In (18a), the individual object *John* cannot be a path, for it does not construct an ordered-points construction. *Kodomo* 'child/children', on the other hand, may form a path when it is interpreted to be plural, and actually it must be interpreted to be plural, to get a coherent interpretation.[5] With *–ni*, *kodomo* 'child/children' may be either singular or plural:

(19) kodomo -ga genkan -ni iru
child -NOM entrance hall -NI be
'There is a child in the entrance hall.'
'There are (some) children in the entrance hall.'

It is apparent from these data that *–ni* phrase takes a theme (i.e. situated object) while *–made* phrase takes a path.

In English, the prepositions such as to, *into*, and *across* permit *how many* steps construction, while in, at, on do not

(20) a How many *steps* are there to/into/across the park?
b. # How many steps are there in the room/at the corner of the street/on the roof?

The prepositions in (20a) also contain a path in their meanings, and this is the common property that *–made* and these prepositions share, and *–ni* does not The combiition manner of motion verbs + *in/at/on* does not induce ungrammaticality in English. This is because these prepositions serve as modifiers that take an event, and do not contribute to the subevetual *structure* of an event In this respect, this combiion works in the same as Process-type verbs + *-de* in Japanese.

We propose now that *–made* and *–ni* are predicates that take thematic predicates Path and Theme, respectively (cf. Parsons 1990):

(21) a. ||x *made*||: λyλe'[Path (e', y) & To (e', y, x)]
b. ||x *ni*||: λyλe' [Theme (e', y) & At (e', x)]

In the next section, we return to the problem why only *–made* can co-occur with manner of motion verbs, and propose the solution in terms of event composition.

3. Event Composition and Telicity

3.1 A constraint on event composition and path

Let us first propose the following constraint on event composition:[6]

(22) To compose events there must be at least one common thematic predicate.

Since manner of motion verbs can co-occur with an *–o* marked path expression, their semantic representations will be the following (we use *aruku* 'walk' as a representative):

(23) ||aruku||: λyλxλe[walk(e) & Agent (e, x) & Path (e, y)]

Given the existence of Path even when it is not realized as an *o*-marked expression, *John-ga aruku* 'John walks' will have the following representation:

(24) ||John-ga O aruku||: λe[walk(e) & Agent (e, j) & Path (e, y)]

John-ga *kooen-made aruku* 'John walks to the park' is now constructed through event composition:

(25) a. ||kooen-made||: λyλe'[Path (e', y) & To (e', park)]
b. he[walk(e) & Agent (e, j) & Path ***(e,*** y)] + λe'[Path (e', y) & To (e', park)]
— event composition
c. ||John-ga kooen-made aruku||: he[walk(e) & Agent (e, j) & Path (e, y) & To (e, park)]

In (25b), the two events ***(John walks***(e) and to ***the park***(e')) are composed into one, observing the constraint in (22). *As* indicated by bold, the two events share the 'Path' predicate. Thus, they form a single event, yielding the representation in (25b).

When two events do not share any common thematic predicates, event composition fails, due to constraint (22). This is observed in the combination of manner of motion verbs and a *–ni* locative phrase:

(29 a ||kooen-ni||: λyλe' [Theme (e', y) & At (e', park)]
b. λe[walk(e) & Agent (e, j) & Path ***(e,*** y)] + he' [Theme (e', y) & At (e', park)]

In (26b), since there is no thematic predicates shared, the two events cannot be composed. Telic verbs and an existential verb, on the other hand, have the following representation, in

which a Theme predicate is involved:

(27) a ‖tuku‖: λxλyλe[arrive (e) &Theme (e, x) & At (e, y)]
b. λe[arrive (e) &Theme (e, j) & At (e, y)] + he' [Theme (e', y) & At (e', park)]
c. ‖John-ga kooen-ni tuku‖: λe[arrive (e) & Theme (e, j) & At (e, park)]

The locative marked by *–made* is excluded with this type of verbs (Type A), since such verbs do not have a Path, which is to be shared by *–made*.

When verbs accompany an *o*-marked path expression, it is explicitly represented in the representation:

(28) a. ‖John-ga kono-michi-o aruku‖: he[walk(e) & Agent (e, j) & Path (e, this street)]
b. λe[walk(e) & Agent (e, j) & Path (e, this street)] + λe'[Path (e', y) & To (e', park)]
c. ‖John-ga kono-michi-o kooen-made aruku‖: he[walk(e) & Agent (e, j) & Path (e, this street) & To (e, park)]

Type B verbs have either the representations (27) or (28): the former excludes *–made* and permits *–ni*, and the latter allows only *–made*.

It is now clear why English dynamic prepositions like *to, into,* and *across can* be used with manner of motion verbs without problem: they have a similar semantic *structure* as the one that *–made* has, not the one that *–ni* has.

3.2 Incrementality, telicity, and the notion of 'scale'

The analysis presented above has eventually proposed that durative verbs (manner of motion verbs and Type B verbs) must be combined with a durative locative phrase, to form an event via event composition. The co-extensivenss condition on (bare XP) resultatives by Rapport Hovav and Levin (2001) seems to work here. The predication to Path both by e1 and e2 is responsible for the temporaldependency of the two events.

The simple event analysis should explicate the origin of the telicity, for it cannot rely on the complexity of the event *structure* for telicity. Hay et al. (1999) proposes that the telicity comes from the boundedness on the 'scale', and when the scale is bounded, the event becomes telic. The Path predicated by *to/into/across* and *–made can be* a delimiter, because the locatives are themselves bounded. Japanese *–ni* phrase cannot be used as a delimiter, because it does not have a 'scale' structure, which is a presupposition to be bounded

4. Conclusion

The acknowledged contrast between Japanese and English with regard to manner conflation is, if the analysis presented here is right, not the typological difference between the two languages. The two languages utilize the same mechanism (event composition), and are governed by the same constraint. The semantic structures of locatives, however, are responsible for the varied grammaticality.

The present analysis supports the recent proposal that the theory of telicity and the complexity of event are not directly related. We have only focused on the manner conflation in Japanese in this paper, and whether the same analysis *can* be extended to other similar constructions (such as resultatives in Japanese) will be the future research topic.

Notes

[1] It should be noted that there is another kind of reading for the sentences in (2b), which might be judged to be grammatical. The *–ni* phrases may be interpreted to mark a 'direction', not a 'goal'. In this reading, they do not indicate the final point of the motion, but merely indicate the destination. In this paper, only 'goal' interpretation is within the scope of discussion.

[2] A *-wasde* phrase may be used as a temporal adverb, as in *John-ga 3-ji made hasitta* 'John ran until three.' This usage will not be dealt with in this paper.

[3] In (12a), the sentence with the durative adverb is interpreted felicitously only when the adverb modifies the resultant state of the event, which results in the interpretation like 'John put a book and the book is *on the desk* for 1 second'

[4] *-O* is usually a marker for Accusative case. In Japanese, motion verbs can take an *o*-marked path object regardless of whether they are unergative or unaccusative.

[5] As is well known, Japanese is one of the languages that do not have morphological marking for singular/plural distinction

[6] For the motivation of this constraint, see Tanaka (2002).

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Voices in Japanese Animation

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1 Introduction

Japanese *anime*, an animation medium which depicts the world as inhabited by good and bad characters, is now wildly popular in Japan and other Asian countries, and North America. Few scholarly studies have considered this medium, and those that exist are still in the development stage (Lent, 2001). The present study examines the voices of characters in Japanese *anime*, focusing on the articulatory and acoustic characteristics of the voices of female and male heroes and villains.

Vocal stereotyping plays an important role in animation: voices need to reflect the physical attributes and personality traits of characters and the vocal stereotypes that consumers, filmmakers, and voice actors share. Previous studies on vocal stereotypes (Zuckerman and Miyake, 1993) reveal that people infer similar personality traits upon hearing a given voice. Yarmey (1993) investigated vocal as well as facial cues of good versus bad characters, but he did not examine their auditory or acoustic properties. In effect, few psychological studies have investigated the acoustic correlates of personality in speech, and no study has investigated auditory correlates. This study will help identify auditory and acoustic correlates of vocal stereotypes of good and evil in Japanese culture.

This paper presents the initial findings of a larger phonetic investigation of the voices of heroes' and villains in 20 Japanese animated cartoons (Teshigawara, forthcoming). Prior to the phonetic analysis, psychological studies on vocal cues to personality and emotion and vocal stereotype were reviewed to help formulate hypotheses about the auditory and acoustic characteristics of the voices of heroes and villains. To test these hypotheses phonetically, the voices of heroes and villains fiom 20 Japanese animated cartoons were collected. These samples were first analyzed auditorily using Laver's (1994; 2000) descriptive framework for "voice quality"—quasi-permanent characteristics that are present more or less all the time while a person is talking (Abercrombie, 1967). Following the auditory analysis, a spectrographic analysis of the voice samples was completed. Based on these analyses, the voices of the majority of villains were seen to be harsh with pharyngeal constriction (a voice quality which may involve activation of the aryepiglottic laryngeal sphincter; see Esling and Edmondson, 2002), while the voices of most heroes were lax and free of pharyngeal constriction.

2 Hypothesis

Studies on personality and voice fall into three main categories: accuracy studies; externalization studies; and attribution (or inference) studies (Brown and Bradshaw, 1985; Pittam, 1994; Scherer, 1979). The present study relies on findings fiom attribution studies. Unlike accuracy studies, which compare subjective judgments of personality fiom voice with standardized personality measures, attribution studies involve lay judges' personality attributions fiom voice without reference to accuracy. This type of research often asks lay judges to rate vocal characteristics of speakers and personality traits, and shows the statistical correlations between the two. Among these studies, those that show correlations between listeners' ratings of vocal characteristics fiom voices and personality impressions (Hecht and LaFrance, 1995; Yarney, 1993)[2] are considered to be relevant in formulating hypotheses regarding the voices of heroes. According to Hecht and LaFrance (1995), vocal characteristics that had significant correlations with five positive personality traits were: changing, high, and clear. The auditory correlates of these characteristics are: high pitch, a wide range of pitch and loudness with temporal fluctuations, and a wide range of articulatory movements. The latter are hypothesized to be the phonetic characteristics of heroes' voices (Hypothesis la). Of these three characteristics, only high pitch will be considered in this paper (see Teshigawara [forthcoming] for the other two characteristics.)

Examining vocal as well as facial cues of good versus bad male characters, Yarney (1993) found some correlations between vocal attributes and personality impressions. Among those significant for good characters, "relaxed" is of interest in the present study as well as the two (changing and clear) that were found in Hecht and LaFrance (1993).[3] Therefore, for heroes only, "relaxed", or, in Laver's (1980, 1994) terminology, a "breathy voice" quality produced with high and low laryngeal tension is expected to be found in addition to those mentioned above (Hypothesis 1b).

As a basis for hypotheses regarding the voices of villains, the author informally listened to the voices of villains in the materials used in this study. In contrast to the wide variety of positive and negative emotions expressed by heroes, villains primarily expressed negative emotions such as anger, disgust, frustration, etc. Therefore, it can be expected that vocal cues associated with these negative emotions will be consistently found in villains' voices, in addition to those associated with unattractive personality traits. Based on Scherer's (1986) predictions for the four relevant emotions of displeasure/disgust, contempt/scorn, irritation/cold anger, and rage/hot anger, the articulatory correlates of villains' voices are hypothesized to be: pharyngeal constriction; vocal tract shortening with the larynx raised and the corners of the mouth retracted downward; overall

tensing of the vocal apparatus; and modal voice phonation (low pitch) (Hypothesis 2).

Lastly, drawing on Yarmey (1993), who suggests that the schemata for good characters are more typical and likeable while those for bad characters are more unique and less enjoyable, it is hypothesized that the auditory and acoustic characteristics of heroes' voices will be more salient and easier to generalize than those of villains, which are presumed to have a wider range of deviation and to exhibit greater variety (Hypothesis 3).

3 Materials

Using two Japanese animation newsgroups on the Internet, titles of animated cartoons with an obvious contrast between heroes and villains were collected.[4] Among the more than 60 titles obtained fiom the newsgroups, 20 were chosen as materials for this study following consultation with two avid animation fans. Table 1 lists the 20 titles along with the lengths of the analyzed portions.

Table 1 Titles and Lengths of the 20 Animated Cartoons
Alphabet letters were assigned to each title for convenience (see the explanation in the text).

No.	Title	Length (min)	No.	Title	Length (min)
A	Anpanman	100	K	Princess Knight	25
B	Astro Boy	75	L	Castle in the Sky	120
C	Conan the Boy Detective	80	M	Sailor Moon	150
D	Devilman	75	N	The Secret of Blue Water	100
E	Fist of the North Star	60	O	Time Bokan Series	75
F	Future Boy Conan	125	P	Star Blazers	75
G	Battle of the Planet	150	Q	Mazinger Z	45
H	Cutey Honey	150	R	Rayearth	45
I	Steam Detectives	50	S	Saint Seiya	150
J	Super Doll Licca-chan	100	T	Saber Marionettes	75

The lengths of the chosen portions range fiom 25 to 150 minutes (average 91.3 minutes), depending on availability. It was noted at which point each hero or villain appeared in the cartoon and, for the purposes of acoustic analysis, which portions of their speech were free fiom sound effects or background music. Characters with noise-free speech samples longer than 5 seconds were included in this study. The latter speech samples were digitized onto a personal computer at

22,050 samples per second, 16-bit, using Cool Edit Pro LE manufactured by Syntrillium Software Corporation. These digitized segments were stored for acoustic analysis. For characters whose digitized samples were less than 45 seconds, additional speech portions with sound effects and/or background noise were also digitized onto a personal computer to ensure an adequate sample for auditory analysis; according to Laver (2000:43), repeated listening of 45-second speech samples is necessary to conduct auditory analysis using his vocal profile analysis protocol.

In the following analyses, for the sake of convenience, each character was assigned a combination of three letters and a number: the first letter represented the unique letter assigned to each cartoon; the second (H or V) designated either a hero or a villain; the third (M or F) indicated sex; the case of the latter (upper or lower) represented either adult or child respectively; these three letters were followed by a serial number in each sex and age category of cartoon to complete the character coding system. The age ranges of the characters were estimated by the author; two age ranges, i.e., children (up to grade six of elementary school, i.e., 12 years old) and adults (junior high school-age or older), were treated separately in the analyses. For example, AHm1 stands for *Ampanman* male child hero No. 1. In total, the voices of 92 heroes and villains were analyzed in this study, broken down as follows: 25 male heroes (ten children; 15 adults); 21 female heroes (six children; 15 adults); 33 male villains (one child; 32 adults); and 13 female villains (all adults).

4 Analysis

4.1 Auditory analysis

Laver's vocal profile analysis protocol (see Laver, 1980,1994,2000) was used for this analysis. Laver distinguishes two factors that contribute to the characteristic sound of a speaker's voice, or "voice quality": "organic" and "phonetic". Of these two, only phonetic factors, which are under the speaker's volitional control, are the subject of description; organic factors, which derive from the speaker's anatomical features and cannot be controlled, are excluded from analysis. The phonetic quality of a voice is created by a combination of "settings". According to Laver (1994: 396), a phonetic setting can be defined as "any co-ordinatory tendency underlying the production of the chain of segments in speech towards maintaining a particular configuration or state of the vocal apparatus." Of the four groups of settings that are distinguished in Laver (1994), three were considered in this analysis: articulatory settings (supralaryngeal settings), phonatory settings (laryngeal settings), and settings of overall muscular tension. These three settings are sub-divided into smaller groups, which also consist of multiple settings, most of which represent the activity of individual articulators, such as the jaw or tongue

body. (As for supralaryngeal settings, only larynx height and pharyngeal constriction or expansion will be discussed in this paper.) Description of each setting is performed in reference to a neutral setting, from which deviation is measured. The neutral reference setting is the neutral disposition of the vocal tract: for articulatory settings, the neutral reference setting is one by which the central unrounded [a] would be produced; for phonatory settings, the neutral reference setting is one where voicing shows modal phonation; for settings of overall muscular tension, the neutral requirement is a moderate degree of tension that characterizes the long-term articulatory adjustment of vocal apparatus (see Laver, [1994: 402–404] for more detail). Deviations from the neutral reference setting are accorded a value in terms of three scalar degrees: 1 represents a slight degree of deviation from neutral; 2 a moderate degree; and 3 an extreme degree. For this study, larynx height and pharyngeal constriction/expansion were distinguished by only two steps, 1 representing a slight degree and 2 a moderate to extreme degree. In order to identify the settings of a speaker's voice, one needs to listen to a fair amount of speech (45 seconds or longer), given that individual segments differ in their susceptibility to the effect of particular settings.

After listening repeatedly to the speech samples for each character, the author reflected upon each articulator's movement and deviation from its neutral setting, and developed a vocal profile for each character using Laver's protocol. In Teshigawara (forthcoming), the auditory characteristics of voices of heroes and villains are discussed separately according to sex and age; however, in the following description, only general tendencies across categories are discussed.

It appeared that most heroes' voices are higher pitched than those of villains (12 out of 20 cartoons), which is in accordance with Hypothesis 1a. It should be noted, however, that all but one of the villains are adults, whereas one third of the heroes are children, and therefore have naturally higher-pitched voices. In order to confirm this finding acoustically, it will be necessary to perform a pitch analysis on each sample. (At the time of writing, the pitch analysis was not completed due to technical difficulties. See Teshigawara [forthcoming] for the pitch analysis.)

Auditorily, heroes' voices are generally characterized by an absence of pharyngeal constriction (slight pharyngeal expansion in the case of male heroes) and a breathy voice quality, which coincides with Hypothesis 1b. Although Hypothesis 1b concerns only male heroes' voices, breathy voice is prevalent in the voices of female heroes as well. In four heroes from cartoons of the 70's, slight or intermittent pharyngeal constriction was observed (i.e., heroes in Battle in the Planet, *Time Bokan* Series, Star Blazers, and *Mazinger Z*), but these samples represent no more than one-sixth of the corpus of heroes.[1]

As for the auditory characteristics of villains' voices, a majority (21 out of 46; 19 males and 2 females) showed raised larynx, pharyngeal constriction and harsh voice, which moderately confirms Hypothesis 2. There were three more villains who showed pharyngeal constriction but with neutral or low larynx height. In addition, 11 villains (5 males and 6 females) exhibited pharyngeal expansion with

lowered larynx. In most cases, however, the degree of expansion seemed to exceed a comfortable level and sounded forced; therefore, it seemed to be distinct from the pharyngeal expansion that was observed in some heroes. As has been seen, it can be said that raised larynx and pharyngeal constriction go together, while lowered larynx and pharyngeal expansion go together, which is consistent with the findings in Esling et al. (1994) and Esling (1999). It should also be pointed out that males and females seemed to use different strategies to sound villainous: while a majority of male villains used pharyngeal constriction accompanied by raised larynx, a majority of female villains used pharyngeal expansion with lowered larynx. There were also four characters who alternated between pharyngeal constriction and expansion, but again, the degree of constriction/expansion seemed to exceed a comfortable level. There were, however, three female villains who showed neither pharyngeal constriction nor expansion; therefore, their voices were virtually indistinguishable from those of female heroes. Even among villains with either slight or intermittent pharyngeal constriction/expansion, there were some whose voices did not differ much in this respect from those of heroes in Sailor *Moon* and a few other cartoons.

As illustrated in the foregoing discussion, villains' voices seem to exhibit a wider range of deviation and greater variety than those of heroes – an observation that is consistent with Hypothesis 3. On the whole, the three hypotheses proposed in Section 2 proved to be correct according to the auditory analysis.

4.2 Acoustic analysis: Spectrographic analysis

In order to illustrate the acoustic correlates of the range of phonatory settings found in the samples, spectrographic images were produced for six speech samples of four speakers[6], using the WaveSurfer program version 1.4.6 (Sjölander and Beskow, 2002). A window length of 172 Hz was used. Examples of modal, harsh, and breathy voices are presented below.

The first three examples (Figures 1 to 3) are from the same speaker, GHM1, a hero of the TV series Battle of the Planet, and all three portions are utterances of the same word /gjarakuta:/ "Gallacter" (the name of the alien trying to invade the earth). GHM1 is one of the heroes who employed a range of phonation types, from slightly breathy to slightly harsh. This speaker's normal phonatory setting is slightly tense compared to other heroes, and he devoiced the /ɯ/ in this environment (between two voiceless consonants), which appears from 0.2-0.25 seconds in Figure 1 and 0.25-0.3 seconds in Figures 2 and 3. Figure 1 is an example of a modal voice, presumably expressing a neutral emotion; Figure 2 is an example of a harsh voice with anger; and Figure 3 is an example of a breathy voice when the character is expressing doubt to himself.

In Figure 1, as can be seen from the colour of the spectrogram, the spectral energy decreases as frequency increases, a characteristic of modal voice. Vertical striations corresponding to vocal fold vibration periods can be clearly seen, due to

the regularity of the glottal waveform.

Figure 1 Spectrogram of GHM1's modal voice /gjarakuta:/ "Gallacter"

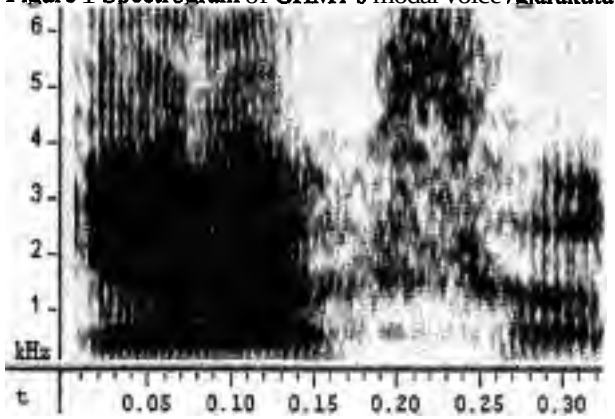
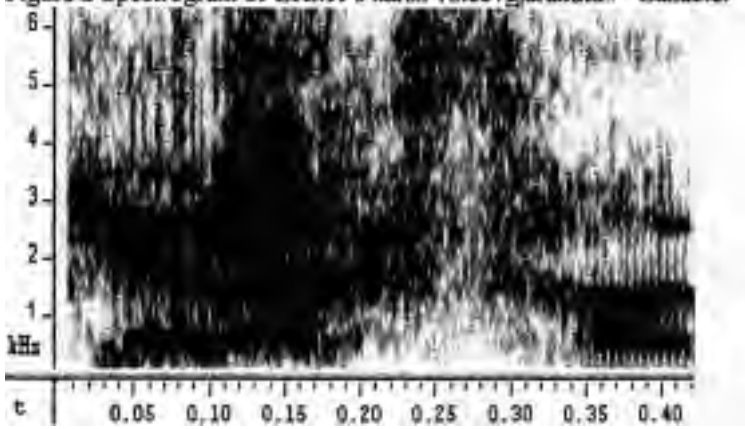


Figure 2 Spectrogram of GHM1's harsh voice /gjarakuta:/ "Gallacter"



By contrast, in the spectrogram of harsh voice in Figure 2, vertical striations are not clear, due to the aperiodicity of the fundamental frequency (Laver, 1980), especially from 0.10-0.15 seconds, where the voice sounds harshest; strong energy continues at high frequency areas of the spectrum. (In this particular sample, the voice sounds less harsh at the end of the word, where these two characteristics are absent.) The strong high frequency energy observed in this portion is in accordance with Scherer's (1986) predictions for the vocal characteristics of negative emotions:

In Figure 3, a spectrogram of a breathy voiced portion fiom the same speaker, the formants are not as pronounced as in Figure 1 (modal voice), and a general energy loss is observed in the high frequency region (Laver, 1980).

Figure 3 Spectrogram of GHM1's breathy voice /gjarakuta:/ "Gallacter"

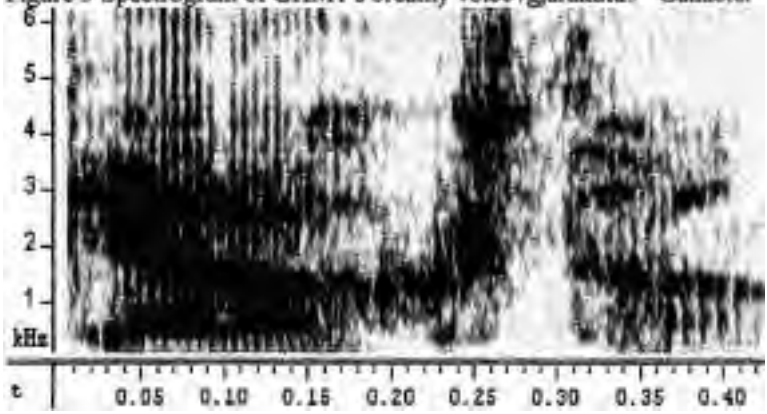
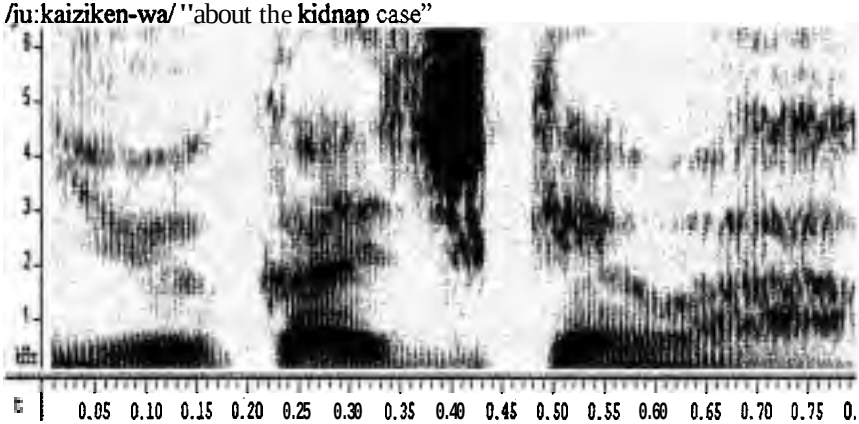


Figure 4 is another example of breathy voice **from** a different speaker **(IHm1)**. The same characteristics as observed in Figure 3 **(i.e.,** weak formants, energy loss in the high **frequency** region) are more pronounced in this example.

Figure 4 Spectrogram of breathy voice **(IHm1)** uttering the phrase **/ju:kaiziken-wa/** "about the **kidnap** case"



Finally, let us examine two examples of harsh voice with intermittent **aryepiglottic** fold vibration. Both Figures 5 and 6 have relatively high energy in the high frequency range (as also seen in Figure 2), an acoustic characteristic of harsh voice. In Figure 5, the secondary pulse of aryepiglottic fold vibration

occurring every other glottal period can be seen most clearly around 4 kHz from 0.16-0.20 seconds and between 3-4 kHz from 0.45-0.55 seconds; this is similar to what Esling and Edmondson (2002) describe. In Figure 5, at the bottom frequency, the same length of presumably aryepiglottic fold vibration can be observed (0.15-0.20 seconds; 0.50-0.55 seconds); however, these pulses double around 2 kHz. Although auditorily, the voice of this character seems higher-pitched than some others (including TV2, whose spectrogram is shown in Figure 6), the preliminary pitch analysis results show that this voice has an average fundamental frequency of 110.1 Hz. Possibly, the aryepiglottic fold vibration is so strong that it is interpreted as the primary source by the acoustic analysis program.

Figure 5 Spectrogram of harsh voice with aryepiglottic fold vibration (AVm1) uttering the phrase /sjo:korimonaku/ "not at all fazed"

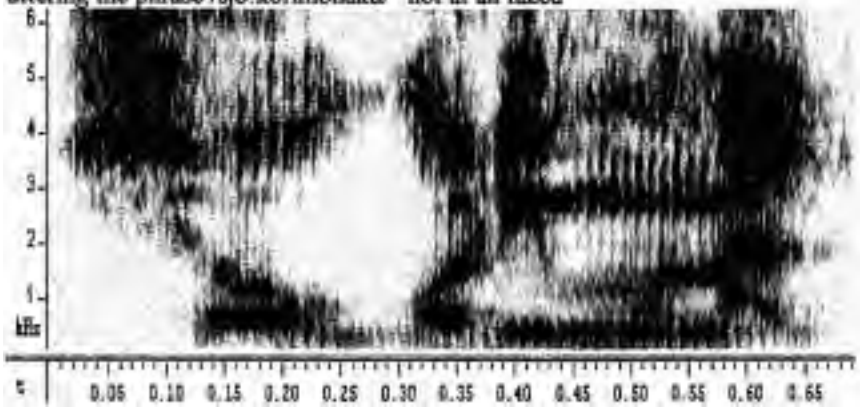
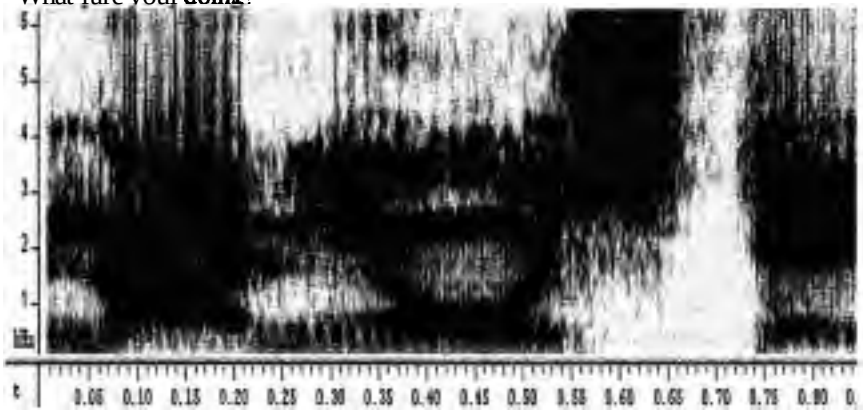


Figure 6 is also an example of harsh voice with aryepiglottic fold vibration; however, in this example, the aryepiglottic fold vibration seems to be at frequencies lower than half the vocal fold vibration. Between approximately 0.3 and 0.4 seconds, seven or so secondary pulses can be observed at around 5 kHz and above, and much finer crepe-like pulses are observed at lower frequencies up to 3 kHz. According to the pitch analysis results, the primary pulses are around 200 Hz, while the secondary pulses seem to be around 50-70 Hz by estimation (one cycle is 14 to 17 msec long).

Figure 6 Spectrogram of harsh voice with aryepiglottic fold vibration (TV2: Adult male villain from Teshigawara [forthcoming]) uttering the phrase /naniosite/ "What rare youl doing?"



5 Conclusions

In this paper, hypotheses about the auditory and acoustic characteristics of voices of heroes and villains in Japanese animation were formulated, based on findings from the research literature on vocal cues of personality and emotion. A study using 20 TV animated cartoons was conducted. An auditory analysis using Laver's (1980, 1994, 2000) framework was performed on the voices of 92 characters (46 heroes and 46 villains). The auditory characteristics of heroes' voices were an absence of pharyngeal constriction (slight expansion in some heroes) and breathy voice, which coincided with Hypotheses 1a and 1b. By contrast, the main auditory characteristics of the majority of villains' voices were pharyngeal constriction and harsh voice caused by tense laryngeal tension settings, which was in accordance with Hypothesis 2. However, in a majority of female and some male villains, pharyngeal expansion accompanied by lowered larynx was observed. Hypothesis 3, which states that the voices of villains are more unique and exhibit wider variety, was also confirmed. Following the auditory analysis, a spectrographic analysis was performed, in which acoustic correlates of some of the auditory characteristics mentioned above were identified; examples of modal voice, breathy voice, and harsh voice with aryepiglottic fold vibration were discussed.

Based on these findings, Teshigawara (forthcoming) is further developing this study to incorporate findings from a variety of disciplines, including voice quality research in auditory phonetics (Esling, 2000; Laver, 1980, 1994,2000); acoustic phonetics; and psychological studies on vocal cues of personality and emotion (Hecht and LaFrance, 1996; Scherer, 1986; Yarmey, 1993). Aspects not covered

in this study, such as an auditory analysis of supralaryngeal settings, pitch and vowel formant analyses, and Japanese lay people's perceptions of the voices, will be discussed in the study. Careful examination of both the auditory and acoustic characteristics of these voices will result in a better understanding of the vocal cues to personality and emotion and vocal stereotypes. In addition, auditory and acoustic analyses of the voices of villains may contribute to a fuller understanding of pharyngeal and related articulations, a subject which has been studied extensively by Esling and his colleagues (Esling, 1996, 1999; Esling and Edmondson, 2002; Esling et 4 1994).

Notes

'In this *study,* the variety of heroic types whose voices are analyzed was limited to a prototypical heroic type, i.e., that representing good (i.e., a champion of justice) as opposed to evil, which is represented by villains. (See Levi [1998] for the types of heroic characters found in Japanese animation.) Where more than one heroic character appears as a member of a group and is treated equally importantly in the story, those on the sidekick side were also included in the analysis.

[2]Hecht and LaFrance (1995) used both male and female speakers, whereas Yarmey (1993) used only male speakers; therefore, only the first half of the hypothesis, which was based on Hecht and LaFrance (1995), includes female heroes.

[3]A further vocal characteristic was found to be statistically significant in Yarmey (1993)—"deep". However, since the auditory correlate of this characteristic, low pitch, conflicts with high pitch, which was drawn from Hecht and LaFrance (1995), it is not included in the hypothesis.

[4]In addition to this condition, the following conditions were stated in the advertisement soliciting suggestions on animation titles: heroes must not get involved in criminal activities such as theft; it is desirable that heroes be good-loolungand villains not.

)it should also be noted that of the four, the two (PHM2 and QHM2) who showed more constant pharyngeal constriction, are not principal characters in the stories.

[6]One speaker TV2, whose spectrogram is shown in Figure 6, is from the preliminary study in Teshigawara (forthcoming).

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The Acquisition of Clitics in Greek: a Phonological Perspective

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1. Introduction

This paper deals with the phonological aspects of the acquisition of clitics in Greek. The problems related to this topic are a) whether we can account for the emergence of single enclitics and proclitics and clitic pairs on purely phonological grounds, b) whether children favor unmarked structures, that is, single clitics, over marked ones, i.e. clitic pairs and, finally, c) if children exhibit distinct developmental stages. An issue emerging from the above is whether the representation of single clitics and clitic pairs provides evidence for the existence of the clitic group in Greek child language (Hayes 1984, 1989, Nespor and Vogel 1986).

2. Theoretical Preliminaries

Clitics can be considered to be weak elements drawn from the non-lexical[1] (closed) classes of pronouns, prepositions and grammatical particles. The examples of Dutch clitics in (1) demonstrate that in the case of pronominal clitics the weak forms are preferred over the strong ones. Clitics are always dependent on the word that hosts them. The English examples in (2) indicate that this dependence is not only structural, but also influences the phonological status of the clitic. Clitics are, furthermore, considered to be failing to receive stress, because they are inherently unstressed (cf. Kenstowicz 1994).[2] Finally, clitics are normally monosyllabic. In terms of Phonology, what is generally assumed by cliticization is the adjunction of floating clitic syllables to higher prosodic structure by stray syllable adjunction to a neighboring phonological word (Berendsen 1986).

(1) a. Je vergist je / *jou → [jə vərˈɣist jə] 'you're making a mistake'
b. Schaam je / *jou → ['sxaːm jə] 'shame on you'
(examples from Booij 1996)

(2) a. Jack's a fool → [ʤæks], *[ʤækz]
b. Ray's a fool → ['reiz], *['reis] (examples from Klavans 1985)

In her definition of prosodic clitics, Selkirk (1995,1996) argues that they are morphosyntactic words that are not themselves PWds. She assumes that prosodic clitics fall into three major categories, free, internal, and affixal clitics, depending on their phonological representation, as is shown in (3).

(3) (i) free clitics *(fnc (lex)* $_{PWd}$*)* $_{PPh}$
(ii) internal clitics *((fnc* la*)* $_{PWd}$*)* $_{PPh}$
(iii) affixal clitics *(fnc (lex)* $_{PWd}$*)* $_{PWd}$*)* $_{PPh}$

In addition, a lot of debate has been going on among theoreticians, who argue for or against the existence of the so-called Clitic Group (hereafter CG) as a separate layer in the prosodic hierarchy. According to the supporters of the CG, clitics should not be forced in either of the categories of the phonological words and phonological phrases (Nespor and Vogel 1986, hereafter N&V). N&V (1986) claim that the CG should be the first phonological constituent above the prosodic/phonological word. As a result, the difference between the Prosodic hierarchy that Selkirk (1995,1996, among others) proposes and the one proposed by N&V is the addition of the CG tier, as is shown in (4).

(4) a. *Selkirk 1995, 1996*

Utt	Utterance
IP	Intonational Phrase
PPh	phonological phrase
PWd	Prosodic word
Ft	Foot
σ	syllable

b. *Nespor* and *Vogel 1986*

Ph. Utt.	Phonological Utterance
IP	Intonational Phrase
Ph	Phonological phrase
CG	**Clitic Group**
PWd	Prosodic Word
Ft	Foot
σ	syllable

Researchers who argue for the existence of the CG rely on phonological processes that take place within its domain, such as stress readjustment in Hungarian[7] (Vogel 1990) (see (6)), vowel deletion and s, z-palatalization in English (see (7)), a) stress readjustment, b) vowel deletion in word edges, c) assimilatory processes, and d) nasal deletion in Greek (see (8a,b,c,d respectively) (Hayes 1984, NV 1986).

(6) a. az 'egyetern 'the university'
b. 'gabor meg 'and Gabor'

(7) a./'loraz 'ʃadoʊ/ → ['loraʒ 'ʃadoʊ] 'Laura's shadow'
(fast or sloppy speech)

(8) a. /a'ɣorase to/→ [a'yora'seto] 'buy-2ND.SG.IMP. it'
b. /to 'exo/→ ['toxo] 'it have-1ST.SG. PRES. MD.'
c. /o 'kosrnos mu/→ [o 'kosmozmu] 'word- NOM. SG. MASC. my'

d. /tin 'vlepo/→ [ti 'vlepo] 'her see 1ST. SG. PRES. IND.'

Other researchers reject the existence of the CG and suggest that clitics are incorporated into or are adjoined to a neighboring prosodic word, or are incorporated into other categories of the prosodic hierarchy depending on the language's requirements. In such proposals, there is no need for the CG (Selkirk 1995, Berendsen 1986, Zec and Inkelas 1992, Booij 1996, Peperkamp 1997).

In this paper we will only deal with pronominal clitics, both single (see (8a), (8b), (8d)) and clitic pairs (see 10). These clitics are weak/ short forms of the 1st, 2nd, 3rd sg. and pl. personal pronouns, which encode features of direct (ACCUS) and indirect (GEN) object.[4]

(9)

SG GEN	mu	'me'	PL GEN	mas	'us'
	su	'you'		sas	'you'
	tu/tis/tu	'him'		tus	'them'
SGACC	me	'me'	PLACC	mas	'us'
	se	'you'		sas	'you'
	ton/tin/to 'him/her/it'			tus/tis ή tes/ta	'them'

(10) a. /'ðjavase mu to/→ ['ðjava'semuto], ['ðjava'setomu], ['ðjava'stomu]$_{PRWD}$ 'read-2ND.SG.IMP. ME-IT' or 'read-2ND.SG.IMP. IT-ME.'

b. /mas to 'eðose/ → [mas to 'eðose], [mas 'toðose] 'us-them-cook-3RD.SG.PRES.IND.'

3. The evidence from child data

The data used for this study come from 6 children, 3 male and 3 female. They come from two corpuses, the corpus collected by M. Tzakosta and by E. Metaxaki respectively. They are transcribed into the P A and they are currently classified into a formal database (University of Leiden Centre for Linguistics). The period during which the data were collected for each child is indicated by the children's age at the first and last session, next to their names in (11).

(11)

Melitini[5]	: 1;07.05-2;04.27
Bebis 1	: 1;09.22-2;10.23
Bebis 2	: 1;10-2;01.05
Felina	: 1;11.07-3;09.19
Dionisis	: 2;01-2;09
Marilia	: 2;07.06-3;05.23

Before we go into the general observations of the data, we find it essential to briefly report on the basic characteristics of the accentual system of Greek in general and Greek child language in particular. Greek is a quantity insensitive left-headed (trochaic) language, which builds its trochees from right to left. Word stress on the right edge of the word (End Rule Right). There is no overt foot iteration to the left in the lexical component of Standard Greek. Even in derivation and compounding the rightmost stress survives. Extrametricality is observed at the right edge of the word. (see Drachman and Malikouti-Drachman 1999, Revithiadou 1999 and more references therein).

With respect to clitics, proclitics occur in finite environments (pre-verbally) and enclitics emerge in non-finite environments (post-verbally). According to Drachman and Malikouti-Drachman (1999), proclitics, as pre-stressed syllables, are metrified post-lexically and get only rhythmic stress, whereas enclitics fall within the right-edge trisyllabic window and, consequently, the addition of stress, due to window violations, affects them. Drachman and Malikouti-Drachman (1999) assume that Greek clitics are bound affixes functioning as either possessives with noun hosts, as direct or indirect object pronominals with verb hosts, or indirect object pronominals with adverb hosts.

Greek children's earlier productions, on the other hand, make broad use of the Minimal Word Template, which has been proven to be very important for Prosodic-Morphological phenomena for both adult and child language (McCarthy and Prince 1990 for adult language, Demuth 1995, Demuth and Fee 1992, Pater 1998, for English child language, Fikkert 1994, for Dutch child language, Kappa 2000, Tzakosta 2000a, b, for Greek child language). While Kappa has argued for a trochaic Minimal Word Template in Greek child language, we have argued (2000a, b) for a less strict trochaic Minimal Word template, simply, because the high percentage of disyllabic word minima stressed on the final syllable cannot be accounted for by means of a trochaic minimal word (see Pater 1998, for a comparable analysis on English child language).[6] In this paper, we will further consider (C)V(C).(C)V(C) words stressed on either the initial or the final syllable, to be minimal words, given the fact that Greek is a quantity insensitive language.

3.1. Data and general observations

The major data observations are the following:

1. Enclitics are the first clitics that emerge and are the 'favorite' clitics in child language. Proclitics appear later than enclitics.[7] The reason for this is that single enclitics are post-stress elements and they easily become part of the minimal word (as defined above for Greek) produced, as is shown in (12). In (12a-c) a word + enclitic form that can appear as either fused or not fused in the adult form (this is indicated by the parenthesized segment) is selected to be produced as fused in the children's production. The examples in (12d-f) below indicate that the clitics

(which are in bold in all examples) are fully footed. This shows, that children do not treat clitics simply as extrametrical syllables.

(12) a. /'ðos(e)mu/→ **['ðo.sem],** ['ðo.bu], **['ðo.mu]**
'give-2^{ND} SG.IMP.ME'
b. /'ðos(e)mu/→ ['ðo.θmu] 'give-2^{ND}.SG.IMP. IT'
c. /'vɣal(e)to/→ ['vɣa.to] 'take out-2^{ND}.SG.IMP. IT'
d. /'par(e)ti(n)/→ [('pa.ti)], [('pa.ti).ne] 'take-2^{ND}.SG.IMP. HER'
e. /'ðos(e)to/→ [e.('jo.to)] 'give-2^{ND}.SG.IMP. IT'
f. /'par(e)to/→ [('pa.to).no] 'take-2^{ND}.SG.IMP. IT'
g. /ti 'vazo/→ ['va.zo] 'IT put-1^{ST}.SG.PRES.IND.'
h. /θa to 'paro/→ ['pa.ro] 'IT take-1^{ST}.SG.FUT.IND.'

With respect to clitic pairs, there also cases, where one of the members of the clitic pair is word internal and not adjoined to the phonological word. This is a characteristic of both adult and child language in Greek, as shown in (13).

(13) a. /'ðose'mu-tin/→ $[['ðo.mu.]_{prwd}ti]_{prwd}$
'give-2^{ND}.SG.IMP. ME-HER'
b. /'ðose'mu-to/→ $[['ðo.mu.]_{prwd}to]_{prwd}$, $['to.to.]_{prwd}mu]_{prwd}$
'give-2^{ND}.SG.IMP. ME-IT'

2. Enclitics (and sometimes proclitics, as will be shown by the statistics tables below) are word internal (examples in (12) above and (14a-c) below).

(14) a. /'to '(e)xo/→ ['to.co] ' IT-have-1^{ST}.SG.PRES.IND'
b. /'tin '(e)vales/→ ['ti.va.leθ] 'HER- put-2^{ND}.SG.PAST.IND'
c. /'to '(e)kane/→ ['to.ka], [to 'e.ka] 'IT-do-3^{RD}.PAST.IND'

In (14a,b) and the first case of c. the clitics are word internal and they attract stress. Still, I follow other researchers in arguing that clitics are not inherently stressed. Rather, they attract stress at a post-lexical level (cf. Berendsen 1986, Malikouti-Drachman and Drachman 1991).

3. Proclitics become more frequent when a. tenses (i.e. finiteness) and the subjunctive (i.e. mood) start being acquired[8] (see examples in (14) above and (15) below) as well as when b. they undergo fusion, that is, when they become part of the minimal word or the foot (see examples in (13) above and (16) below). In (15) e. and (16) clitics are part of the reduplicated forms produced.

(15) a. /na to 'parume/→ [to 'pa.lu.me] 'IT-take-1^{ST}.SG.PRES.SUBJ'
b. /θa to aɣo'raso/→ [to.ɣo.'la.co] 'IT-buy-1^{ST}.SG.FUT.IND'

c. /to 'veice/→ ['to.bi.ce], ['to.vi.ce] 'IT-find-3RD.SG.PAST.IND'
d. /me 'ðagose/→ ['me.ga] 'ME-bite-3RD.SG.PAST.IND'
e. /θa to 'parume/→ [pa'pa.ru.me] 'IT-take-1ST.PL.PRES.IND'

(16) /to (e)vala/→ ['ve.va.la] ' IT-put-1ST.SG.PAST.IND'

4. Just like single enclitics are the first to emerge, enclitic pairs are also the first to emerge and they become more frequent.

(17) a. /'pare'mu-to/→ ['pa.le.'mu.to], ['pa.le.'to.mu]
'take from-2ND.SG.IMP. ME-IT'
b. /'ðose'mu-to/→ ['ðo.mu.to], ['ðo.ce.'mu.to], ['lo.θe.'mu.to], ['ðo.θe.'mu.to], ['to.to.mu] 'give-2ND.SG.IMP. ME-IT'
c. /na tis ta 'ðoso/→ [na ti 'ðo.co]
'HER-THEM give-1ST.SG.PAST.SUBJ'
d. /mu to 'pire/→ [mu to 'pi.re]
'ME-IT take from-3RD.SG.PAST.IND'

This leads us to assume that the emergence of clitics is related to the asymmetry of the left and right edge and the misalignment of proclitics, both single and pairs. We consider the right edge to be far more unmarked in child language compared to the left edge. Post-verbal clitics show much more flexibility with respect to their position compared to pre-verbal clitics (see examples in 12, 13), they are more frequent and appear in many different ways, for example, they undergo fusion or secondary stress is developed (18) in order to be fully footed, stress readjustment takes place correctly at later stages of development (19), they are preferred over pre-verbal clitics, even in cases where clitics should appear in pre-verbal position (20). Finally, they emerge first.

(18) /'maze'pseta/→ ['ma.ze.'tse.ta] 'pick up-2ND.SG.IMP. THEM'

(19) a. /'ftɕakse to/→ ['ɕa.ɕe.to], ['te.pe.'ɕe.to] 'FIX-2ND.SG.IMP. IT'
b. /'val(e)tin/→ ['va.le.'ti.ne] 'put in-2ND.SG.IMP. HER'

(20) a. /θa to 'vɣalo/→ ['ɣa.lo.to] 'take out-1ST.SG.FUT.IND. IT'
b. /θa to 'valo/→ ['va.lo.to] 'put-1ST.SG.FUT.IND. IT'

5. The above findings, especially the fact that clitics are nicely incorporated or adjoined to the prosodic word, lead me to assume that there is no necessity whatsoever to assume the existence of the CG in Greek. More evidence will be provided by my Optimality Theoretic analysis.

3.2. Percentages

In the next section we will provide support for the above observation in terms of the percentages that children exhibit in their productions of clitics. In Table 1 the percentages of production and deletion of single enclitics are given. What is observed is that the percentage of single enclitics preservation is very high for all children. Bebis 2, who is one of the youngest children, exhibits full production of single enclitics. Table 1 should be compared with Table 2, which shows the percentages of single proclitics deletion. It is worth mentioning that, while the number of tokens for proclitics present in the data is higher than that of single enclitics, their percentage of preservation is lower and the percentage of deletion is higher compared to the numbers for single enclitics. This lets us argue that single enclitics are the first to emerge and consequently the more unmarked structures. We assume that the number of tokens for single enclitics is lower only because we started our recordings during the stage that proclitics started being produced more often. Consequently, we believe that there is a stage earlier than those existing in our recordings, where all children produced only single enclitics.

Table 1 Single enclitics

	PRODUCED		DELETED		TOTAL
Melitini	90	(95.74%)	4	(4.25%)	94
Bebis 1	107	(97.2%)	3	(2.72%)	110
Bebis 2	16	(100%)	-	-	16
Felina	67	(94.36%)	4	(5.63%)	71
Dionisis	23	(100%)	-	-	23
Marilia	38	(100%)	-	-	38

Table 2 Single proclitics

	PRODUCED		DELETED		TOTAL
Melitini	304	(92.28%)	24	(7.31%)	328
Bebis 1	332	(88.29%)	44	(11.70%)	376
Bebis 2	9	(34.61%)	17	(65.38%)	26
Felina	369	(95.34%)	18	(4.65%)	387
Dionisis	205	(93.18%)	15	(6.81%)	220
Marilia	195	(100%)	-		195

In table 3 the percentages of the emergence of fused single enclitics and proclitics are given. As we can see the percentages are very high for both categories, except for Bebis 1 fused enclitics productions. This is further evidence for the fact that enclitics, but especially proclitics start being produced properly as long as they fall within the templatic limits posed by Phonology (minimal prosodic words). This

also indicates that it does not take only tenses being acquired for proclitics to be produced. Phonology clearly outranks syntax.

Table 3 Fused single clitics

	FUSED ENCL.	FUSED PROCL.
Melitini	(68.75%)	(78.46%)
Bebis 1	(36.58%)	(79.72%)
Bebis 2	(100%)	
Felina	(86.20%)	(33.33%)
Dionisis	(60.86%)	(49.05%)
Marilia	(71.42%)	(86.04%)

In tables 4 and 5 we provide the percentages for the emergence and deletion of enclitics and proclitics pairs. We observe that enclitics pairs are fully produced, whereas enclitic pairs show some deletion. This supports the idea that enclitics, both single and pairs, are produced first and, as a result, unmarked, while proclitics, both single and pairs, are acquired later and are more marked structures compared to enclitics.

Table 4 enclitic pairs

	PRODUCED	DELETED	TOTAL
Melitini	8 (100%)	-	8 (100%)
Bebis 1	6 (100%)	-	6 (100%)
Bebis 2	-	-	-
Felina	13 (100%)	-	13 (100%)
Dionisis	1 (100%)	-	1 (100%)
Marilia	-	-	

Table 5 proclitic pairs

	PRODUCED	DELETED	TOTAL
Melitini	2 (66,66%)	1 (33,33%)	3 (100%)
Bebis 1	3 (75%)	1 (25%)	4 (100%)
Bebis 2	-	-	-
Felina	7 (100%)	-	7 (100%)
Dionisis	4 (100%)	-	4 (100%)
Marilia	4 (100%)	-	4 (100%)

In tables 6 and 7 the total percentages of production and deletion of all categories of clitics are shown.

Table 6 Total (production)

	SIN.ENCL.	SIN.PROCL.	ENCL. PAIRS	PROCL. PAIRS	TOTAL
Melitini	90 (22,27%)	304 (75,24%)	8 (1,98%)	2 (0,49%)	404 (100%)
Bebis 1	107 (23,88%)	332 (74,10%)	6 (1,33%)	3 (0,66%)	448 (100%)
Bebis 2	16 (64%)	9 (36%)	-	-	25 (100%)
Felina	67 (13,92%)	369 (76,71%)	13 (2,70%)	7 (1,45%)	481 (100%)
Dionisis	23 (9,87%)	205 (87,98%)	1 (0,42%)	4 (1,71%)	233 (100%)
Marilia	38 (47,50%)	38 (47,50%)	-	4 (5%)	80 (100%)

Table 7 Total (deletion)

DELETED	SIN.ENCL.	SIN.PROCL.	ENCL. PAIRS	PROCL. PAIRS	TOTAL
Melitini	4 (13,79%)	24 (82,75%)	-	1 (0,03%)	29 (100%)
Bebis (Met.)	3 (6,25%)	44 (91,66%)	-	1 (2,66)	48 (100%)
Bebis (Tz.)	-	17 (100%)	-	-	17 (100%)
Felina	4 (18,18%)	18 (81,81%)	-	-	22 (100%)
Dionisis	-	15 (100%)	-	-	15 (100%)
Marilia	-	-	-	-	-

3.3. Developmentalstages

The above lead us establish 3 developmental stages in the acquisition of clitics in Greek. The ages in parenthesis are not indicative of the ages that the acquisition of clitics covers in general, but only of the mean age of the children under investigation.

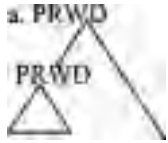
stage 1: single enclitics emerge, no proclitics. Instances of enclitics instead of proclitics but never vice versa (1;07.05-1;10)

stage 2: single proclitics and enclitic pairs are produced, stress retraction takes place (1;10-2;07)

stage 3: enclitics and proclitics, both single and pairs emerge. Stress readjustment takes place correctly (after 2;06)

Given the widely held assumption that the input to the children is the output adult form, we provide the input representation of clitics to children, **i.e.** the adult form, in (21) below. The final representation (21.**d.b)** is not found in our data. This indicates the fact that this representation is the most marked for children to perceive.

(21) a. Single enclitics



verb **cl** (affixal)

b. PRWD

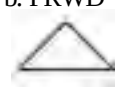
Verb cl
(word internal)

b. Single **proclitics**

a. PRWD

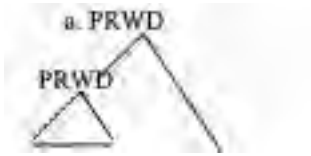
cl verb (affixal proclitic)

b. PRWD



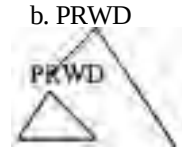
verb **cl**
(internal proclitic)

c. enclitic pairs



verb **cl + cl**
(adjoined cl. clitics)

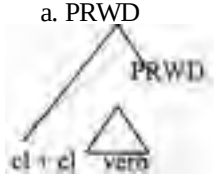
b. PRWD



verb cl **cl**
(part of the cluster is word internal)

d. proclitic pairs

a. PRWD



(adjoined **cl.clitics)**

b. PRWD

(part of the cluster **=** internal)

4. OT analysis

Within OT[8], the proposed constraints are a. those mainly known as constraints on prosodic domination[9], b. alignment constraints, c. other well-formedness constraints. The constraints involved in our analysis are:

EXH
NONREC
MINWD = (C)V(C)(C)V(C) constructions
ALIGN-CL-L/R[10]: The left (right) edge of clitics coincides with the left (right) edge of the PWd.
INTEGRITY: no part of the word (PWd) is deleted
FAITH CLITICS: (en/pro)clitics in the input also surface in the output

4.1. Developmental stages and OT analysis

Given the developmental stages discussed above, the relevant constraint rankings are the following:

Stage 1
monosyllabic enclitics emerge, but no proclitics. Rare substitution of enclitics for proclitics.

MINWD, FAITH(clitic), ALIGN-CL-R>>EXH, NONREC>>ALIGN-CL-L >>INTEGRITY

Under this constraint ranking and given an input, such as /'ðosetɔ/, the possible candidates can be a) [['ðo.se]$_{PWD}$ to]$_{PWD}$, b) ['ðo.tɔ]$_{PWD}$, and c) ['ðo.se.tɔ]$_{PWD}$. The winner is candidate b), since it satisfies all constraints of the higher stratum. Candidates a) and c) crucially violate the constraint that requires word minimality. For the same reason, given the input /θa to 'paro/, and the possible candidates a) [Ba to 'paro]$_{PWD}$, and b) ['palo]$_{PWD}$, the loser is candidate a), because it fatally violates word minimality and alignment of the clitic to the right of the prosodic word. The preference for enclitics, even when the input requires proclitics, is, again, satisfied by the same ranking in this first stage of development. As a result, given an input /θa to 'vɣalo/ and the candidates a) [[to ['ɣalo]$_{PWD}$]$_{PWD}$, and b) ['ɣaloto]$_{PWD}$ the correct output is b).

Stage 2
Single proclitics and enclitic pairs are produced, stress retraction takes place.

MINWD, FAITH (clitic), ALIGN-CL-R, ALIGN-CL-L>>EXH, NONREC, INTEGRITY

At this stage, proclitics start being produced. Consequently the constraint requiring alignment of the clitic to the left of the PRWD is promoted. In the case of the acquisition of clitics we can hardly have an analysis in terms of constraint

demotion, since both enclitics and proclitics are produced. Both **ALIGN-CL-L** and **ALIGN-CL-R** are ranked in the higher stratum. The constraint on word minimality is still highly ranked. As a result, proclitics are produced as long as they are part of minimal prosodic word. This is a condition that phonology imposes. For example, in the case of the input **/to 'exo/** and the possible output candidates a) ['toco]$_{PWD}$, b) [[to ['exo]$_{PWD}$] $_{PWD}$, and c) [to 'exo]$_{PWD}$, the winner is a). The violation of constraints, such as **INTEGRITY** is not fatal, since these constraints are lower ranked. The same happens with an input lme **'ðagose/** and the candidates a) [me 'ðagose]$_{PWD}$, and b) ['me:go]$_{PWD}$. The winner is b).

Stage 3
Enclitics and proclitics, both single and clitic pairs emerge. Stress readjustment takes place correctly.

ALIGN-CL-L, ALIGN-CL-R, **FAITH(clitic), INTEGRITY>>EXH,** NONREC, **MINWD**

Since all kind of clitics, enclitics, proclitics, single and pairs are produced in this stage, we assume that all ALIGN constraints are promoted in the higher stratum. Given an input **/'pare, muto/** and the candidates a) **['pale, tomu]** $_{PWD}$, b) **['pale,** muto]$_{PWD}$, and c) ['pato]$_{PWD}$, a) and b) are equally correct outputs, since they violate only the constraint on word rninimality. C) loses because it violates the highly ranked constraint on INTEGRITY. In another example, for an input such as **/θa** mu to **'ðosis/** and the possible outputs a) [[e mu to [ðoθiθ] $_{PWD}$] $_{PWD}$, b) ?[[to mu [ðoθiθ]$_{PWD}$] $_{PWD}$, and c) [ðoθiθ] $_{PWD}$, the correct output is a). b) could also be a winner given phonological constraints, but this output is ungrammatical on the basis of other syntactic constraints.

With respect to the CG, the representations that we have provided and the possible OT candidates demonstrate that there is no necessity for a CG. Especially in terms of OT, we can perfectly account for the data without making use of a special constraint refemng to the CG. Moreover, the additionlintroductionof anew constraint would not be economical for the theory, especially since the given tools are enough and precise for a phonological account of clitics (see also Peperkamp 1997, Drachman and Malikouti-Drachman 1999, Revithiadou 2002).

5. Conclusions

The above findings verify an enclitics – proclitics asymmetry, which was also explored for adult Greek (Revithiadou 2002). Enclitics, both single and clusters, are the favorite clitics of children acquiring Greek. This conclusion is further supported by the higher percentage of enclitic production and retention, their flexibility with respect to their position and their phonological coherence. It is never the case that enclitics are **phonologically** less coherent than proclitics within a language

according to Peperkamp (1997). Single clitics are produced before clitic pairs. In that case, enclitic pairs come first.

Given the phonological representations proposed above (see 21), there is no evidence for the theoretical necessity of the CG. The processes suggested by N&V (1986) are not enough evidence for the CG. Asymmetries between proclisis and enclisis provide additional evidence against the clitic group (see also Peperkamp 1997). We can rather talk about clitics integrated into the PWDs.

In terns of OT, developmental stages in the acquisition of clitics are represented by the parallel (de)activation of constraints, for example the constraint ALIGN-CL-R is deactivated when proclitics are assessed, and by means of constraint promotion rather than constraint demotion. Constraint demotion cannot account for the simultaneous emergence of marked and unmarked structures. Constraint promotion would rather be the means to analyze such patterns (see Bernhardt and Stemberger 1998 for a comparable analysis).

We believe to have adequately showed that Phonology totally outranks Syntax in first stages of language development (contra Golston 1995, who argues that 'prosody chooses between structures which are equally well-formed syntactically' (p. 343), but in line with Bošković 2001). The acquisition of clitics in Greek is an instance of prosodic bootstrapping because it provides further evidence about the role of prosody in the acquisition of syntactic structures (see Demuth et al. (2000) for an account of object ellipsis in Sesotho).

Acknowledgements

Special thanks to V. van Heuven, J. van de Weijer, J. Kooij, C. Levelt, A. Revithiadou for useful discussion and comments as well as the participants of the Leiden Phonology group where the paper was first presented. I also thank the participants of WECOL 2002, especially J.P. Stemberger for useful feedback. All errors are mine.

Notes

1. There is a long ongoing debate with respect to the status of clitics in Greek. Joseph (1988) and Condoravdi and Kiparsky (2001) assume that clitics are affixes. Condoravdi and Kiparsky (2001) further assume clitics to be lexical in certain Western Greek dialects. See also Drachman and Malikouti and Drachman (1999) for the same issue.
2. See Malikouti-Drachman and Drachman (1991) for a cyclic account of the Greek clitic stress.
3. Vogel (1990) claims that primary stress is assigned in a domain larger than the phonological word and smaller than the phonological phrase. Primary stress always falls on the first syllable in Hungarian. When clitics are present, however, the

primary stress is on the first syllable of the lexical item; only one primary stress surfaces.

4. For more details on weak syllable omissions, an issue related to clitic omission, see Gerken 1991, 1994, Gerken, Landau and Remez 1990, Gerken and McIntosh 1993, Carter and Gerken 1998, Carter 1999. Nevertheless, the above studies are not directly related to the present one, because they do not refer to pronominal clitics but mainly to subject and article omissions in English.

5. The data of Melitini, Bebis 2, Dionisis and Marilia come from Tzakosta's corpus, whereas the data of Bebis 1 and Felina come from Metaxaki's corpus.

6. As soon as Greek children encounter words stressed on the final syllable they keep the stress on the final syllable in their truncated forms. For a more detailed account see Tzakosta (in prep.).

7. Marinis (2000) argues that enclitics appear the same period with proclitics in Greek child language.

8. Boskovid 2001 for a relevant discussion on the syntax-phonology interface of the clitic position.

9. For OT analyses of clitics see also Anderson 1996, 2000, Billings 2002, Legendre 2000, O'Connor 2002, Revithiadou 2002.

10. The constraints on Prosodic Domination are those defining the relations between the different layers of the units of the Prosodic Hierarchy, namely:

(i) Layeredness= No C^i dominates a $C^j, j>i$ (no a dominates a Ft),

(ii) Headedness= any C^i must dominate a C^{i-1} (except if C^i = a) (A PWd must dominate a Ft)

(iii) Exhaustivity= No C^i immediately dominates a constituent $C^j, j<i-1$ (No PWd immediately dominates a Ft)

(iv) Nonrecursivity = No C^i dominates C^j, j=i (No Ft dominates a Ft)

11. Anderson (1996, 2000), and Legendre (2000) have introduced the use of alignment constraints in their analyses of clitics.

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Fall-Rise, Topic, and Speaker Noncommitment*

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1 Introduction

Recent work on information structure and dynamic semantics has inspired new interest in old puzzles about the interpretation of intonation. In general, this work has followed two paths. One approach, building on the information packaging literature, explores the way that prosody, syntax and semantics interact to give rise to a representation that is more fine-grained than a proposition. This fine-grained representation is then linked to pragmatic factors (see, e.g., Büring 1997,2000, Steedman 2000; classic work includes Jackendoff 1972.) The other approach explores direct links between prosody and pragmatics, most commonly by identifying particular speaker attitudes or speech acts with intonational contours or parts of contours (see, e.g., Pierrehumbert & Hirschberg 1990, Bartels 1997, Gunlogson 2001, and, arguably, Schwarzschild 1999). Although the two approaches are compatible in principle, often it's not clear whether a particular phenomenon is best characterized with the mediation of information structure or as a direct prosody-pragmatics relationship. Determining this is one of the "big questions" in the study of intonation.

This paper addresses one aspect of this larger issue by focusing on the interpretation of the so-called "fall-rise contour on English declaratives. Recent research has identified the pitch accents of the fall-rise contour with a category of information structure called "(contrastive) topic" (Büring 1997, 2000) or "theme" (Steedman 2000). The aim of this paper is to show that it is also worthwhile to consider the direct relation of the fall-rise contour to pragmatics.

My proposal captures the distribution of the contour in terms of a condition on the context, without reference to ,information packaging. After considering the distribution of fall-rise in responses to interrogatives and declaratives, I develop a unified analysis of these facts that claims, intuitively speaking, that fall-rise intonation indicates a failure to resolve an issue. This analysis is quite simple and intuitively plausible, demonstrating that an investigation of direct relationships between prosody and pragmatics can lead to insights that complement the results of work on information structure.

The contour usually called "fall-rise" actually consists of a rise-fall-rise between the nuclear accent and the end of the intonational phrase, and includes the two contours notated as L*+H LH% and L+H* LH% in the Pierrehumbert system (Ladd 1980, Ward & Hirschberg 1985, Steedman 2001). In many contexts either fall-rise or the falling contour is possible, with clear differences in interpretation. For example, if B's response in (1) bears the falling contour it is taken as a complete direct answer, while if it bears the fall-rise contour it is taken as a partial answer.

(1) A: Who came to the party?
B: VeRONica did.'

There are environments, however, where just one of the contours is possible on a declarative. For example, in (2) below fall-rise is impossible on B's response.

(2) A: John ate some of the cookies.
B: John ate MANY of the cookies. (*fall-rise (henceforth FR))

Section 2 of the paper investigates the distribution of the fall-rise contour. The observations in section 2 motivate the analysis developed in section 3, which draws on recent work in dynamic semantics by Groenendijk (1999) and Gunlogson (2001).

2 The Distribution of Fall-Rise

Fall-rise cannot be used out of the blue – there must be some prior context. It is infelicitous for a speaker to walk into a room and suddenly produce (3) with fall-rise intonation. However, the context supporting fall-rise need not be linguistic, as demonstrated in (4), an example suggested to me by Ken Safir.

(3) It's RAINing. (*FR)

(4) [A and B are in an elevator, waiting to go to the 19th floor. C enters and pushes buttons 1-20. B grimaces at A in disgust.]
A: Well, we're getting off at ONE of those floors.

Fall-rise is not particularly good on the last move in a discourse either. If the discourse in (4) ends after B's utterance, we have the impression that something is left unresolved. This intuition is supported by the fact that fall-rise is acceptable on partial answers but not on complete direct answers: after a partial answer we expect further discussion but after a complete answer the discourse can presumably end.

Two obvious questions arise from the observation that fall-rise can be used neither discourse-initially nor discourse-finally: what contexts license the subsequent use of fall-rise, and what must remain unresolved following its use?

2.1 Licensing Fall-Rise

Although some analyses of fall-rise (Ward & Hirschberg 1985) and "topic" pitch accents (Büring 1997, 2000) have focused solely on the use of fall-rise in question-answer contexts, it is important to note that fall-rise is licensed after either an interrogative or a declarative. Below, we see that fall-rise is possible following a constituent or alternative question, as in (5), a polar question, as in (6), or an it-cleft or sentence with only, as in (7).

(5) A: Who read the book?/Did Veronica read the book or did Robin?
B: VeRONica did.

(6) A: Did Robin read the book?
B: VeRONica did.

(7) A: It was Robin who read the book./Only Robin read the book.
B: VeRONica also read the book.

The one context in which fall-rise is not obviously licensed is immediately following a plain falling declarative, as in (8) below.

(8) A: Robin is taking the seminar.
B: VeRONica is taking the seminar. (??FR)

However, with minimal support, this use of fall-rise is acceptable to most speakers:

(9) A: Robin is taking the seminar.
B: No, she's not, but VeRONica is taking the seminar.
B': Yes, she is, and VeRONica is taking the seminar (too).

In (9), B corrects A's assertion, while B' adds to the information given by A. Notice that in (8) B's response could be taken either as a correction or as an addition to A's assertion. I will assume that the infelicity of (8) is due to the fact that it's not clear whether to take B's response as a correction or as an addition. Given this assumption, we can conclude that fall-rise is potentially licensed following any declarative – that is, the syntactic structure of the utterance preceding a declarative bearing fall-rise does not appear to be relevant for the licensing of the contour.

2.2 Scalar Effects

Although we have seen discourse fragments in which fall-rise is licensed after utterances of various syntactic types, the use of the contour is not entirely unconstrained. In question-answer contexts, we have seen that fall-rise is limited to partial and indirect answers. The distribution of the contour in all-declarative contexts can be clarified by considering the interaction of fall-rise with scalar semantics.

Let's consider the use of fall-rise on declaratives where the item bearing the pitch accent expresses a degree or extent on a scale. Below, we see that (10B) is acceptable with fall-rise, but (11B) is not. In each case, B's response is acceptable with falling intonation.

(10) A: John ate many of the cookies.
B: John ate SOME of the cookies.

(11) A: John ate some of the cookies.
B: John ate MANY of the cookies. (*FR)

In (10), B's response expresses a lower degree or extent on the relevant scale than A's assertion, while in (11) the degree or extent is increased. It seems, then, that the degree expressed by a declarative bearing fall-rise must be lower than the degree expressed in the previous move.[3] But not too much lower: a response that changes the polarity of the previous scalar item cannot bear fall-rise, as shown in (12). A response expressing the endpoint of a scale also cannot bear fall-rise, as shown in (13).

(12) A: John ate some of the cookies.
B: John ate FEW of the cookies. (*FR)

(13) A: John ate few of the cookies.
B: John ate NONE of the cookies. (*FR)

These facts suggest that fall-rise is subject to the requirement stated below.

(14) The Nonentailment Condition: Following a declarative with propositional content p, fall-rise is licensed on a declarative whose content does not entail either p or $\neg p$.

On the face of it, this generalization is challenged by the acceptability of fall-rise on responses that are word-for-word repetitions of the previous statement:

(15) A: The movie was good.
B: (Yes), the movie was GOOD.

The content of B's response in (15) clearly entails the content of A's statement, but fall-rise is acceptable. However, notice that ***good*** is a vague item, and B's response intuitively conveys some doubt about just how good the movie was. Perhaps this response is possible with fall-rise because ***good*** can be coerced to a slightly lower degree than usual, so that the Nonentailment Condition is in fact met. In fact, if the pitch accent of fall-rise occurs on a scalar item that is not vague, word-for-word repetition is not acceptable.

(16) A: That movie was the best.
B: (Yes), that movie was the BEST. (*FR)

A similar problem arises with responses that contradict the previous statement by changing just the polarity, such as (17) below.

(17) A: The movie was good.
B: (No), the movie wasn't GOOD.[3]

Although it seems equally plausible in (15) and (17) to assume that the Nonentailment Condition is met by coercing the vague scalar element to a degree other than the default, contradictions involving non-vague scalar elements unexpectedly appear to be acceptable with fall-rise:

(18) A: That movie was the best.
B: (No), that movie wasn't the BEST. (...But it was pretty good.)

This brings us to the second factor that arguably obscures the Nonentailment Condition: fall-rise can be quite difficult to distinguish from the "Contradiction Contour," first described in Liberman and Sag 1974. The consensus from subsequent work on this contour is that it consists of a low pitch accent and a final rise, that is, it is transcribed as L* LH% in the Pierrehumbert system. (See Ladd 1980 for reasons to distinguish the "Contradiction Contour" from fall-rise.) There is certainly room for experimental work to determine if and when fall-rise can be used on contradictions, but this is beyond the scope of the present paper, and I will disregard contradictions henceforth.

We can conclude, in spite of the apparent problems raised by contradictions and word-for-word repetitions, that in all-declarative contexts the use of fall-rise is subject to the Nonentailrnent Condition.

2.3 Fall-Rise and Exhaustivity

Fall-rise cannot occur in the same utterance with the operators ***only*** and ***alone*** or with it-clefts, all of which require an exhaustive interpretation (E. Kiss 1998). In (20-22) below, responses to (19), only falling intonation is felicitous.

(19) (John solved the problem.)
(20) Only VeRONica solved the problem. (*FR)
(21) VeRONica alone solved the problem. (*FR)
(22) It was VeRONica who solved the problem. (*FR)

On the other hand, fall-rise can cooccur with the operators also and too, which do not involve exhaustivity; both of the falling and fall-rise contours are acceptable on (24-25) below.

(23) (John solved the problem.)
(24) VeRONica also solved the problem.
(25) VeRONica solved the problem, TOO.

These facts follow from what we have seen so far about the distribution of fall-rise. In question-answer contexts, it is unlikely that a construction requiring an exhaustive reading, if it is a relevant response at all, will be anythiig other than a complete answer. (I assume a separate principle of relevance.) Since fall-rise is licensed only on partial and indirect responses in question-answer contexts, we do not expect fall-rise to be licensed on a statement with an exhaustive reading. Likewise, in all-declarative contexts we have seen that fall-rise is subject to the Nonentailment Condition. But a declarative with an exhaustive reading can hardly fail to entail either the content of the previous statement or its negation, if the two declaratives are related. Once again, declaratives with an exhaustive interpretation do not occur in contexts in which FR is licensed.

2.4 Interim Summary

In this section we have seen that the distribution of fall-rise can be captured with two conditions on the context. In question-answer contexts, fall-rise is limited to partial and incomplete answers, and in all-declarative contexts, fall-rise is subject to the Nonentailment Condition. In fact, if we take a complete answer to entail the corresponding question (as in, e.g., Groenendijk & Stokhof 1994), then the Nonentailment Condition captures the distribution of fall-rise in all contexts. The Nonentailment Condition on fall-rise is a natural candidate for a dynamic treatment, since it is a condition on the state of the context. The next section develops a dynamic analysis of the interpretation of fall-rise based on the observations of this section.

3 A Dynamic Approach to Fall-Rise

3.1 On Fall-Rise in Question-Answer Contexts

In order to capture the fact that fall-rise is licensed on partial and indirect responses to questions, but not on complete answers, it is necessary to have a model of discourse that has something to say about the effect of questions. The proposal of Groenendijk 1999 is particularly appealing, as it gives an elegant treatment of question updates that is compatible with a standard treatment of assertion. This analysis is essentially a dynamic version of the partition theory of question meanings (Groenendijk & Stokhof 1984, 1994), in which a question is interpreted as a partitioned set of worlds, where each cell of the partition corresponds to one possible complete answer. In Groenendijk 1999, the Stalnakerian context set, or set of worlds in which all of the propositions in the common ground are true, is replaced by a partitioned set of worlds – formally, an equivalence relation on worlds. The updates for declaratives and interrogatives in this approach are given in (26) and (27), respectively. Note that φ! is a metavariable ranging over declarative formulae, and φ? ranges over interrogative formula. A declarative formula denotes a truth value, and an interrogative formula denotes a proposition, namely the complete true answer to the question relative to a world.

(26) $C[\varphi!] = \{\langle w,v\rangle \in C \mid [[\varphi!]]^w = [[\varphi!]]^v = 1\}$

(27) $C[\varphi?] = \{\langle w,v\rangle \in C \mid [[\varphi?]]^w = [[\varphi?]]^v\}$ (p. 113)

The declarative update in (26) eliminates worlds from the context by limiting the equivalence relation to pairs of worlds in which the declarative is true. The interrogative update in (27) sets up a potentially nontrivial partition by limiting the equivalence relation to pairs of worlds in which the answer to the question is the same. Worlds in which the answer to the question is different will no longer be related – they will belong to different cells of the partitioned set of worlds.

This approach provides a straightforward way to characterize the question-answer contexts in which fall-rise is licensed, namely, on partial answers and indirect responses. In these cases, the partition set up by a previous question is not reduced to a single cell. Let us define a context as neutral if the equivalence relation defines a single-celled partition. In other words, the context is neutral if any two worlds in the domain of the equivalence relation are also related to each other, that is, belong to the same cell of the partitioned set of worlds.

(28) A context is neutral iff $\forall w,v \in W$:
$(\langle w,w\rangle \in C \wedge \langle v,v\rangle \in C) \rightarrow \langle w,v\rangle \in C$

Fall-rise is licensed in the opposite case, when the update of the declarative leaves the context in a non-neutral state.

3.2 On Fall-Rise in Declarative Contexts

The second generalization to capture is the Nonentailment Condition, which holds for fall-rise in all-declarative contexts. A standard Stalnakerian model of the context does not provide enough information to capture the Nonentailment Condition. On the standard view, the context consists only of the context set. Once the content of a proposition has been added to the context, it is not possible to refer back to that proposition. But the Nonentailment Condition specifically refers to the content of the previous utterance. It seems that we need more information than is encoded in a standard model of discourse.

One obvious alternative is to assume that the context includes a record of everything that has been said. Indeed, some work on information structure has suggested that we need access not only to a record of the propositional content of previous utterances, but also to their syntactic structure (see, e.g., Aloni & van Rooy 2002, Büring 2000). But this is far more information than is necessary for the problem at hand. There is no evidence that we need access to the syntactic structure of previous utterances, nor do we appear to need access to the content of more than one previous utterance.

The model of discourse proposed in Gunlogson 2001 provides just the information that we need, and no more. In this model, the Stalnakerian approach is enriched by separating the commitments of the discourse participants: the context set is replaced by two or more sets of worlds, each corresponding to the "commitments" (roughly, public beliefs) of one discourse participant. A falling (or falling-rising) declarative is proposed to affect the speaker's commitment set, but not the addressee's, as shown below.

(29) Gunlogson's context: Let the context $C_{(A,B)}$ be $\langle cs_A, cs_B \rangle$, where:
a. A and B are discourse participants
b. cs_A of $C_{(A,B)}$ = (w ∈ W: the propositions representing A's public beliefs are true of w)
c. cs_B of $C_{(A,B)}$ = (w ∈ W: the propositions representing B's public beliefs are true of w) (p. 43)

(30) $C + S_{decl} = C'$ such that:
a. $cs_{spkr}(C') = cs_{spkr}(C) + S_{decl}$
b. $cs_{addr}(C') = cs_{addr}(C)$ (p. 52)

Given this structure, it is no longer necessary for the Nonentailment Condition to refer to the propositional content of a previous utterance. The acceptable uses of fall-rise that we have seen have been responses to assertions by another speaker. This suggests that the Nonentailment Condition can refer to the addressee's commitment set rather than the content of the previous utterance.

(31) Revised Nonentailrnent Condition:
Fall-rise is licensed on a declarative with content p iff p does not entail or contradict cs_{addr}.

The revised condition is probably too strong, in that it rules out the use of **fall-**rise on a statement that entails or contradicts any of the addressee's public beliefs. Still, the revised condition is less arbitrary than the original version, and begins to explain the function of fall-rise. In the contexts in which the revised condition holds, the participants have failed to reach an agreement about the truth or falsity of a proposition, but have not contradicted one another – that is, fall-rise is used when there is still room for discussion about a proposition.

3.3 A Unified Account

The two conditions on fall-rise proposed above, taken separately, each provide a plausible explanation of the connection of fall-rise intonation to the state of the context. However, the analysis is somewhat deceptive in that the conditions on fall-rise in question-answer contexts and in all-declarative contexts appear to be unrelated. This is not an unavoidable result – in section 2.4 above, I suggested that the Nonentailment Condition could describe the distribution of fall-rise in all contexts, given appropriate assumptions about entailment relations between questions and answers. What we need, then, is a way to unify the two conditions on the use of fall-rise developed in the last two sections without losing an explanation of how the condition on fall-rise is related to pragmatic principles.

As a first step, let's assume a model of discourse that incorporates the proposals of both Groenendijk 1999 and Gunlogson 2001. The context in this "hybrid" model is **defined** in (32) below. The commitment sets proposed in Gunlogson 2001 are simply replaced by equivalence relations (or partitioned sets of worlds) à la Groenendijk 1999.

(32) The context consists of a pair of equivalence relations on worlds, $\langle R_A, R_B \rangle$, such that:
a. A and B are discourse participants.
b. $\langle w, w' \rangle \in R_A$ iff w is consistent with A's public beliefs
c. $\langle w, w' \rangle \in R_B$ iff w is consistent with B's public beliefs

A preliminary version of the declarative update is shown in (33). This update eliminates worlds **from** an equivalence relation as in Groenendijk's proposal (see ex. **(26)),** but, following Gunlogson, operates only on the speaker's equivalence relation. The interrogative update is given in (34). It creates potentially nontrivial partitions as in Groenendijk's proposal (see ex. **(27)),** but operates on both the speaker's and the addressee's equivalence relations.

(33) $\langle R_{Spkr}, R_{Addr}\rangle[\varphi?] = \langle R_{Spkr}', R_{Addr}'\rangle$ such that
a. $R_{Spkr}' = \{\langle w,v\rangle \in R_{Spkr} \mid [[\varphi?]]^w = [[\varphi?]]^v\}$
b. $R_{Addr}' = \{\langle w,v\rangle \in R_{Addr} \mid [[\varphi?]]^w = [[\varphi?]]^v\}$

(34) $\langle R_{Spkr}, R_{Addr}\rangle[\varphi!] = \langle R_{Spkr}', R_{Addr}'\rangle$ such that
a. $R_{Spkr}' = \{\langle w,v\rangle \in R_{Spkr} \mid [[\varphi!]]^w = [[\varphi!]]^v = 1)$
b. $R_{Addr}' = R_{Addr}$

In this model of discourse, the two conditions on fall-rise are still unrelated. The step that allows us to collapse the two conditions is a conception of assertion due to William Ladusaw (p.c.). On Ladusaw's view, assertion is actually a two-step process of raising an issue and proposing a resolution of the issue. (If we set aside complications having to do with information packaging, it is as if every assertion were prefaced with the corresponding polar interrogative.) It is straightforward to implement this view in the model proposed above. We need only redefine the update of declaratives as follows:

(35) Declarative Update (final version):
$\langle R_{Spkr}, R_{Addr}\rangle[\varphi!] = \langle R_{Spkr}', R_{Addr}'\rangle$ such that
a. $R_{Spkr}' = \{\langle w,v\rangle \in R_{Spkr} \mid [[\varphi!]]^w = [[\varphi!]]^v = 1)$
b. $R_{Addr}' = \{\langle w,v\rangle \in R_{Addr} \mid [[\varphi!]]^w = [[\varphi!]]^v\}$

In (35), a declarative creates a two-celled partition in the addressee's commitment set and eliminates worlds from the speaker's commitment set – the result of first updating the context with the corresponding polar interrogative and then applying the original declarative update. Now, of course, declaratives and interrogatives look more similar. This approach suggests that both utterance types can make the context "inquisitive" in the sense of creating a nontrivial partition. This sets the stage for a simple condition on the use of fall-rise:

(36) A context C is inquisitive if for at least one equivalence relation R_X of C, $\exists w,v \mid \langle w,w\rangle \in R_X \wedge \langle v,v\rangle \in R_X \wedge \langle w,v\rangle \notin R_X$.

(37) Condition on Fall-Rise (final version):
Fall-rise indicates that the context remains inquisitive.

The condition is meant to require that the context be inquisitive both before and after the use of fall-rise. The inquisitive state may have any of several sources – I have explicitly claimed that declaratives and interrogatives both create inquisitive contexts, and example (4) suggests that sufficient nonlinguistic context might also support the inference of a relevant inquisitive context. The requirement that the context remain inquisitive after the use of fall-rise captures the restriction of fall-rise to partial and indirect answers, as well as the Nonentailment Condition, in a way that makes the functional motivation for the

use of fall-rise clear. It seems likely that there is some pressure to keep the context in a non-inquisitive state as much as possible – that is, to answer questions as they come up and agree on the truth of asserted propositions – and it is not surprising to find a mechanism for marking a failure to return the context to a non-inquisitive state.

4 Conclusion

The proposed interpretation of fall-rise presented here raises new questions about the relation of the proposal to the larger picture. One of these questions is to what extent the proposal developed here can be reintegrated with a theory of information structure. The fall-rise contour is special in that it only contains one overtly marked information structure constituent, namely the topic. This suggests the possibility that the generalizations that arose from a holistic treatment of the fall-rise contour might actually apply more generally to (contrastive) topics.[4] One starting place for future research, then, is to contrast the fall-rise contour with other complex contours to determine which generalizations about fall-rise, if any, apply to topic constituents in other environments. There is also room for work on dynamic analyses of other intonational contours. In addition, the proposal offers an answer to one aspect of the "big question" about the interpretation of intonation. I have argued that the distribution of the fall-rise contour on English declaratives is best treated as the reflection of a direct link between prosody and pragmatics, and have offered an analysis of that link in a dynamic model of meaning.

Notes

• I am grateful for valuable comments from Donka Farkas, William Ladusaw, Geoffrey K. Pullum, James Isaacs, Christine Gunlogson, the members of the Winter 2002 Research Seminar at UC Santa Cruz, and audiences at LASC (Linguistics at Santa Cruz) 2002 and WECOL 2002. Research for this paper was supported by a Regent's Fellowship from the University of California, Santa Cruz.

[1] Capitals indicate prominence.

[2] This observation is consistent with Ladd's (1980) set-theoretic analysis of similar facts, but Ward & Hirschberg (1985) provide a few apparent counterexamples to the claim, such as (i) below. The counterexamples are rare and often pragmatically strained.

(i) A: You need three dependents to get this deduction.
B: I have SEven.

Since examples like (i) appear to be marginal at best, I pursue an analysis that does not allow for them. A more liberal analysis might allow discourse fragments like (i) by including a mechanism for certain types of inference. For example, (iB) might be a response to an inferred question like "Do you have the right number of dependents to get this deduction?"

[3] Not all speakers judge fall-rise to be acceptable on responses like (9B). However, Hedberg and Sosa (2001) report that discourse fragments quite similar to (9) are attested in recordings of public radio broadcasts, including (i) below, which bears fall-rise and is in response to the assertion that a particular representation of Jesus was unattractive.

i I don't find him unatTRACtive. (Hedberg & Sosa's (20))

[4] This speculation was inspired by John Esling's (p.c.) suggestion that the observations in section 2 of this paper might also apply to falling-rising-falling contours.

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