

Proceedings of the 25th Annual Meeting of the Berkeley Linguistics Society: General Session and Parasession on Loan Word Phenomena
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PROCEEDINGS OF THE TWENTY-FIFTH ANNUAL MEETING OF THE

BERKELEY LINGUISTICS SOCIETY

February 12-15, 1999

GENERAL SESSION

and

PARASESSION

ON

LOAN WORD PHENOMENA

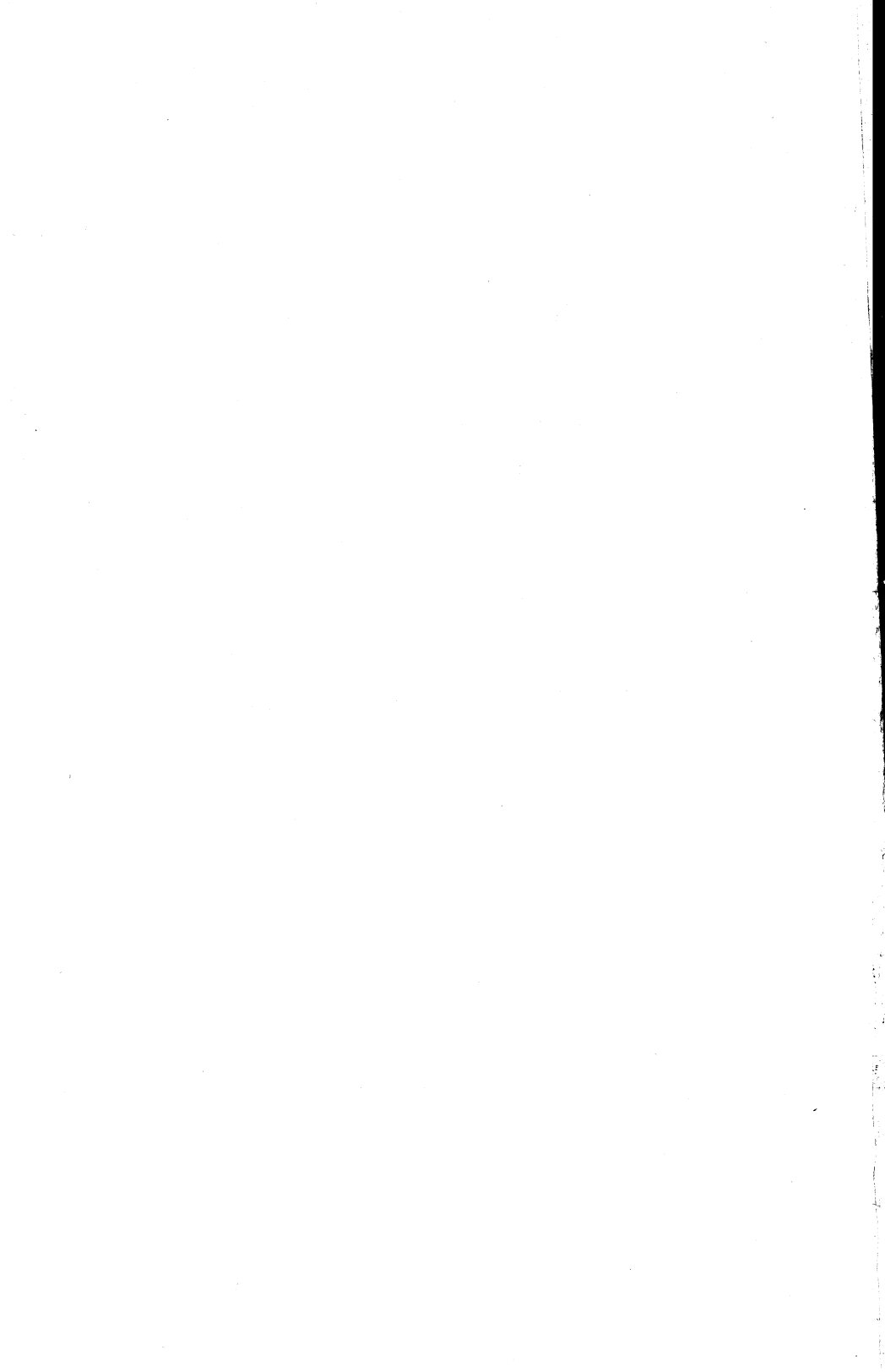
Edited by

Steve S. Chang

Lily Liaw

Josef Ruppenhofer

**Berkeley Linguistics Society
Berkeley, California, USA**



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LETTER FROM THE EDITORS

Dear colleagues,

Depending on how precise one wants to be, the Proceedings of the Twenty-fifth Annual Meeting of the Berkeley Linguistics Society is the final or penultimate volume of this millennium. Either way, it is our pleasure to present the silver anniversary volume of the Proceedings of the Berkeley Linguistics Society. We hope that you enjoy reading this volume even more than we enjoyed preparing it.

This volume consists of papers from the General Session and Parasession of the Twenty-fifth Annual Meeting of BLS. The General Session includes papers on all areas of linguistic interest, while the papers from the Parasession on *Loan Word Phenomena* address various theoretical, historical, sociolinguistic, and typological perspectives. Parasession topics include stratification of the lexicon, loan word subgrammars, re-lexification, markedness effects, bilingualism, and code-switching.

We would like to thank the contributing authors, in particular, our invited speakers: Ellen Broselow, Garland Cannon, Carol Fowler, Junko Ito & Armin Mester, Stephen Levinson, Björn Lindblom, and Alec Marantz. BLS depends on the involvement of the Berkeley linguistics community, especially that of the graduate students. We are grateful for their support. Special thanks go to Benjamin Bergen, Madelaine Plauché, Jeff Good, and Alan Yu. Finally, we would like to thank the linguistics community at large for your continued interest and support.

Steve S. Chang
Lily Liaw
Josef Ruppenhofer

Berkeley, September 1999

GENERAL SESSION

Argument structure and animacy restrictions on anaphora¹

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1. Introduction

This paper presents a new constraint, the Antecedent Closeness Constraint (ACC), which unifies the binding properties of control, Super Equi-NP constructions, picture NPs, and anaphors as specifiers of NPs (in English). The focus will be on the last three cases, which share the property of containing an anaphoric element that is exempt from binding theory (see section 4 for examples of the data under consideration).² The formal theory I am assuming is Head-driven Phrase Structure Grammar (HPSG; Pollard and Sag 1994), with the version of binding theory presented in Asudeh (1998) and briefly reviewed below.

The ACC formalizes the following facts about the antecedents of these anaphors: 1) animacy of antecedents matters for these constructions; 2) order also matters: any nonexpletive nominal α that commands an anaphor β can be an antecedent for β , so long as no *animate* potential antecedent γ is closer to β than α is; 3) this in effect sets up a chain composed of potential antecedents and having the anaphor as its tail: $\langle (\text{animate}), \text{inanimate*}, \text{anaphor} \rangle$.

The presentation is as follows: in section 2, I quickly review some relevant HPSG binding notions; section 3 presents the ACC; finally, section 4 shows the application of the ACC to the data.

2. A brief review of HPSG's binding theory

The binding theory assumed here is stated in terms of the obliqueness of a head's arguments, which are represented on an argument structure list (ARG-ST). As discussed in Asudeh (1998), ARG-ST is treated as a head feature, which means it will be passed from head daughters to mothers via the Head Feature Principle (Pollard and Sag, 1994). Obliqueness follows a hierarchy, with subjects as least oblique, and this is assumed to be universal: subject < primary object < secondary obj. < obliques < verbal/predicative complements.

The binding principle that applies to anaphors is Principle A, which states that "a locally [a]-commanded anaphor must be locally [a]-bound"³ (Pollard and Sag, 1994: 254). Here *anaphor* is read to be the type of the nominal's CONTENT, and it has the subtypes *reflexive* and *reciprocal*. Crucially, due to the wording of this principle, anaphors that are not locally a-commanded are exempt from binding. It is precisely these anaphors that the ACC deals with.

The notions of command required are:

(1) A-Command:

Let Y and Z be *synsem* objects, with distinct LOCAL values⁴, Y referential.

Then Y *a-commands* Z just in case either:

- i. Y is less oblique than Z; or
 - ii. Y *a-commands* some X that has an ARG-ST containing Z.
- (Asudeh, 1998: 40, (3.1))

(2) **Local A-Command:**

Let Y and Z be *synsem* objects, with distinct LOCAL values, Y referential. Then Y *locally a-commands* Z just in case:

- i. Y is less oblique than Z;
- (Asudeh, 1998: 40, (3.2))

Finally Y (locally) *a-binds* Z if and only if Y and Z are coindexed and Y (locally) *a-commands* Z. Otherwise, Z is (locally) *a-free*.

3. The Antecedent Closeness Constraint

The ACC is based on the Intervention Constraint (IC)⁵, which was first discussed with respect to ‘Super Equi-NP Deletion’ (Grinder, 1970; Jacobson and Neubauer, 1976). This construction contains an anaphoric relation between a noun phrase controller and the unexpressed subject of a gerund or infinitive. In the examples I mark the position of the understood subject with ‘PRO’⁶, but this is only for presentational purposes.⁷

- (3) a. Chrystale_i claimed [that [PRO_i smearing herself with mud] was fun].
- b. Gonzo_i said [that it was difficult [PRO_i to satisfy himself]].

I have used reflexives in these examples to accentuate the anaphoric relationship between the matrix subject and the understood subject of the gerund or infinitive.

Grinder (1970), who was the first to discuss these constructions in detail, noticed that not all instances of Super Equi-NP are grammatical, as exemplified by the following sentences which are highly similar to those in (3).

- (4) a. *Chrystale_i claimed that Craig said [that [PRO_i smearing herself with mud] was fun].
- b. *Gonzo_i said that Chrystale complained [that it was difficult [PRO_i to satisfy himself]].

The ungrammaticality of these sentences stems from the inclusion of an NP closer to the anaphor with which it cannot agree. Similarly, if we were to change the anaphors in (4a) and (4b) to *himself* and *herself* respectively, the sentences would be grammatical, albeit with different construals. This led Grinder (1970: 302, (23)) to observe that Super Equi is subject to the following constraint:

(5) **The Intervention Constraint** (first version)

Super Equi-NP deletion between NP^a and NP^b is blocked if there exists a possible controller NP^c in the deletion path.

Since Grinder's analysis was transformational, he defined 'being on the deletion path' of two NPs as intervening between them (in terms of linear order) at the point that the deletion transformation applies.

Jacobson and Neubauer (1976) observed that the Intervention Constraint seems to hold for picture NPs, too:

- (6) a. John_i thought that a picture of himself_i/herself_j⁸ was given to Mary_j.
 b. John_i thought that Mary_j was given a picture of *himself_i/herself_j.

(Jacobson and Neubauer, 1976: 435, (17a–b))

In sentence (6a), *John* can serve as the antecedent of *himself*, but in sentence (6b) this antecedent-anaphor relationship is blocked by the presence of the intervening NP *Mary*.

Pollard and Sag (1992, 1994) take the position that the IC is a "processing based factor that interacts with grammatical constraints in such a way as to render unacceptable a family of sentences that are otherwise grammatical" (1994: 269). However, they do not provide any evidence for the claim that the IC is a processing constraint. As such, it is just as reasonable to say that it is in fact a grammatical constraint. But there is also independent evidence for this. First, processing constraints can be overcome with practice or through the use of external representations (e.g. pencil and paper). For example, center embeddings like the following are assumed to be grammatical but subject to processing constraints.

- (7) The linguist the psychologist the philosopher likes likes likes traces.

For most speakers of English (including linguists) this sentence is virtually indecipherable. However, it obeys the rules of English grammar and it is perfectly grammatical. In general, center embeddings become easier with practice, and it is also much easier to decipher the sentence by writing it down and marking it up. IC violations do not become better with practice or with the use of external aids to work them out. Second, it may seem obvious, but processing constraints usually arise due to processing difficulties. Thus, (7) is especially difficult because the NPs have to be kept track of and then matched up with the corresponding predicate. Furthermore, the first NP does not correspond to the first verb, but rather to the outermost one. But, I fail to see what the processing difficulty is in matching an anaphor with its antecedent in a sentence in which there is only one possible antecedent for the anaphor. Why should the sentence *John thought that Mary was given a picture of himself* be difficult to process when the only possible antecedent is *John* and the only other possible antecedent does not even agree with the anaphor? It seems trivially simple to tell what the antecedent is meant to be, but the sentence is ungrammatical anyway.

Thus, I take it that there is some evidence for treating the IC as a grammatical constraint, and no evidence for treating it as a processing constraint. The fact that it

is a grammatical constraint means that the IC should be formulable as a constraint in HPSG. Of course, Grinder's definition of the IC does not make sense in a non-transformational theory such as this. In terms that are more amenable to HPSG, the Intervention Constraint states that an exempt anaphor cannot skip over a potential binder in its clause to take a higher one. But, what exactly is meant by a potential binder? Minimally, in HPSG terms, this must be a *nominal-object*, since these are the only entities that enter into syntactic binding relations. Furthermore, the binder's INDEX must be of sort *referential*, since expletive subjects cannot be binders. This fact is reflected by the grammaticality of the following example.

- (8) John_i said there was a picture of himself_i in yesterday's paper.

Although *there* intervenes between *John* and *himself*, it is not a potential binder, since its index is of sort *there*, not *referential*. Thus, the potential binder must meet the usual requirements on antecedents.

As the following examples illustrate, there also seems to be a kind of animacy requirement (Pollard and Sag, 1994) for the intervening binder, and certain quantified intervenors also fail to trigger the IC. The relevant potential intervenor is italicized in these examples.

- (9) a. Bill_i suspected that *the silence* meant that [a picture of himself_i] would soon be on the post office wall.
 b. Bill_i thought that *nothing* could make [a picture of himself_i; in the *Times*] acceptable to Sandy.

(Pollard and Sag, 1994: 268, (87d), (88a))

As far as quantifiers go, the animacy requirement covers the appropriate ones. For example, if we replace *nothing* in (9b) with *no one* or *everyone*, the quantifier is an intervenor:

- (10) a. *Bill_i thought that *no one* could make [a picture of himself_i; in the *Times*] acceptable to Sandy.
 b. *Bill_i thought that *everyone* could make [a picture of himself_i; in the *Times*] acceptable to Sandy.

It seems that the animacy facts can be extended to quantifiers if it is understood to apply to their restriction. The quantifiers *no one* and *every one* have restrictions that refer to people and hence count as animate. On the other hand, *nothing* is restricted to quantify over things, which are not necessarily animate. In fact, according to standard HPSG, the quantified NP inherits the CONTEXT information of the noun (Pollard and Sag, 1994), resulting in the quantified NP being marked for animacy like other NPs.

Thus, we can conclude that the Intervention Constraint should only apply if the intervening noun phrase a) satisfies normal conditions on antecedents (i.e. it is

a *nominal-object* with a *referential* index), and b) is animate. In addition, the IC must be stated such that the relative order of potential binders that are on the same ARG-ST list does not matter, as the following sentences illustrate.

- (11) a. John_i told Mary that some compromising pictures of himself_i are available online.
 b. John_i heard from Mary that some compromising pictures of himself_i are available online.

If *Mary* in sentences (11a) and (11b) were an intervening potential binder, we would expect the sentences to be ungrammatical. The fact that they are grammatical indicates that the IC is not in force here. Sentence (11b) also illustrates that point of view is not in effect here, as the point of view reported is *Mary's*, but the anaphor is still grammatical.

We can now reformulate the Intervention Constraint appropriately.

(12) **The Intervention Constraint** (second version)

No potential binder may intervene between an anaphor and its antecedent. A potential binder is an animate, referential nominal that is not a coargument of the antecedent.

Now that the informal version of the IC is in place, I will reformulate it as a constraint in HPSG. But, since my constraint is based on closeness of an antecedent and not intervention, I will call it the Antecedent Closeness Constraint instead. The ACC needs to refer to a-command, which is defined recursively, so the ACC itself cannot be formulated as a feature constraint directly; only instances of structures that do or do not satisfy the ACC can be given as feature structure constraints.

(13) **The Antecedent Closeness Constraint**⁹

If an anaphor *Z* has one or more close potential antecedents, then there is a close potential antecedent *Y*, such that

$$Y_{\left[\begin{smallmatrix} \text{INDEX} & \boxed{1} \end{smallmatrix} \right]} \text{ and } Z_{\left[\begin{smallmatrix} \text{INDEX} & \boxed{1} \end{smallmatrix} \right]}.$$

(14) **Definition of Close Potential Antecedent**¹⁰ (CPA)

Y is a close potential antecedent of *Z* if and only if

- a. *Y* a-commands *Z*; and
 b. There is no *X* such that
 i. *Y* nonlocally a-commands *X*; and
 ii. *X* a-commands *Z*; and
 iii. *X*

$$\left[\begin{array}{c} \text{LOC} \\ \left[\begin{array}{c} \text{CONX} \\ \left[\begin{array}{c} \text{BACKGROUND} \\ \left\{ \left[\begin{array}{c} \text{animate_rel} \\ \text{INSTANCE } \boxed{1} \end{array} \right\} \end{array} \right] \end{array} \right] \end{array} \right] \left[\begin{array}{c} \text{CONT} \\ \text{INDEX } \boxed{1} \end{array} \right] \end{array} \right]$$

Although there is something like intervention in the definition of close potential antecedent, the ACC itself does not really mention intervention. In fact, it guarantees that an anaphor selects a close potential antecedent, rather than ruling out derivations that display bindings that cross a potential antecedent, as the literature on the IC originally intended. In this sense, closeness applies more generally than intervention. Since intervention is a ternary relation (i.e. it only makes sense to talk about something intervening between two other things), if there is a situation that only involves two objects, intervention is undefined. However, closeness is only binary, which means that this notion applies so long as there are at least two things. The importance of this distinction will become obvious shortly. In fact, stating that an anaphor must be bound by its closest binder and stating that no potential binder may intervene between an anaphor and its actual binder amount to the same thing. Therefore, the constraint as formulated here will cover the correct intervention cases.

Now I will demonstrate application of the ACC to an exempt anaphor. In the following sentence, the ACC stipulates that the anaphor contained in the picture NP is coindexed with *Chrystale*, because *Chrystale* is a close potential antecedent, since it a-commands the reflexive¹¹ and there is no intervening a-commander that meets the requirements outlined in the second clause of the definition of close potential antecedent. In this case there is no X that is closer than *Chrystale* at all, as shown by the ARG-ST lists in (15b).

- (15) a. *Chrystale_i likes photos of herself_i.*
 b. *likes*: ARG-ST $\langle NP[Chrystale]_i, NP[photos\ of\ herself_i] \rangle$
photos: ARG-ST $\langle PP[of\ herself]_i \rangle$

The lexical entry for the anaphor guarantees that it must unify with its antecedent on the agreement features in INDEX, which it does in this case. And, as desired, if we were to replace *Chrystale* with *Andrew* or any other non-female NP, such as the pronoun *it* used to refer to, say, a pet fish, the corresponding sentences would be ruled out, due to this same agreement requirement.

Example (15) shows that the ACC as formulated here applies whenever there is sufficient locality, even if there is no intervention. Thus, if the notion of 'closeness' as formulated above is used, the ACC applies to cases like these. However, if intervention were specifically mentioned, these cases would not be covered, because the antecedent does not intervene between the reflexive and anything else, since there is no other potential antecedent between the actual antecedent and the reflexive.

In this section I have formulated the Antecedent Closeness Constraint as a further constraint on the anaphor-antecedent relationship. The ACC requires anaphors to be coindexed with a close potential antecedent, as defined in (14). The CPA must be referential, as required by the definition of a-command. Furthermore, in simple sentences like *Chrystale likes photos of herself*, the ACC predicts, as is the case, that the reflexive is bound by the next higher NP. However, if there is another closer

but inanimate potential antecedent, the ACC does not force coindexation with the inanimate argument. In this manner, the ACC covers the cases discussed in Pollard and Sag (1992, 1994) as exempt anaphors. This will be more obvious in the next section, where I discuss further examples of the coverage of the ACC with respect to exempt anaphora.

4. Some results

Three major cases of exempt anaphora are covered in this paper: Super Equi-NP deletion, picture NPs, and specifiers of NPs. In this section, I will demonstrate how the ACC makes the correct generalizations about the binding properties of anaphors in these constructions.

4.1. Super Equi-NP deletion

The original motivation for the Antecedent Closeness Constraint was Super Equi-NP deletion. First I will examine examples that are predicted to be grammatical by the Antecedent Closeness Constraint and show how these work.

- (16) a. Chrystale_i claimed [that [PRO_i smearing herself with mud] was fun].
- b. Gonzo_i said [that it was difficult [PRO_i to satisfy himself]].
- c. John_i thought [that it was likely [to be illegal [PRO_i to undress himself]]].
- d. Mary_i knew [that there would be no particular problem in [PRO_i getting herself a job]].
- e. John_i thought [that Proposition 91 made [PRO_i undressing himself] illegal].

(Pollard and Sag, 1994: 269, (91b–c), (92a))

In sentence (16a), the understood subject on the ARG-ST of *smearing* is exempt, since it is not locally a-commanded. The CPA of the understood subject is *Chrystale* and the ACC correctly predicts that *Chrystale* must be the antecedent of PRO and these arguments are coindexed. The situation in (16b) is similar, except that the CPA of *himself* is *Gonzo*. Expletive *it* cannot serve as a CPA, due to not having a *referential* index — and thus not being an a-commander — and it therefore also fails to block *Gonzo* being a CPA. Sentence (16c) gives another example of an expletive *it* not serving as a CPA, but the sentence also illustrates that the CPA can be a longer distance away, over a raising predicate. In example (16d), the matrix subject is again the CPA of the understood gerund subject, because the closer NP is an expletive with an index of type *there*.

Example (16e) is the crucial case. In this example, both *John* and *Proposition 91* are CPAs. The latter is a CPA because a) it a-commands the understood subject PRO, and b) there is no X such that i) *Proposition 91* nonlocally a-commands X,

ii) X a-commands PRO, and iii) X is animate. This predicts that *Proposition 91* could be the antecedent of PRO (assuming the reflexive were changed to *itself*), but I presume that in this case this reading is out due to pragmatics. However, *John* is also a CPA: *John* a-commands PRO, and there is no X that satisfies the conditions just mentioned. Although *Proposition 91* is nonlocally a-commanded by *John* and a-commands PRO, it is inanimate and therefore fails to block *John* as a CPA. This example illustrates that inanimate NPs can still be close potential antecedents, but they let the next higher NP be a CPA as well. If the next higher NP is inanimate, then this NP again lets the next higher NP be a CPA, and so forth. This predicts that sentences like the following are grammatical.

- (17) Gonzo_i moaned that the records showed that Proposition 91 made [[PRO_i undressing himself in public] illegal].

Indeed, this sentence is perfectly fine, although a bit long.

It is also possible to construct situations in which the closer, inanimate argument can be a CPA, while allowing a higher argument to be a CPA, and in which both CPAs are pragmatically possible binders. These cases are discussed in section 4.4.

Next I turn to cases that are ruled out by the ACC.

- (18) a. *Chrystale_i claimed that Craig said that [[PRO_i smearing herself with mud] was fun].
 b. *Gonzo_i said that Chrystale complained that [it was difficult [PRO_i to satisfy himself]].
 c. *John thought that Mary was surprised by [the fact that [PRO_i criticizing himself was hard]].
 (Jacobson and Neubauer, 1976: 435, (15b))

In sentence (18a) *Chrystale* cannot be a CPA according to the definition in (14), since *Craig* is nonlocally a-commanded by *Chrystale* while simultaneously being animate and a-commanding PRO. In fact, the CPA for the understood subject is *Craig* and the ACC requires that the INDEX of *Craig* and the INDEX of the understood subject be re-entrant; therefore, PRO is actually coindexed with *Craig* and the sentence is out due to unification failure on the GENDER feature of the Super Equi target and that of the reflexive *herself*. However, since *Craig* is coindexed with PRO, a pronoun *her* that is anaphoric (in the discourse sense) on *Chrystale* would yield a grammatical sentence. A similar scenario obtains in (18b), except that the CPA is one clause further removed, since *it* cannot be a potential antecedent. Likewise, sentence (18c) is out for the same reasons as (18a), but the CPA *Mary* is further removed in the structure from the understood subject of *criticizing*. However, *Mary* is still the only CPA, and thus must be coindexed with PRO.

4.2. Picture NPs

With respect to picture NPs, the ACC predicts that the sentences in (19) are grammatical.

- (19) a. Simon said Gonzo_i likes photos of himself_i.
 b. Elvis_i said there should be pictures of himself_i for sale at Graceland.
 c. Gonzo_i was sure that the delay indicated that a picture of himself_i was coming through on the fax.
 d. Andrew_i hoped that something would prevent a picture of himself_i in the *Real Estate Guide* from being seen by his friends.

Sentence (19a) is grammatical on the construal indicated, since the reflexive is coindexed with its close potential antecedent, *Gonzo*. The only CPA in (19b) is *Elvis*, since the expletive *there* is not a CPA and also does not block a higher argument from being a CPA. In sentences (19c) and (19d), *the delay*, and *something* respectively don't meet the animacy requirement in the ACC. Therefore, sentences (19c) and (19d) would fail to unify with the constraint on X in the third clause of the CPA definition, (14), due to conflicting background information. This has the result that the first CPA in these sentences is *Gonzo* and *Andrew* respectively.

Now I will turn to the sentences in (20), which the ACC predicts are ungrammatical.

- (20) a. *Gonzo_i said Chrystale sent a photo of himself_i to *Strange Goatee Digest*.
 b. *Simon_i said Gonzo likes photos of himself_i.

Sentence (20a) is ruled out due to a gender mismatch. The close potential antecedent of *himself* is *Chrystale*, but there is unification failure due to the agreement features on the indices. *Gonzo* is not a close potential antecedent, since there is an X, *Chrystale*, that fulfills the blocking conditions in (14). Sentence (20b) would be ruled out by Principle C. The ACC requires coindexation between the reflexive and *Gonzo*, as *Simon* is not a CPA due to *Gonzo* being animate; if *Simon* is also coindexed with the reflexive, *Simon* will a-bind *Gonzo*.

4.3. Specifiers

The last case of exempt anaphora that I will consider here is that of anaphors in specifier position. In English, this is restricted to reciprocals. The ACC makes the correct predictions about the following sentences.

- (21) a. [John and Mary]_i knew that [the journal had rejected [each other's]_i papers].

- b. *[Hank and Peggy]_i said that [Bobby ate [each other's]_j apple brown betty].
- c. [Hank and Peggy]_i said that [[Bobby and Khannie]_j like [each other's]_{i/j} wrestling moves].

In (21a) *the journal* refers to a publication, which is clearly inanimate. This means that both *John and Mary* and *the journal* are CPAs (since *the journal* is not animate it does not block the higher NP being a CPA). However, *the journal*'s index cannot be unified with the index of *each other's*, leaving only the higher NP as a CPA. The ACC is satisfied by coindexing this NP with the reciprocal. Example (21b) illustrates that an animate CPA prevents the higher NP from being a CPA, even if it cannot satisfy the ACC. This is directly predicted by the ACC, due to the definition of close potential antecedent. Since *Bobby* fulfills the condition on blocking in (14), *Hank and Peggy* is not a CPA. Therefore the sentence is ungrammatical, due to unification failure on the NUMBER feature of *Bobby* and *each other's* indices. The last example shows that an animate CPA with the right index features (i.e. plural number), binds the reciprocal and prevents the higher NP from binding the reciprocal. Thus, the ACC gets the correct grammaticality results for these reciprocal cases as well.

4.4. Optional binding

The definition of CPA does not prevent inanimates from being CPAs; it just lets a higher animate be a CPA in addition to any lower, inanimate CPAs. As a result, the ACC can sometimes be satisfied optionally by coindexation to multiple CPAs:

- (22) a. Louise teaches "embodied cognitive logic". She_i claims [a good formal logic]_i; should make [PRO_i describing itself easy].
- b. Louise teaches "embodied cognitive logic". She_i claims a good formal logic should make [PRO_i describing herself easy].

Of course, it's a stretch to think of cases where inanimate things can be the subjects of causatives as well as the subject of the causative complement, but sentence (22a) illustrates that, insofar as this is possible, an inanimate NP can serve as a CPA. And it does this without blocking binding by the animate, pronominal subject of *claims*, allowing the coindexation in (22b). Thus, the ACC makes correct, though delicate, predictions about possible antecedent-anaphor relationships for exempt anaphors.

It is also possible to construct similar examples with picture NPs and reciprocal specifiers:

- (23) a. John is fascinated by this book. He_i claims it contains [a description of himself]_i].
- b. John is fascinated by this book. He claims it_i contains [a description of itself]_i].

- (24) a. [John and Mary]_i said the journals rejected [each other's_i papers].
 b. John and Mary said [the journals]_i rejected [each other's_i papers].

These optional bindings are accounted for by the CPA, since it in effect sets up a chain of CPAs, any one of which can satisfy the ACC, modulo agreement of indices.

5. Conclusion

In this paper, I have shown how the Antecedent Closeness Constraint unifies the treatment of Super Equi-NPs, picture NPs and anaphors in specifier position. The antecedent-anaphor relation in all of these constructions was shown to exhibit animacy effects, which is accounted for by the ACC. In particular, the ACC can be read as setting up a chain of potential antecedents, such that if there is an animate member of the chain, it must be the first member. Another virtue of the ACC is that it makes subtle predictions about optional bindings for all three constructions. Finally, although this was only implicit here, adoption of the ACC simplifies binding theory, while maintaining a treatment of control verbs as taking VP complements with reflexive subjects (Asudeh, 1998).

Notes

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- ² For a detailed discussion of control and the ACC, see Asudeh (1998), which is available at <http://www.stanford.edu/~asudeh>
- ³ The terms used to be o-command, etc., for 'obliqueness'. But, with the move to defining binding on argument structure (see e.g. Manning and Sag 1999), the mnemonic has changed.
- ⁴ This caveat is here to prevent a *synsem* from a-commanding itself or its gap. It will not be important for understanding the rest of this paper.
- ⁵ While discussing the history of the ACC, I will continue to refer to it as the Intervention Constraint as this is what it was called in the literature cited.
- ⁶ I use PRO simply for notational convenience in indicating the position of the control target, since HPSG does not use this empty category.
- ⁷ There is an apparent wrinkle in this data. It is not possible to assume that the understood subject is always a reflexive, due to examples like the following:
 (i) Chrystale_i claimed that smearing her_i with mud was fun.

This sentence is grammatical, but it has the construal that someone other than Chrystale smeared mud on her. If the understood subject were a reflexive bound

to *Chrystale*, this would result in a Principle B violation (the pronoun would be locally a-bound by the understood subject) and the sentence would not be possible. The fact that it is possible indicates that the understood subject in this sentence is in fact not a reflexive coindexed with *Chrystale*. In general, gerunds and infinitivals in subject position can optionally have arbitrarily referring (i.e. pronominal) understood subjects (Pollard and Sag, 1994).

⁸ These are the judgements given by Jacobson and Neubauer. However, my informants found the *herself* binding to be ungrammatical.

⁹ It may seem at first that the ACC and Principle A interfere with each other, since they both apply to the same type (*anaphor*). While it true that in local a-command situations the two constraints are partially redundant, they require the same binding for the INDEX of the anaphor, so there is no conflict (Asudeh, 1998: 54–55).

¹⁰ In this definition, nothing guarantees that Z is of type *anaphor*. Thus, any argument can have a close potential antecedent. However, the ACC itself refers to Z being an anaphor. This makes the notion of CPAs general and extensible to other phenomena should further work motivate this.

¹¹ *Chrystale* a-commands the picture NP by a-command clause (i). The reflexive's index is structure shared with the case-marking PP[*of*], which is on the ARG-ST of the picture NP. By an application of a-command clause (ii), it follows that *Chrystale* a-commands the reflexive, since *Chrystale* a-commands something that has the reflexive on its ARG-ST list.

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Proving basic polysemy: subjects reliably distinguish several senses of *see*¹

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1. Introduction

1.1 Background

Psycholinguistic experiments can be divided into those that ask the subjects to make high-level, conscious decisions about linguistic questions and those that ask subjects to make quick responses to relatively simple questions but measure reaction times, seeking clues as to the moment-to-moment processing of sentences; we can refer to these as "off-line" and "on-line" methods respectively. Off-line methods allow us to construct experiments relatively easily that seem to answer some fundamental linguistic questions directly ("Is this sentence grammatical?", "Are these words synonyms?" "What is the antecedent of this pronoun?"), but the data they provide is often hard to interpret, because so much higher-level cognition may be involved in the decision; e.g. in a grammaticality judgement, the subject may actually have time to remember some rule that she was taught in the sixth grade, rather than relying on a purely intuitive judgement. On-line tasks have a much better chance of discovering something about the semantic representation used in actual sentence understanding, but the experiments are much harder to construct and a great many factors need to be carefully controlled to produce valid results.

Among the tasks used in off-line experiments, free sorting tasks have better face validity than similarity judgments, but the resulting categories are hard to compare. For example, Jorgensen (1990) gave subjects cards containing low-polysemy nouns and high-polysemy nouns, as measured by the number of dictionary senses. In the first task, they did completely free sorting; in the second, they were told to divide the cards according to a set of dictionary definitions they had been provided with. She found that subjects basically produced about three categories for the low-polysemy words in both tasks, but created 5.6 categories on the free sorting and 9.1 on the dictionary-guided sorting. This was still less than the average number of senses given in the dictionary (14.6), but the increase was significant. Jorgensen (1990) uses measures of the number of categories produced by her subjects and the amount of agreement between them on the classification of individual items, but has nothing to say about the relation between the **semantics** of the categories produced by one subject and those of other subjects or those of the dictionary.

Various experiments have demonstrated that priming effects between related words can provide information as to the structure of semantic fields (Meyer & Schvaneveldt 1971, de Groot 1984). Other experimenters have found priming effects between the separate senses of homonyms (Swinney 1979, Simpson 1981, Seidenberg *et al.* 1982). Williams (1992) showed similar priming effects between senses of polysemous words; his experiment has important implications for those described here. In particular, Williams found that central and non-central senses had very different priming effects. Unfortunately, like many others, both Williams' sense distinctions and his decision as to which constituted the central sense were based on

a dictionary, despite the fact that commercial and other linguistically irrelevant factors influence the number and type of senses listed in dictionaries.

Given this situation, we chose to combine free sorting with two other methods, a forced classification task and a priming experiment, in the hope that the strengths of each method would complement the weaknesses of the others. In the classification task, subjects were forced to classify uses into many predetermined categories, assuming that they represent a finer breakdown than is available to most people through introspection. If subjects reliably make certain semantic distinctions, these should be representable as logical combinations of the finer ones. Of course, carrying the process to its logical conclusion, by collapsing **all** the categories together would produce complete "agreement" of the unsatisfactory sort posited in the strong version of monosemy (Ruhl 1989). As Cruse (1992) points out, claiming that a single highly abstract, undefinable "sense" accounts for all the uses of a highly polysemous word is not only *ipso facto* unprovable but also fails to distinguish such words from each other.

1.2 Predictions

On the basis of the study so far, we would predict the following:

- Since *see* seems to be highly polysemous, we would expect that speakers will be able to distinguish different senses when tested on tasks involving similarity judgements, categorization (using either predefined or their own spontaneous categories), etc. There is no reason to suppose that all speakers have exactly the same set of senses, but it is likely that there will be a great deal of overlap, which is essential to communication in general.
- Since *see* is such a highly-polysemous, high-frequency word, we expect to find that our subjects will produce more senses than Jorgensen's subjects.
- Since the senses appear to have a complex structure, some senses being more central than others, we expect to find prototype effects, with more central senses more likely to be spontaneously produced and more quickly recognized. We would expect to find broad agreement among speakers as to which are the central senses.
- In a cross modal priming experiment, in accord with Williams' (1992) findings, we would predict that sentences which provide a context for one sense of *see* would facilitate responses to a probe consisting of the keyword for that sense of *see*, more than probes consisting of keywords for other senses.

2. Experimental Methodology

2.1 Stimuli

2.1.1 Experiment 1

The stimuli for this experiment consisted of two blocks of 100 sentences selected at random from the Brown corpus, combined with 43 constructed example sentences, representing a total of 19 senses. For the sorting task, each block of 100 sentences was printed on 3x5 inch cards, forming two sets. A set of 43 cards was also prepared for the constructed example sentences (the "target" set), to see how they would be sorted.

2.1.2 Experiment 2

After completing Experiment 1, the list of senses was revised and expanded from 19 to 24 total senses. At the same time it was decided that some of the senses would not be used in further experiments, as they involve collocations with other specific words; among these are: SEE-X-THROUGH, SEE-THROUGH-X, and LET'S-SEE. On the other hand, senses such as ACCOMPANY, although "idiomatic", place semantic restrictions on their complements, but do not require any specific syntax, e.g. *I'll see you as far as the bus stop, I'll see you home, I'll see you to your door.*

In evaluating the results of Experiment 1, it became apparent that much of the subjects' difficulty was due to the large number of senses involved. It was therefore decided to construct a new experiment which would contain only examples of seven clear-cut senses, which would be relatively easy to distinguish from each other. The senses chosen were: EYE, FACULTY, RECOGNIZE, DETERMINE, ENSURE, EXPERIENCE, and SETTING. Example sentences were constructed for each of these senses, systematically varying other factors such as tense and aspect, question vs. statement, negation, voice, and domain of discourse. (The three domains of discourse were academic, personal, and entertainment, broadly construed.) In practice not all of combinations of these factors produced reasonable sentences, but as many as possible were created.

2.1.3 Experiment 3

After reviewing the results of Experiment 2, seven more senses were added to the stimuli for Experiment 3: VISIT, CONSULT, PROCESS, CONDITION, ENVISION, HALLUCINATE, and ACCOMPANY. In order to keep the total set of stimuli small enough, only the clearest examples of the seven senses used in Experiment 2 were retained in Experiment 3. As before, not all combinations of the manipulated factors with the senses produced good sentences.

2.2 Tasks

In Experiment 1, only Sentence Sorting and Classification were performed. Because both of these tasks are metalinguistic, two online tasks were added in Experiments 2 and 3, Lexical Decision and Categorical Judgement.

2.2.1 Task 1: Sentence Sorting

In this task, subjects were given cards containing the examples of *see* and asked to sort them into piles according to the sense of *see* used in the sentence. No directions were given as to how many senses there should be or how the distinctions should be made. At the end of one hour, subjects were asked to write a brief definition or characterization of each group and to choose the sentence which best exemplified it.

Nine subjects were randomly given one of the two sets of 100, and instructed to group them by sense. Then subjects were given the target set and asked to add these to the groups, then (if time permitted) they were given the second set of cards and asked to continue the task. All subjects completed one set of 100 sentences and the target set; if time permitted they continued to the second set of 100.

2.2.2 Task 2: Sentence Classification

For the Classification task, the example senses and the senses to be chosen (defined above) were presented on a computer screen using HTML and a web browser. Both the responses and the response latency were recorded.

2.2.3 Timed Tasks

The stimuli in these tasks were presented by use of the PsyScope program on Macintosh computers. In each case the subjects saw one of the same example sentences as in the previous tasks, and then heard an auditory prime consisting of a single word (or sometimes in the Lexical Decision task, a single non-word). The subjects then pressed one of the keys on the keyboard to respond. The sentences were displayed for up to 4 seconds. This was followed by the auditory probe which lasted approximately 500 ms. Subjects had 1500 ms. from the beginning of the auditory probe to respond; responses after this time period were not used in further analysis.

Blocks of 40 trials of each task (Lexical Decision and Categorical Judgement) were administered randomly across subjects. Subjects were allowed to rest after each block.

2.2.3.1 Task 3: Lexical Decision

In Lexical Decision blocks, the probe was either a keyword for the primed sense, a keyword for another sense, or a non-word. The task was a word/non-word judgement.

2.2.3.2 Task 4: Categorical Judgement

In Categorical Judgement blocks, the probe was either a keyword for the primed sense or a keyword for another sense, and the task was to decide whether the probe was an instance of the primed sense.

2.3 Subjects

The subjects were undergraduates at University of California at Berkeley, who received credit toward introductory psychology courses for their participation. The same subjects participated in all tasks within each experiment. Table 1 shows a summary of the stimuli, tasks, and number of subjects in each of the experiments.

Table 1: Summary of the Experiments

Experiment	Senses	Stimuli	Number of subjects	Tasks
1	20	Corpus	9	1 & 2
2	7	Constructed	21	all
3	14	Constructed	39	all

2.4 Statistical Measures of Agreement

Two different measures of agreement were used in the experiments reported here, omega and kappa. The omega statistic (Morey & Agresti 1984) is inherently less

powerful, since it is based on whether or not two raters classify each pair of stimuli in the same category or not, without regard to the classification of other pairs. However, omega has the advantage that it can be used in cases in which the number of categories differs from rater to rater.

The kappa statistic (Scott 1955, Cohen 1960, see also the excellent introduction in Siegel & Castellan 1988 284-91) is the standard statistic for interrater reliability used when the number of categories is fixed for all raters.

Both statistics vary from 0 for chance agreement to 1.0 for perfect agreement and are insensitive to the number of categories involved, or the distribution of instances into categories. The variance of the sampling distribution is known for both, so that the probability of a particular outcome can be calculated.

3. Results and Analysis

Because the materials and tasks used in Experiment 1 were substantially different from those used in the latter two experiments, the results for Experiment 1 will be discussed separately first, and the results for the other two experiments will be discussed together thereafter.

3.1 Experiment 1

3.1.1 Task 1: Sorting

The number of categories per subject ranged from 6 to 21, with a mean of 11. This is substantially higher than the 5.6 found by Jorgensen (1990), as we had predicted.

The sizes of the categories varied greatly, from 33% for EYE (*See the cat on the mat*), and 15% for RECOGNIZE (*See that it's red*) to 0 for some categories. The agreement between raters as to the relative sizes of the categories was high, $r = .70$ to .97, suggesting that there is not a large division of the population into "lumpers" and "splitters".

3.1.2 Task 2: Classification

All subjects finished 99 sentences of the first set. Some subjects continued on to other sets, but the order of the sets was randomized, so that there was little overlap beyond the first set. The overall agreement among raters, measured by the kappa statistic, was .38. This value is low, but understandable, given the large number of senses listed and the ambiguity of many of the stimuli. A more detailed analysis of the classification data will be given for Experiments 2 and 3.

3.2 Experiments 2 and 3

3.2.1 Task 1: Sorting

For Experiments 2 and 3, the median numbers of categories produced by each subject were 6 and 10 respectively, which approximate the number of senses intended by the experimenters, i.e. 7 and 14. The difference between the two medians is significant (using the median test, $\chi^2=26.09$, $p < 0.01$); this means that subjects recognized that more senses were present in Experiment 3 on the basis of the stimuli alone.

The omega statistic was used to compare the subjects' initial sortings with the values of the manipulated variables, including the intended sense. The results suggest that the subjects were able to follow the instructions to pay attention only to the sense of *see* occurring in each sentence and to ignore the other syntactic and semantic factors. Table 2 shows figures for a representative group of nine subjects; the agreement for the irrelevant manipulated factors is essentially zero (because of the correction for chance agreement, the value of omega can sometimes be less than zero). The agreement with the intended sense ranges from a low 0.36 for subject number 30 to a high of .82 percent for subject number 33; this variation in agreement seems to be due to individual differences.

Table 2: Agreement between subjects' sorting and manipulated variables

Subjects→ Factors↓	30	31	32	33	34	35	36	37	38
Tense/Asp.	0.03	0.04	0.02	0.02	0.03	0.05	0.03	0.02	0.02
Qn/state.	0.03	0.01	0.00	0.01	0.01	0.02	0.02	0.02	0.01
Negation	0.01	0.00	0.01	0.01	0.00	0.01	0.00	0.01	0.00
Voice	-0.03	-0.01	0.03	0.01	0.00	0.03	-0.02	0.03	0.01
Domain	0.08	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
Sense	0.36	0.40	0.75	0.82	0.62	0.46	0.50	0.71	0.61

A calculation of the omega statistic between each pair of subjects showed that there was substantial agreement among subjects even before any instructions as to categorization were given; on Experiment 2, for example, the mean $\Omega = .57$. There was considerable variation among subjects, but there was no cluster of subjects who agreed with each other and disagreed with the experimenters' initial categorization. This suggests that there does not exist another well-defined "dialect" for the senses of *see*, although there may be agreement among subjects and disagreement with the experimenters on individual pairs of senses.

3.2.2 Task 2: Classification

In Experiment 2, the mean kappa for agreement among all subjects on the seven categories was .74, and 84% of the items were classified as intended by the experimenters.

In Experiment 3, we found that the 10 sentences with the lowest level of agreement were causing a disproportionate amount of error, and had no more than about 50% of responses in one category, so we eliminated them from further consideration, reducing the number of stimuli from 115 to 105. There were no comparable problems in the data for Experiment 2.

In Experiment 3, with 14 senses, the mean kappa among all subjects fell only to .70; after the elimination of the 10 weakest items, it rose to .75; also, 75% of the responses agreed with the experimenters' categorization.

In addition to recording subject responses, the response latency on the Classification task was also recorded; the distribution has a strong right skew, as is typical of such measurements. The median latency was 19 seconds, with the first quartile at 13 seconds and the third quartile at 26 seconds. Latencies longer than 80 seconds were

considered errors, since it seems unlikely the subjects were actually attending to the current item for so long.

Table 3. Experiment 2: Intended senses vs. responses

Responses → Intended ↓	EYE	FACUL- TY	DETER- MINE	ENSURE	RECOG- NIZE	EXPERI- ENCE	SETTING	Total
EYE	623	49	3	2	8	0	0	685
FACULTY	65	381	1	0	3	0	0	450
DETERMINE	46	11	394	25	2	2	2	482
ENSURE	19	7	33	444	13	3	1	520
RECOGNIZE	11	9	25	7	597	3	0	652
EXPERIENCE	10	3	4	5	4	388	131	545
SETTING	11	1	1	6	1	73	335	428
Total	785	461	461	489	628	469	469	3762

Table 3 shows the relation between intended senses and responses for all of the items on the Classification task in Experiment 2. The senses have been arranged so that those frequently confused with each other are in adjacent rows and columns. Thus, while EYE and FACULTY were correctly classified most of the time, 49 instances of intended EYE were classified as FACULTY, and 65 instances of intended FACULTY were classified as EYE. The asymmetry between the two "errors" may be due to the general bias toward the response EYE.

There is also some confusion among the three senses DETERMINE, ENSURE, and RECOGNIZE. We note that all three of these senses involved a relation between the SEER, and a proposition; in the case of ENSURE, the SEER brings the proposition about; in DETERMINE, the SEER finds out if the proposition is true; in RECOGNIZE, the SEER merely becomes aware of the proposition.

Finally we note confusion also between EXPERIENCE and SETTING, especially from intended EXPERIENCE to response SETTING. It may seem surprising that these two senses are confused, especially as the SETTING sense is unique with respect to the semantics of its subject. The similarity between the senses is that both of them allow non-animate subjects, e.g. *The house saw use as a barracks during the Revolutionary War*. In the Sorting task, several subjects created a category for non-animate SEER, and this may point to the source of the confusion between these two senses.

Table 4 shows the relationship between intended senses and responses for Experiment 3, after the 10 weakest items have been eliminated as described above. Once again, we find the general bias toward the response EYE, and some of the same confusions as noted in Experiment 2. In addition, the newly added senses create new combinations; the most striking result is that the majority of examples of intended PROCESS receive the response EYE. Although some of the subjects created a separate category in the sorting task for what we call PROCESS, the predominance of EYE responses for intended PROCESS stimuli in Experiment 3 suggests that most subjects regard perceiving a person performing an action as a simple physical perception, notwithstanding the secondary predication associated with it. The newly introduced sense CONDITION also creates considerable

Table 4. Experiment 3: Intended senses vs. responses

Responses → Intended ↓	EYE	PRO- CESS	FACUL TY	VISIT	CON- SULT	CONDI- TION	EXPER IENCE	SET- TING	ENVI- SION	HALLUC INATE	RECOG- NIZE	DETER- MINE	EN- SURE	AC- COM- PANY	Tot
EYE	175	4	11	0	0	2	1	1	0	0	2	1	0	0	197
PROCESS	239	174	18	4	0	7	8	2	16	0	10	1	0	1	480
FACULTY	20	0	153	0	1	0	0	0	0	0	0	0	0	0	174
VISIT	35	0	4	382	0	0	0	0	1	0	0	2	0	0	424
CONSULT	1	0	1	25	487	0	0	0	0	0	0	1	0	0	515
CONDITION	30	32	16	2	0	279	14	0	3	0	5	0	1	0	382
EXPERIENCE	0	6	1	0	0	2	122	6	6	0	1	1	0	0	145
SETTING	0	0	0	0	0	3	33	108	6	0	0	0	1	0	151
ENVISION	9	9	2	0	0	0	1	1	335	2	1	0	0	0	360
HALLUCINATE	19	0	3	0	0	1	0	0	0	397	1	0	0	0	421
RECOGNIZE	1	4	1	0	0	30	4	0	3	0	168	7	1	0	219
DETERMINE	3	2	0	5	9	4	0	0	9	0	3	210	15	2	262
ENSURE	0	0	0	0	0	1	0	0	1	0	3	2	222	2	231
ACCOMPANY	6	0	1	5	0	0	0	0	0	0	0	0	2	416	430
Total	538	231	211	423	497	329	183	118	380	399	194	225	242	421	4391

confusion, although the vast majority of cases are "correctly" recognized, and the rest of the table is remarkably low in confusion.

3.2.3 Clustering of Classification Responses

One approach to finding shared structure is to use a clustering algorithm, based on the kappa statistic. The steps are as follows: (1) For each pair of categories, compute the kappa that would result if they were combined into one. (2) Actually combine the pair which produces the greatest increase in agreement. (This represents the distinction which was hardest for the subjects to agree upon.) (3) Repeat this procedure, until combining categories produces no more improvement. Depending on the data, this may be before all categories are merged.

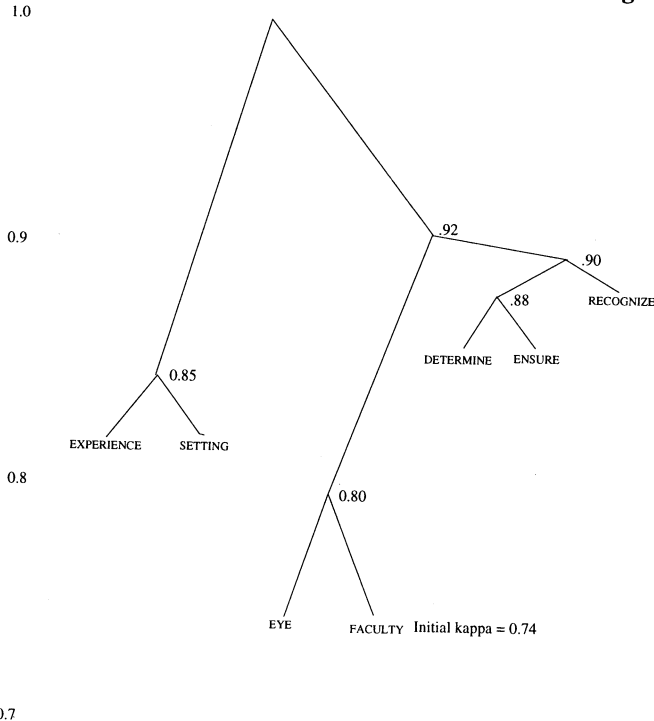
The order of combining can be represented as a tree, with the branchings at the bottom of the tree representing the categories most easily confused. The height of each branching represents the new level of agreement produced by combining the categories below. The clusters can be thought as reflecting the speakers' hierarchy of mental representations in this semantic space.

Figure 1 shows the results of clustering on the basis of agreement (i.e. kappa) for Experiment 2. This can be thought of as another way of looking at the confusion between intended senses and responses. Three clusters are noticeable (in order of decreasing confusion), EYE/FACULTY, EXPERIENCE/SETTING, and DETERMINE/ENSURE/RECOGNIZE. While these clusters were not foreseen by the experimenters, they seem reasonable *post hoc*, and also reflect the subjects' naive categorizations, as noted above. A somewhat similar, but less clear-cut tree (not shown) is produced from the results of Experiment 3. EYE and PROCESS are the first senses to merge, and ACCOMPANY lies at the top of the tree, but the other expected clusters are not apparent.

3.2.4 Timed Tasks

The data for the Lexical Decision task and the Categorical Judgement task are still being analyzed. The priming effects expected on the basis of Williams (1992) are very small (less than 50 milliseconds), and may require more accurate methods to detect them. In particular, our measurement of reaction times is subject to an error of approximately 16 ms., due to the polling frequency of the Macintosh keyboard. Preliminary results suggest that there is priming in the predicted directions in Experiment 2; it appears that the data is too sparse for good statistical analysis of the timed tasks in Experiment 3. We are continuing to work on eliminating outliers and finding appropriate groupings in this data.

Figure 1. Experiment 2: Clustering of senses based on increasing agreement



We have found quite a high percentage of "correct" responses in the Categorical Judgement task. On Experiment 2, the median is 92% correct (Q1 = 87%, Q3 = 96%). On Experiment 3 (after eliminating one subject who pressed the "yes" key on all of his responses) the median is 94% (Q1 = 89%, Q3 = 97%), even with the larger number of senses.

4. Conclusions and Future Directions

Our subjects were able to distinguish a relatively large number of senses for the highly ambiguous word *see* in Experiments 2 and 3, suggesting that the relatively low rate of agreement in Experiment 1 was due to the ambiguous and unbalanced stimuli rather than to inherent difficulty of the tasks. The level of agreement within subjects between the sorting task and the classification task suggests that the categories which we used in the classification task were fairly well matched with the categories which the subjects had at the beginning of the experiments.

The very high accuracy found on the Categorical Judgement task under timed conditions might be interpreted as proving that the subjects actually use the categories which they displayed on classification task in understanding natural language sentences. However, we cannot rule out the possibility that subjects have merely learned the categories created by the experimenters extremely well by that point. If the latter is occurring, there may be no way to get at the subjects' naive

representations except by creating several sets of a priori categories and determining which ones produce the highest agreement, presumably because of greater "naturalness",

Nothing in this experimental setup will help to resolve the vexed question of retrieval of fixed representations vs. different processing strategies, with which cognitive psychologists have been so concerned. Nor do these experiments provide any evidence as to the relative importance (or temporal precedence) of semantic vs. syntactic factors. Many senses have quite specific restrictions (syntactic and/or semantic) on their arguments, such as ACCOMPANY or DETERMINE. The subjects may be learning to distinguish at least some of senses from relatively straightforward syntactic cues, despite our best efforts to vary the syntactic patterns within senses. But the assumption that syntactic cues are more straightforward than semantic cues may itself be characteristic of linguists rather than most language users.

The technique of clustering on the basis of agreement statistics, described in Section 3.2.3 above, is useful in revealing certain aspects of the underlying structure of the senses. It is, however, naturally one-dimensional, and thus cannot reveal the complexity underlying the sense divisions. Several approaches for further, multidimensional analysis are being considered.

From a linguistic point of view, it would be possible to treat all of the syntactic factors (and perhaps some of the semantic factors) connected with each sense as features in a high dimensional space. As mentioned above, it was difficult to construct examples of particular senses with particular combinations of syntactic characteristics; the participation of certain senses in certain patterns of alternation and not others could be used as a set of features for discriminating the senses, somewhat in the manner of Levin 1993. These features need not be binary, and could even be continuous values. Such an approach would depend more on the analysts' linguistic judgments, but would not be limited by the particular alternations exemplified in a given experiment. A more experimental approach would be to consider the responses on the classification tasks as (partially) independent dimensions, and to find a method to reduce their dimensionality.

Notes

1. This is joint work with Jane A. Edwards, who has taken part in the design, running, and analysis of the experiments. This research will be discussed in more detail in my dissertation (Baker forthcoming). My colleague Chris Johnson also participated in the initial establishment of the list of senses, and I have received innumerable suggestions from the members of my committee, other UCB graduate students and faculty, and audience members at the presentation of this paper at the Berkeley Linguistics Society, February, 1999. Any errors which remain are my own responsibility.

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What is the Information Structure-Syntax Interface in Basque?

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I. Introduction¹

Basque is a language that has inspired a great deal of interest because it seems to have transparent pragmatics. In Basque, as in Hungarian (Kiss 1998), there appears to be a one-to-one relationship between a preverbal syntactic position and focus scope, as in the question and answer contexts of examples (1-2):

- (1) Gaur erosi aldezu zerbait azoka-n?
today buy AUX something market-IN?
"Did you buy anything at the market today?"

Bai, ni-k bi kilo sagar erosi ditut.
yes, I-E two kilo apple buy AUX
"Yes, I bought two kilos of apples²."

- (2) Nork apurtu du hau?
who break AUX this?
"Who has broken this?"

Ume hor-rek apurtu du.
child that-E break AUX
"That child has broken it." (Zubiri 1991:63)

Many accounts involve movement of phrases to a syntactic focus position, e.g., specifier of CP. In these accounts, a lexical ergative argument is generally regarded as occupying a higher specifier position reserved for a detached or extraclausal topic (Aissen 1992, Kiss 1998, Elorrieta 1994, etc.):

- (3) Emakume-ek zer nahi dute?
women-E what want AUX
"Women, what do they want?"

In this paper, we propose a different way to look at these same facts. We make two closely related points about the mapping between syntax and the pragmatic roles TOPIC and FOCUS in Basque. First, despite appearances, there is no syntactic focus position in Basque. We establish this by showing that the relationship between focus construal and word order in Basque is more indeterminate than previous analyses have assumed (see § 3). Our argument will be based on ambiguities of focus construal of the kind described by Ladd 1996 with respect to prosody. Second, it is more revealing to represent the relationship between focus construal and word order in Basque by a grammatical construction than by movement rules (see §2). The construction that we have in mind is Lambrecht's pragmatically preferred clause structure, which was originally proposed to capture the motivation for statistical tendencies in Spoken French syntax (1987).

2. Movement Rules vs. The Pragmatically Preferred Clause Construction

A movement account of focus seems reasonable for VSO languages like, for example, Tzotzil, as described by Aissen 1992. Since Tzotzil is verb-initial, preverbal and extraclausal status can be equated. Aissen argues that an element in preverbal focus is in specifier of IP. However, leftward shifts are problematic for Basque, since the preverbal focus position, as we have seen, is also an argument position. However one wants to model semantic scope, it simply does not make sense to treat pragmatically and syntactically basic OV sentences as derived. The derivational account makes Basque look anomalous in comparison to, say, English, in which VO word order is not treated as derived. In English, as in Basque, a direct object may be a narrow focus. For example, (4) can be a narrow-focus answer to the question 'What did she buy?':

(4) She bought a BOOK.

However, we don't find a parallel suggestion that the NP *a book* is MOVED to postverbal position in English. We therefore see no strong reason to propose that a focal NP is moved to preverbal position in Basque. Another problem with a focus-movement account for Basque is the status of topical arguments that precede the preverbal focus. For example, Elorrieta and others claim that the ergative argument preceding the focus in (5) is in specifier position of a CP which, in turn, is adjoined to a CP which contains the focus, *bizikleta*, in its specifier position. Such accounts, with two movement transformations that have to be linked and simultaneous, we find problematic.

(5) Mikelek, *bizikleta* apurtu du. (=Elorrieta (21a))

Mikel-E bicycle-A break AUX
"Mikel, he broke his bicycle."

The comma indicates a boundary tone which Elorrieta sees as creating a separate intonation unit for the detached topic expression (see also Aissen 1992). The problem is, as Elorrieta puts it, that "topicalization of other NPs is obligatory when an NP is in narrow focus" (p. 42). We could conclude that detached topics are base-generated, as per Aissen 1992, and retain a movement account of focus. We are not sure what such a move would gain us, because we are doubtful that there are long-distance dependencies in Basque. In this respect, we differ from both Ortiz de Urbina (1986:230) and Elorrieta (1994:35). Elorrieta (1994: 35) gives the pair in (6).

(6) a. *? **Nor-k** uste du Jonek ekarri-ko dio-la oparia seme-ari?
who-E think AUX Jon-E bring-FUT AUX-that present-A son-D
"Who does Jon think will bring a present to her son?"
(=Elorrieta 1994 (39a))

b. Oparia seme-ari **nor-k** ekarri-ko dio-la uste du Jonek?
present-A son-D who-E bring-FUT AUX-that think AUX Jon-E
"Who does Jon think will bring a present to her son?"
(=Elorrieta 1994 (39b))

Elorrieta says that both sentences are acceptable and that they mean the same thing. However, we have found that native speakers reject (6a), while they accept (6b), which involves the in situ strategy for focus. This makes us question whether a movement account of focus is appropriate for Basque. Another problem for a movement account is the status of postverbal topical elements, which Lambrecht (1981, 1994) refers to as ANTITOPICS. An example of an antitopic in Basque is given in (7). The topic of the

conversation in which this sentence occurs is the Basque immigrant experience in America, specifically how Americans struggle to pronounce Basque words.

- (7) Mila modu diferenteta-n esaten zuten nire abizena.
 thousand way different-IN say AUX my last-name
 "They pronounced my last name (Urrutia) a thousand different ways."
 (Interview with Johnny U, Basque Country-Western singer from Idaho, *El Diario Vasco*, January 1997)

In accordance with Ziv and Grosz 1994, we presume that right-dislocated arguments are inferentially related to discourse topics. In (7), the NP *nire abizena* ('my last name') denotes something that is related to what is under discussion, Basque words. Example (7) shows that a direct object need not be focal, and that a topical direct object may be realized in postverbal position, with the low pitch accent characteristic of topics. Rightward topics are problematic for approaches like Elorrieta's, in which topics move to specifier position of multiply adjoined right-branching CPs. They are also problematic for any approach that identifies a particular syntactic position, say specifier of CP, with the topic role.

As an alternative to a movement-based account of topic and focus, we propose a pragmatically preferred clause structure for Basque, in accordance with Lambrecht's (1987) proposal for Spoken French clause structure. This pattern is shown in Figure 1, using certain conventions of unification-based Construction Grammar (Kay and Fillmore 1999):

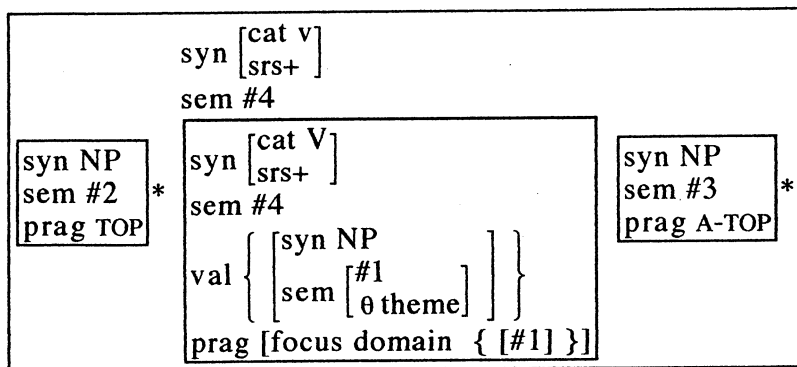


Figure 1. Pragmatically Preferred Clause Structure in Basque

In Figure 1, we use the pragmatic role of TOP to represent a detached or extraclassical topic. This is what Aissen calls an EXTERNAL TOPIC. Herring 1990 observes that these topics tend to be in leftward position, irrespective of word order type. The clausal constituent to the right of the detached topic has a valence structure. This is the set of participant roles licensed by the verb. The focus domain of the clause is represented as a valence set. This valence set contains those elements that are in focus. The set of focus elements includes the absolutive NP that is in the valence set of the lexical verb. The pragmatic role A-TOP represents a rightward detached topic—an ANTITOPIC. Following Ziv and Grosz 1994, we assume that antitopics denote referents which are highly recoverable but not currently under

discussion. Lambrecht (1987:233) argues that antitopics are more CONTINUOUS than external topics, which are used for more discontinuous strategies: topic switching and topic establishment.

The pragmatic structure in Figure 1 is closely paralleled by Van Valin's (1993) layered clause structure, which also includes a clausal core and left- and right-detached positions for topics. The structure in Figure 1 unifies with valency and constituency constructions per Kay and Fillmore. The constraints that are represented in Figure 1 come into play only when a verb is paired with a lexical NP. Not all clauses in Basque contain an NP. The clausal pattern in Figure 1 finds a close parallel in Du Bois's Given A constraint, which was developed on the basis of statistical tendencies in Mayan narratives. Bellver 1993 found the same tendencies in Basque narratives. Namely: There is one at most one lexical NP per clause, and this strongly tends to be an absolutive argument. This is a pragmatically motivated fact. The motivation is captured by Lambrecht's Principle of Separation of Reference and Role (1994). This principle is stated in terms of a maxim: Do not introduce a referent and talk about that referent in the same clause. This principle says basically that topics are introduced outside the clause in which they play a topic role. Following from this, argument-position lexical NPs are in focus.

It is generally presumed that sentences which exhibit OSV orders like (8) give evidence for a 'focus position' because default SOV word order is apparently overridden.

- (8) Bizikleta Mikelek apurtu du. (after Elorrieta (21d))
 bicycle-A Mikel-E break AUX
 "Mikel broke his bicycle."

The implication of our analysis is that word order variation is not taken to be evidence of a syntactic focus position. In this sentence, against the tendency described by the representation in Figure 1, an ergative NP denotes a focus. Such sentences are correspondingly rare³. The lexical NP *bizikleta* is in detached topic position. Crucially, since only the second of the two preverbal NPs is an argument, only this NP is in focus. Therefore, we do not view permutations in the ordering of preverbal lexical NPs as reflecting competition for focus position. Instead, in accordance with Elorrieta, we assume that all preverbal lexical NPs, save that in immediate preverbal position, are extracausal TOPICS. By extension, we do NOT presume that the putative OSV word order in (8) reflects 'scrambling,' because if there is only one lexical argument NP, it cannot be ordered with respect to other argument NPs.

By drawing a functional distinction between two classes of lexical NPs—topic introducers and participant-role denoters—we motivate Aissen's observation that external topics in Mayan languages are extrasyntactic. For example, as Aissen notices, they do not obey island constraints (1992:69). In addition, as Aissen shows, they may be syntactically unlinked, in not corefering with any referent inside the clause. Examples of UNLINKED detached topics in Basque are given in examples (9-11):

- (9) Eta beste hizkuntzak baduzu aditzak urtebete-an ikastea.
 and other languages-A, have verbs-A year-IN learned
 "Other languages, you can learn the verbs in a year."
- (10) Euskal Herria, ez daukazu etxe-tik irtetzerik guardasolrik gabe.
 Basque Country, NEG AUX house-ABL leave umbrella without
 "The Basque Country, you can never leave the house without an umbrella."

- (11) Nere arreba, etxea beti zikiña dago.
 my sister, house always dirty is
 "My sister, her house is always dirty."

Another indicator of the extrasyntactic status of detached topics is their ability to stack. Stacked topics are multiple preclausal detached topics. Their sequence does not determine how they are coindexed with grammatical-function NPs in the following clause. An example from French is given in (12a-b):

- (12) a. Nicole_i, Marie_j, elle_{i,j} ne l_{i,j}'aime pas. (=Lambrecht 1987 (8a))
 b. Marie_j, Nicole_i, elle_{i,j} ne l_{i,j}'aime pas.
 "Nicole, Marie, she doesn't like her."
 "Marie, Nicole, she doesn't like her."

Lambrecht (1996:221) points out with respect to these examples that neither ordering to the leftward topics affects coreference within the clause. In either ordering, Marie is construable as coreferential with the subject. The same can be said of Nicole. This stacking phenomenon can be found with Basque detached topics also, as in (13):

- (13) a. Zure lagun-ek, seme-ari, oparia ekarri diote.
 your friends-E son-D present-A bring AUX
 "Your friends brought the present to their son." (=Elorrieta 1994 (12a))
 b. Seme-ari, zure lagun-ek, oparia ekarri diote.
 son-D your friends-E present-A bring AUX
 "Your friends brought the present to their son." (=Elorrieta 1994 (12c))

Detached topics do not denote arguments, so their order is not relevant for argument structure. In addition to ordering freedom, we find MORPHOLOGICAL indicators that detached topics are nonsyntactic. Examples (14-15) show that left-detached topics need not be morphologically case-marked for their role in the following clause. Example (14) is reported by Alan King (pers.com. 1999): (14a) represents the "properly" dative-marked topic NP, while the topic NP in (14b) is an alternative in natural speech, and is not case-marked. We see the same situation in (15) where we would anticipate the NP *gizon hori* being case-marked ergative if it were within the clause.

- (14) a. Antxon-i, badakite nork lapurtu zion.
 Antxon-D they-know who-E rob AUX
 "Anthony, they know who robbed him."
 b. Antxon, badakite nork lapurtu zion.
 Anthony, they-know who robbed him.
 "Anthony, they know who robbed him."
 (15) Maite du-dan gizon hori, beti opariak erosten dizkit.
 love have-REL man that, always presents-A buy AUX
 "The man that I love, he always buys me presents."

Caseless detached topics also occur in spoken Spanish, according to Klein-Andreu 1989. In (16a), "the Dative plural clitic *les* 'them' refers to the entities affected by the horn-structures' falling off" (1989:26), the entities being *los cérvidos* 'deer'. However, "normative prescription would lead us to expect that any explicit mention of this entity should be accompanied by the preposition *a*," as in (16b). Klein-Andreu refers to such

“syntactically unintegrated forms” as *los cérvidos* in (16a) as “X-forms”. She finds that the systematic occurrence of these X-forms in the spoken language points to topic establishment rather than “performance error.”

- (16a) Los cérvido-s se les cae
 the deer-NOM-PL it-NOM-PAS-SG DAT-PL fall-3SG
 todo-s los año-s el cuerno.
 all-PL the year-PL the antler
 “Deer, they drop their antlers every year.” (after Klein-Andreu 1989(1))

- (16b) A los cérvido-s se les cae todos los años el cuerno.
 to-DAT the deer-PL it DAT-PL fall-3SG all the years the antler
 “Deer drop their antlers every year.” (after Klein-Andreu 1989 (1b))

This lack of case-marking on detached topics makes sense when we consider the difference in function between topic NPs and argument NPs. As described by Lambrecht, with respect to strong and weak pronouns in French, topic NPs have a naming function only; they do not denote participants⁴.

By separating topic-establishing and case-role denoting functions of NPs, the preferred clause structure captures discourse tendencies. But does it have any relevance for syntactic analysis? Notice that we have said nothing in Figure 1 about constituency, or even word order within the clause. Instead, we propose the preferred clause structure as a criterion that syntactic analyses must meet in order to have a sound empirical basis. Although one can easily invent Basque sentences in which all case roles are expressed by lexical NPs, these do not occur as products of ordinary linguistic behavior (see Lyons 1977 for discussion). Under the plausible hypothesis that the function of syntax is to convey information, it seems reasonable that constraints on information flow should form the basis for syntactic representation.

3. Focus Position vs. Focus Construal

Focus position, as it is conceived of by Kiss (1998) and others, is a tight spot. Only a single constituent can occupy this spot, and this single constituent may only accept a narrow, or contrastive, reading, as in (17a). Kiss terms this construal IDENTIFICATIONAL FOCUS. In contrast, her example of INFORMATIONAL FOCUS (17b) takes a broad reading, with the preverbal focus position unoccupied by an argument.

- (17) a. Tegnáp este **Marinak** mutattam be Pétert.
 last night Mary-DAT introduced PERF Peter-ACC
 “It was **to Mary** that I introduced Peter last night.”
 (=Kiss 1998 (5a); her boldface)
- b. Tegnáp este be mutattam Pétert Marinak.
 last night PERF introduced Peter-ACC Mary-DAT
 “Last night I introduced Peter to Mary.” (=Kiss 1998 (5b))

Preverbal position may indeed be dedicated to narrow focus constructions in Hungarian, but this is not the case for Basque, where OV sentences can have broad focus readings in addition to narrow ones. In other words, the facts of interpretation do not allow us to uphold a one-to-one mapping between a syntactic position and focus. Instead, we claim that focus construal in Basque is underdetermined by surface syntax. Our claim is based on focus-scope ambiguities. These ambiguities come from a mechanism that is sometimes called FOCUS PROJECTION after Höhle 1982.

Early models of the focus-accent interface, like that proposed by Bolinger 1961, were based on the assumption that accent marks the 'information point' of the sentence. Theorists like Schmerling 1976, Selkirk 1984, Lambrecht 1994, and Ladd 1996, have rejected this iconic view of the accent-focus relationship. They argue that models of sentence accent must contain a mechanism for focus projection. One mechanism of this kind is the **PRINCIPLE OF ACCENT PROJECTION**, as described in (18) by Lambrecht and Michaelis; (19a-c) illustrates how this principle is applied.

- (18) **The Principle of Accent Projection.** The accent on an argument expression may project its value onto an unaccented predicate and additional lexical arguments, if any. In such cases, the predicate and the argument(s) are integrated into an informational unit. (Lambrecht and Michaelis 1998: 498)
- (19) a. They brought a present to their SON.
 b. **Argument-focus context.** Who did they bring a present to?
 c. **Predicate-focus context.** What did they do?

The argument-focus construal in (19b) corresponds to Kiss's definition of **IDENTIFICATIONAL FOCUS**. In (19b) there is an open proposition, *They brought a present to X*, and the assertion in (19a) identifies the variable in the open proposition. Accent projection operates in the context of (19c). In this context, (19a) is construed as a topic-comment structure. The entire VP is in focus. This is roughly what Kiss means by **INFORMATION FOCUS**.

Predicate focus is also compatible with the presence of topical referents inside the focal VP. Two examples of this are given in (20):

- (20) A: What did they do for their SON?
 B: They brought a PRESENT for their son.
 B': For their SON they brought a PRESENT.

In (20), A's question has two possible responses. The first B response involves what Lambrecht and Michaelis (1998) call the discourse condition on unaccented argument expressions. This is shown in (21):

- (21) **Discourse Condition on Unaccented Argument Expressions:** An argument expression is unaccented iff the speaker assumes that its referent can be construed as a ratified topic at the time of the utterance. (ibid.)

In accordance with this principle, the NP *their son* in B lacks accent because the speaker views it as an established topic. The B' response is a different situation. Here, *their son* contrasts with other possible beneficiaries. Left dislocation signals this contrastive or set-inclusion function (Prince 1997). Notice that in the B' response there are two accents. One is on the left-dislocated NP and the other falls inside the VP. This double accent pattern makes sense according to a corollary principle given by Lambrecht and Michaelis, the **Topic-Comment Principle**. This is given in (22):

- (22) **The Topic-Comment Principle:** If a predicate capable of integration with its argument is not subject to accent projection, i.e. if both the predicate and the argument constituent are accented, the two denotata have a topic-comment relation to each other. (ibid.)

Accent projection is a major component of predicate focus. It also occurs in the more specialized case of SENTENCE FOCUS. Sentence-focus sentences, according to Lambrecht (1994) are used to report an event or to assert a state of affairs. They are formally constrained: they require an intransitive verb that is typically stative or inchoative AND a lexical NP subject. The sentence *My CAR broke down* is an example of sentence focus in context (23b):

- (23) a. My CAR broke down.
 b. **Sentence-focus context.** Bus passenger apologizing to fellow passengers as she slowly loads grocery bags onto bus.
 c. **Argument-focus context.** What broke down?

Sentence focus is like predicate focus: it permits a narrow or argument-focus reading. We can see in (23c) that the sentence *My CAR broke down* can be used in an argument-focus context, where the NP *the car* is the focus, rather than the whole sentence. What we propose is that preverbal position in Basque acts like a prosodic peak in English. An NP or other phrase in the preverbal position can project its focus value onto the whole predicate or, under certain circumstances, onto the whole clause. Evidence that focus projection operates in Basque is found in (24):

- (24) a. Opari bat ekarri diote.
 present-A one-A bring AUX
 "They brought a present."
 b. **Argument-focus context.** What did they bring?
 c. **Predicate-focus context.** What did they do?

As Elorrieta observes (1994:13), (24a) is ambiguous between the argument-focus reading that is appropriate in context (24b) and the predicate-focus reading that is appropriate in context (24c). As in English, we can find a TOPICAL ELEMENT inside a focal VP in Basque, as well. A CONTRASTIVE topic will occur in the left detached position as in English. This is shown in (25a). A NONCONTRASTIVE topic will be placed in the right detached position. This is shown in (25b):

- (25) a. Semeari, opari bat ekarri diote.
 son-D present-A one-A bring AUX
 "For their SON, they brought a present." (What did they do for their son?)
 b. Opari bat ekarri diote, semeari.
 present-A one-A bring AUX son-D
 "They brought a PRESENT for their son." (What did they do for their son?)

As in English, focus projection also occurs in the SENTENCE-FOCUS CONTEXT. Examples of this are found in (26):

- (26) a. Nere kotxea puskatu egin da.
 my car broke do AUX
 "My CAR broke down."
 b. **Sentence-focus context.** Bus passenger apologizing to fellow passengers as she slowly loads grocery bags onto bus.
 c. **Argument-focus context.** What broke down?

Sentence (26a), like its English translation beneath, is ambiguous with regard to focal scope. It has a sentence-focus reading in the context of (26b) and an argument-focus reading in the context of (26c). Other examples of sentence-focus are given in the news reports in (27-29).

- (27) Zure ama-k deitu egin du.
 your mother-E call do AUX
 "Your MOTHER called."
- (28) Nere errelojua gelditu egin bai-da.
 my watch stop do AFF-AUX
 "My WATCH has stopped."
- (29) Kartera galdu zait.
 wallet lose AUX
 "My WALLET is missing."

For each of the examples in (27-29), there is a narrow-scope/wide-scope ambiguity, as in the 'car broke down' example in (26). What this means is that preverbal position in Basque cannot be equated with argument-focus construal.

Basque has disambiguating devices for both predicate-focus and sentence-focus. These indicate that the different focus construals we have talked about are true ambiguities. In the case of predicate focus, we find that a construction which Aske (1997) calls DELAYED FOCUS forces a predicate-focus reading. The contrast between delayed focus and preverbal focus is nicely illustrated by the following passage from de Rijk. The lines are from an old folk tale about some brothers setting out on a quest:

- (30) a. Bat-ek topau eban astronomo bat
 one-E run-into AUX astronomer one-A
 "One (brother), he met an astronomer."
 b. Bigarren-ak sastre bat topau eban.
 second-E tailor one-A run-into AUX
 "The second, he came across a tailor." (de Rijk 1969:348)

In the first passage, delayed focus is used to convey predicate focus. The new information is that the brother met an astronomer. By the second passage, (30b), the reader can treat as background the open proposition 'A brother ran into X'. This background makes it appropriate to produce an argument-focus assertion, in which the focal argument is in preverbal position. In the case of sentence focus, Spanish-like inversion appears to provide for unambiguous sentence-focus construal. Examples of inversion constructions are given in (31-33). Example (31) is taken from an old tale of a wife's tough love plan to reform her inveterate drunk of a husband, while (32-33) are more recent examples.

- (31) An etorren taberna-tik etxealde-ra trinkulun-trankulun
 there came tavern-from farmhouse-to bouncy-bounce
 mozkortia.
 drunk-(DET)
 "There came the drunk tripping along down the road from the bar back to his house." (de Azkue 1934: 264)
- (32) eta eztanda egin du beste lehergailu batek

and explosion-A make AUX other bomb one-E
 "...and another bomb exploded." (Egunkaria newspaper, 1996)

- (33) Balaztarik gabe geratu zen kamioi bat.
 brakes without appear AUX truck one-A
 "Along came a truck with no brakes." (Euskaldunon Egunkaria, 1997)

In (31-33) an inversion structure is used to convey sentence focus. Notice that the postverbal elements in these examples are not antitopics or continuous topics, since they denote discourse-new referents. Examples of postverbal focus provide further evidence against an account of Basque syntax in which focus is identified with a single syntactic position.

4. Conclusion

This analysis suggests a more descriptively adequate and typologically realistic picture of the pragmatics of word order in Basque than one based on movement to a syntactic focus position. The word-order permutations we have described now represent just one basic construction for predications with NPs, in which:

- Focal scope in an OV or SV sequence is indeterminate, because of focus projection;
- There is at most one lexical argument per clause, and it is typically absolutive;
- One or more lexical NPs can appear in the extraclausal positions that are reserved for detached topics.

We conclude that:

- Pragmatic generalizations based on word order should not be based upon relative ordering of lexical NPs, since pragmatic functions and grammatical functions are orthogonal: a lexical NP may not be an argument.
- Syntactic representation should be compatible with functional principles like Lambrecht's Principle of Separation of Reference and Role.
- We should not, however, overstate the isomorphism between syntactic representation and pragmatic representation. The view that pragmatic construal is directly 'read off' syntactic representation is hard to maintain when we look closely at Basque as it is spoken.

Endnotes

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² The uncited data were gathered in the Spanish Basque Country. They include both elicited and spontaneous productions in the Gipuzkoan dialect of Basque; this dialect accounts for the largest group of native speakers.

³ The markedness of focal ergative NPs, as captured by Du Bois's (1987) Given A Constraint, is suggested by their rarity in Basque corpora. Aske 1997 reports no instances

of OSV word order in his data bank, while de Rijk 1969 reports only 4%. With regard to the Given A Constraint in particular, Bellver 1993 found that only 12% of ergative arguments were new mentions in a Basque narrative.

⁴ See Davidson 1996 for a similar discussion on the topicalizing function of emphatic pronouns in spoken Madrid Spanish.

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From *ergativus absolutus* to topic marking in Kiranti: a typological perspective

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1. Case markers as subordinators

In many languages, clauses can be subordinated by means of case markers. For Bodic languages, a branch of Sino-Tibetan, Genetti (1986) has shown that the meaning of case markers on clauses is in most instances a natural extension of their function on nouns. A dative, for example, which marks a referential goal with a noun, signals a situational goal, i.e., a purpose, when used on a clause. Among the case markers recruited for subordination, we not only get relatively concrete cases like datives, comitatives and various types of locatives, but also core argument relators such as ergatives and accusatives. In this paper, I will focus on ergative markers in one subgroup of Bodic, viz. in Kiranti languages spoken in Eastern Nepal, especially in Belhare. A typical example of ergative case-marking on a clause is the following:¹

- (1) *cama m-pak-yakt-u-naŋa ta-hatt-he-ŋ.*
 food 3nsA-serve-IPFV-3U-ERG reach-TELIC-PT-1sA
 'I arrived there when they were dealing out the food.'

In Belhare the ergative is marked by *-ŋa*, but after vowels there is an alternative form in *-a*. Where the forms compete, *-ŋa* seems to be slightly more emphatic and typically appears when repeating an ergative expression. In subordinate clauses, *-ŋa ~ -a* is always supported by a marker *-na*,² whose function will be elucidated below. Outside subordinate clauses, the ergative has three basic functions: it indicates a transitive actor (2a), an instrument (2b) or a cause (2c):

- (2) a. *tombhira-ŋa wa sei?-t-u.*
 lynx-ERG chicken kill-NPT-3U
 'The/a lynx will kill the/a chicken.'
 b. *dabhek-ŋa n-cept-he.*
khukuri.knife-ERG 3nsA-cut-PT
 'They cut it with the/a *khukuri*.'
 c. *cuŋ-ŋa si-yu.*
 cold-ERG die-NPT
 'S/he will die from the cold.'

Given this range of meanings, the use of ergative markers as subordinators seems to follow from the straightforward application of a grammaticalization scheme along the lines sketched in (3):

(3) ERGATIVE/INSTRUMENTAL > BECAUSE > WHEN/WHILE

Such a grammaticalization path is well-attested throughout Bodic (Genetti 1986), but several observations cast doubt on this explanation in Southern and Eastern (SE) Kiranti languages. These observations are discussed in Section 2. In Section 3 I propose an alternative explanation according to which SE Kiranti ergative clauses derive from a reanalysis of relative constructions as absolute constructions, in which the ergative functions like an absolute case in an Indo-European language (e.g., the *ablative absolutus* in Latin), viz., as a signal that its host NP has sentential rather than referential or attributive force and that it supplies circumstantial background information. The scheme in (3) might still explain the choice of the ergative as the absolute case, but it falls short of accounting for all aspects of the construction. Section 4 closes the paper by discussing the Kiranti findings against the background of a general typology of absolute constructions.

2. Problematic aspects of a grammaticalization account

While an account in terms of grammaticalization may hold for other Bodic languages, most semantic, morphological and syntactic properties of SE Kiranti ergative clauses are left unexplained by the developmental scheme in (3) or are even hard to reconcile with it. I first focus on the semantics of ergative clauses (Section 2.1), before moving on to morphological structure (Section 2.2) and syntactic distribution (Section 2.3).

2.1. The function of ergatives in subordinate clauses

From the scheme in (3) it would appear that causal readings figure prominently among the available interpretations. Indeed, in other languages where ergatives are found on clauses, the prototypical function they assume is causal. This is the case in many languages of Nepal (both Sino-Tibetan and Indo-European) and also in Tibetan (cf., among others, Genetti 1986, 1991; Gyurme 1994; Tournadre 1996):

- (4) stag maŋpo yod pa-s ŋa-s gcig bsad-pa yin.
 tiger many have NZR-ERG 1s-ERG one kill-NZR AUX:PFV
 'Because there are many tigers I killed one.' (Genetti 1991:231)

While Northern Kiranti languages such as Thulung (Ebert 1994:135) or Yamphu (Rutgers 1998:274) show essentially the same pattern, the functional range of ergative clauses is quite different in the Southern and Eastern part of the Kirant.³ In Belhare, cause relations are typically expressed by sequential clause chaining, which follows the universal logic of *Post Hoc Ergo Propter Hoc* 'after this, therefore because of this' (see Haiman 1985 for similar patterns in other languages):

- (5) a. mai-lur-he kina khar-e-ŋa.
 1sU-tell-PT SEQ go-PT-e
 'He told me and then I went' = 'I went because he told me so.'

- b. ika khar-e-ga? — un-na mai-lur-he kina=mu!
 why go-PT-2 3-ERG 1sU-tell-PT SEQ=OBVIOUSLY
 ‘Why did you go? — Because he told me [what else do you think?!]’

This is all the more remarkable as *kina* (~ *ki* ~ *kinahun*) is not a **marker** for causality: the ergative subordinator *-nana* ~ *-naa* could easily take over functional ground here. In elicitation it is possible to get causal readings from ergative clauses, but such examples are hard to come by in natural discourse:

- (6) u-lamma kar-a-naa cama n-ca-at-ni,
 3POSS-appetite come.up-SUBJ-ERG food NEG-eat-PT-NEG
 tara u-sak lus-a-naa.
 but 3POSS-hunger be.felt-SUBJ-ERG
 ‘S/he doesn’t eat because [the food] is appetizing, but because s/he is hungry.’

The core function of ergative clauses is different. It lies in signaling a sentential topic, that is, “a framework within which the main predication holds” (Chafe 1976). As is typical for topic clauses in many other languages (Haiman 1978), this often translates as a conditional clause:

- (7) ŋka-na har-e-ŋ=be kochu lis-a-ŋ-naa. <G4.56b>
 1s-TOP bite-PT-1sA-IRR dog be-SUBJ-e-TOP
 ‘I would have bitten him if I were a dog.’

Being full-fledged discourse topics, the scope of ergative subordinate clauses is by no means limited to single predications. Especially in narratives, it is not uncommon to find ergative clauses setting the stage for a longer stretch of discourse. This use defies direct translation; it is perhaps best captured by a colon in English writing:

- (8) ŋ-kond-a-ch-u-lo ansar-ai bicar-ai cok-sa ŋ-khar-a-chi-nana
 3ns-search-SUBJ-d-3U-COM thought-EMPH opinion-EMPH do-CONV 3ns-go-SUBJ-d-ERG
 sadhu-rok=phu ta-he, sannesi ta-he, sitara teī-sa, kina, “ŋka-na
 pure-FOC=REP come-PT ascetic come-PT sitar play-CONV SEQ 1s-TOP
 jogi-ŋa, yaŋ nak-cai-?ŋa-ha” cek-sa, kinahungo Ram
 mendicant-e DISTR ask.for-eat-NPT-e-NZR say-CONV SEQ R.
 Lachuman-chi-ŋaha un-chik-ŋaha khimm-e mokkha-et-tok=phu lig-he
 L.-ns-GEN 3ns-GEN house-LOC porch-LOC-FOC=REP enter-PT
 kinahungo . . . <KP59a>
 SEQ
 ‘Thinking and considering, they^d went looking for [Sītā]: (*-nana*) maybe it was a *sādhu* who came, or a *sannyāsī* came, playing the sitar. Then he would say: “I am a *yogī*, I am one who asks everywhere for food.” And then he would go onto the veranda at the house of Rāma and Lakṣmaṇa and then...’

The ergative clause in this example describes the general background for the thoughts that are reported in the subsequent paragraph, it explains why these thoughts are relevant for the overall narrative.

In other situations, the sentential topic described by an ergative clause simply indicates the temporal and spatial circumstances of the main clause event. In the presence of imperfective aspect in either the subordinate or the main clause, this creates what aspectologists call a 'scheme of incidence', where one event interrupts another event going on in the background, as in the introductory example (1). With the (unmarked) perfective aspect, by contrast, the reading is usually sequential:

- (9) i-net-nahuj Kathmandu khar-e-i-ŋa. Kathmandu khar-i-ŋ-naŋa
 DIST-LOC-ABL K. go-PT-1p-e K. go-1p-e-ERG
 i-na Mākanpurjilla-e pheri tarkari-ro his-si khar-e-i-ŋa.<ST4>
 DIST-DEM M. district-LOC again vegetable-FOC look-SUP go-PT-1p-e
 'From there we^e went to Kathmandu. After we^e had gone to Kathmandu, in
 Makvaunpur district it was again vegetable [fields] that we^e went to see.'

For an account of ergative clauses in terms of the grammaticalization path sketched in (3), this reading is crucial because it bridges between BECAUSE and WHEN via notions of logical SOURCE and temporal SEQUENCE (Genetti 1986). However, the sequential reading is already predicted by the aspectual choice, and there is no reason to attribute 'sequentiality' to the semantics of the subordinator. Moreover, among the available interpretations, this use of ergative clauses is rare and virtually limited to tail-head linkages as in (9). In other cases, sequential relations are encoded by chaining constructions of the type exemplified by (5) above.

In other SE Kiranti languages, the situation is similar although causal readings of ergative clauses are found in discourse. Nonetheless, sequential readings seem to be rare again, whereas WHEN and IF readings are very common if not the default choice (cf. van Driem 1987:231 on Limbu; Ebert 1997:149 on Athpare). The following example is from Phedāppe Limbu (van Driem 1987:233):

- (10) kɛ-da-ʔille ŋga ta-ʔɛ wa-ʔɛ.
 2-come-ERG 1s come-1sNPT AUX-1sNPT
 'By the time you show up, I'll have come [back].'

It is of course possible that, functionally, clausal ergatives split away long ago from the instrument, cause and agent readings they have on nouns, but there is no positive evidence for such a historical development. There is, however, positive evidence against such a scenario. This is what I turn to in the following section.

2.2. The morphological structure of ergative clauses

The most important morphological feature of ergatives in subordinate clauses is that, unlike comitatives and other cases, they are not directly attached to a finite verb form but instead follow another morpheme. This morpheme is *-na* in Belhare and Athpare, where it is obligatory, and *-ŋin* (~ *-ŋil*) in Limbu, where it is optional in at least one dialect (Phedāppe). The markers are all systematically homophonous with definite or specific articles.

Unlike what we are used to in modern European languages, SE Kiranti articles can appear on the attribute instead of the head noun, and in Belhare and Athpare

they are even restricted to this position (Belhare example; see Bickel 1999 for discussion):

- (11) tu-na khim v.s. tu-kha khim
 up-ART house up-NZR house
 'the house up there' 'a (unspecific) house up there'

The similarity between the article and the pre-ergative marker on subordinate clauses is unlikely to be due to accidental homophony as we find the same formal convergence in the case of the etymologically distinct marker *-ʔin* in Limbu. However, no explanation for the appearance of the article is readily available if we assume ergative clauses to develop through gradual semantic extension of regular case constructions. Kiranti languages do not necessarily require nominalization in order for case-markers to be attached to clauses. The Belhare comitative in *-lo*, for instance, directly follows finite verbs (cf. *ηkondachu-lo* 'while they searched' in (8) above) and, as noted before, in at least one dialect of Limbu, the ergative can optionally appear on clauses without additional marking as well (e.g., *ta-lle* 'come-ERG', i.e., 'when he came'; van Driem 1987:234). Moreover, even if we assume that the additional marking found on ergative clauses has a nominalizing function, why is it not a plain nominalizer that is chosen, if the language has one, as in Belhare (*-khak*, Bickel 1999) and Limbu (*-pa*, van Driem 1987:193-99)? The presence of the article calls for a different explanation.

2.3. The syntactic distribution of ergative clauses

Other problems with the grammaticalization account in (3) have to do with the syntactic distribution of ergative clauses. In line with their topic-indicating function, ergative clauses are 'ad-sentential' (Bickel 1991), i.e., outside the main clause rather than embedded in it. This contrasts with other case-marked clauses, notably with comitative clauses, where the case marker indicates — through simple extension of its meaning on nouns — an accompanying circumstance (cf. again *ηkondachulo* in (8) above). The difference is evidenced by the possible scope of main clause negation in Belhare. Comitative clauses, which are intrasentential constituents, always attract the scope of main clause negation, to the exclusion of the main predication (12a). Ergative clauses, by contrast, do not necessarily attract negation scope (12b):

- (12) a. taw-a-lo kam n-cok-gatt-u-n.
 come-SUBJ-COM work NEG-do-PT-3U-NEG
 'He didn't [keep] working up to [the time] he came here.'
- b. i-na taw-a-naŋa unbhasan cok-ma-ro mi-η-pi-att-u-n. <III.71.17>
 DIST-DEM come-SUBJ-ERG 3 speech do-INF-FOC 3nsA-NEG-allow-PT-3U-NEG
 'They didn't allow him to deliver a speech when he came here.' (but at another time and place they did allow it.)
 or: 'He came here, but they didn't allow him to deliver a speech.'

(12a) implies that the referent did engage in the activity denoted by the main verb, i.e., what is negated is the circumstance, not the main event. From the sentence in

The internal-head version (14b) is formally identical to a subordinate topic clause — the only difference is in the interpretation. I propose that the semantic shift is due to a reanalysis of the construction as an *ergativus absolutus*, i.e., as an absolute construction parallel to what is known in Indo-European languages.

The core property of absolute constructions is that the erstwhile attribute (*nisurnnana*) is understood as a predicate. In this interpretational shift, the case desinence loses its standard meaning and comes to signal that the host NP has a predicative rather than an attributive or referential force. Where an attributive reading is semantically impossible as in the earlier examples, the reanalysis is compulsory and the shift complete. Absolute constructions are renowned for a wide range of interpretational possibilities, but from a discourse perspective, they are centered on a general notion of sentential topic: they recapitulate previous information or set the stage anew for the following (Holland 1986, Bickel 1991:138-40, Keydana 1997). This corresponds exactly to what we found in Kiranti, and in these languages, the topic function receives further support from the fact that the reanalysis of attributes as predicates also entails a reanalysis of the attribute-marking device, i.e., of the article (*-na*). Since there is no longer a head noun that it could specify, the article only retains its discourse function, which is to signal topicality. This is a short step since specific or definite NPs tend to be topical and vice-versa. Once the article is reanalyzed as a topicality marker, it can be used even outside absolute constructions, and this is indeed what we find: the marker *-na* has become a common means of topicalizing constituents clause-internally, i.e., without putting them into an ad-sentential position (Bickel 1993). Examples for this are *ŋka-na harenye* 'as for me, I would have bitten him' in (7) and *ŋka-na jogiŋa* 'as for me, I am a yogi' in (8).

The single-most important difference from absolute constructions in Indo-European is the fact that Kiranti absolutes derive from attribute constructions that do not show the kind of NP-internal case-agreement that is characteristic of Indo-European (cf. Nichols 1982): the ergative function of the NP is not copied onto any of its sub-constituents. Accordingly, the subject of the absolute construction does not inherit absolute case from the predicate, as it would in Indo-European. The subject *ina* 'that one, he' in (12b), for example, remains in the (unmarked) absolutive. Just as attribute constructions can be headless, however, so can absolute constructions be without subject:

- (15) asamba niu-s-u-ŋ-na-ŋa paɪsa khat-lott-he.
 last.night see-TRANS.PERF-3U-1sA-ART-ERG money take-TELIC-PT
 'The one I saw last night took the money.' *or*
 'When I saw him/her, s/he took the money.'

It is well-known in Indo-European linguistics that the only obligatory constituent of absolute constructions is the participle (among many others, cf. Serbat 1979, Bickel 1991:140, Keydana 1997:22). At least some expression must be included that allows the construal of a proposition. This explains, finally, why a simple noun marked by an absolute ergative (as in (13)) can only be understood as having sentential value. The effect is the same as with Latin expressions like *Cicerone consule*, where the absolute ablative in *-e* triggers a propositional reading 'when Cicero was consul'.

4. Conclusions and typological issues

An analysis in terms of an absolute construction explains (i) why SE Kiranti ergative clauses typically include an article that is otherwise used for relativization, (ii) why they are in adsentential position rather than embedded in the main clause, (iii) why article+ergative marking can create sentential but not referential topics and (iv) why the core function of the construction is the description of discourse frameworks rather than of propositional causes. This analysis does not contradict the grammaticalization scheme in (3), but limits its scope. The scheme may still provide an explanation for why the ergative/instrumental/cause marker, rather than, say, the genitive, is chosen as the absolute case. This choice was no doubt supported by contact with other languages of the area, which, as noted in Section 2.1, did follow the path in (3) and grammaticalized the ergative into a marker of causal subordination. However, instead of venturing here further into an historical explanation, I wish to explore in the remainder how the SE Kiranti data fit into a general typology of absolute constructions.

Absolute constructions appear to be rare outside of Indo-European. They are known in Finnish, where the absolute subject is in the genitive and the participle in the partitive case (Flinck 1924, König & van der Auwera 1990):

- (16) [Peka-**n** herät-ty-ä] Liisa läht-i töi-hin.
 P.-GEN wake.up-PPP-PART L. leave-PT work-ILLAT
 'When Pekka woke up, Liisa went off to work.'

From the data discussed by Evans (1995:542-49), it appears that *dat. abs.* (and perhaps *loc. abs.*) constructions are used in some Tangkic languages of Northern Australia, as in the following Yukulta example (in Evan's 1995 orthography):

- (17) dangka-ya=kanda kurri-ja maku, [kunawuna-**ntha** jambila-tharrba-**ntha**].
 man-ERG=AUX:3>3PT see-IND woman child-DAT kick-PRIOR-DAT
 'The man saw the woman as the child kicked her.' (Keen 1983:246)

At least one Pama-Nyungan language (Warlpiri), too, seems to have *dat. abs.* constructions, although the construction is currently dying out (Simpson & Bresnan 1983:62). Other absolute constructions are found in two North American families, Yuman (Winter 1974) and Muskogean (Bickel 1991:175f). Yuman languages use an 'associative' case suffix as in Maricopa *Bonnie-m* 'with Bonnie' or *ʔii-m* 'with the stick' (Gordon 1986:43):

- (18) [da-sh ma-**m**] ʔ-maa-uum.
 DEM-NOM be.ripe-ASS (SUB:DS) 1-eat-INC
 'I'll eat it because it is ripe.' (Gordon 1986:278)

Muskogean relies on object markers (Chickasaw examples):

- (19) a. hattak-at an-k-ā abi-tok.
 man-NOM 1sPOSS-father-ACC kill-PT
 'The man killed my father.' (Munro & Gordon 1982:88)

- b. [ofi? yamma pīs-li-tok-ā] illi-tok.
 dog ART see-1sA-PT-ACC (SUB:DS) die-PT
 ‘After I saw the dog, it died.’ or ‘The dog I saw died.’ (*op.cit.* 94)

In contrast to Indo-European and Australian languages, the embedded subject (if present) is not assigned absolute case in Yuman and Muskogean. The reason is the same as in Kiranti: the absolutes derive in these languages from attribute constructions without NP-internal case agreement.

Most absolute constructions have developed into a formal switch-reference device. Synchronically, the Yuman and Muskogean absolutes illustrated by (18) and (19), respectively, are probably best analyzed as different-subject markers. This has a parallel in Uto-Aztecan: in this family, the wide-spread different-subject marker *-ku* can be reconstructed as identical with the accusative suffix **-kV* (Jacobsen 1983:174), which suggests a prehistorical development from *acc. abs.* to different-subject marking. In agreement with these developments in America, Indo-European, Finnish and Tangkic absolutes also usually signal referential discontinuity. This is true even when the absolute subject is missing as in the following examples from Ancient Greek (20a) and Yukulta (20b):

- (20) a. [ø ek dē toutou thâtton proiô-nt-ōn sùn kraug-ê]
 outPTCL DEM:GENsM faster proceed-IP-GENpM with shout-DATs
 apò toû automátou drómos e-géne-to
 from ART:GENsM spontaneity:GENs run:NOMs PT-become-3sIMPERF.MED
 toîs stratiôt-ais. <Xen. *Anab.* I, 2, 17>
 ART:DATpM soldier-DATp
 ‘But afterwards, as they (the leaders) proceeded faster and with a loud shout, the soldiers took to a running pace by themselves.’
 b. baa-ja=kandi dathin-ki dirr-i [ø bala-tharri-nja=ma].
 bite-IND=3>3POT DEM-ERG snake-ERG hit-NEG.IND-DAT=if
 ‘That snake will bite if (someone) doesn’t kill (it).’ (Evans 1995:545)

However, the referential discontinuity condition is not an intrinsic and necessary property of absolutes (Morani 1973, Haiman 1983, Keydana 1997). Rather, it is the result of a pragmatic competition with conjunct participles (*participia coniuncta*) that show case agreement with a coreferential argument of the matrix, occupy roughly the same adsentential position as absolutes, and fulfill a similar discourse function (Bickel 1991:171-76). This is found in the classical Indo-European languages as much as in Australia. Notice, however, that in Tangkic languages, case markers typically spread on all constituents of the conjunct clause (as a result of *Suffixaufnahme*, on which see Plank 1995):

- (21) a. [hoû dē tôn aítio-n theò-n humnoû-nt-es]
 where thus ART:ACCsM responsible:ACCsM god:ACCs praise-IP-NOMpM
 dikaiōs àn humn-oî-men Êrôt-a. <Pl. *Symp.* 193d>
 rightly PTCL praise-OPT-1p Eros-ACCs
 ‘If we thus praise the responsible god, we may rightly praise Eros.’

- b. *danka-ya=karri ngida karna-ja* [makurra-*wurla-ya* karna-jurlu-*ya*].
 man-ERG=3>3PRES wood light-ACT wallaby-PROPR-ERG light-PURP-ERG
 'The man lit the fire in order to cook the wallaby.' (Keen 1980:247)

Being the result of pragmatic competition, the referential discontinuity condition is not a strict syntactic constraint and can be overridden under certain circumstances. This is true, again, for both Indo-European and Tangkic:

- (22) a. [asthenésa-nt-*os* aut-*oû*], oudépote ap-é-leip-e
 feeble-IP-GENsM 3-GENsM never away-PT-leave-3sIMPERF
 tòn pápp-on_i. <Xen. Cyr. I, 4, 2>
 ART:ACCsM grandfather-ACCs
 'When he was sick, he would never leave his grandfather.'
 b. *mutha=kurrarrinka kurri-kurri-ja* [ø, wirka-jarrba-*ntha*
 lot=AUX:3p>1ns_iPT watch-RED-IND dance-PRIOR-DAT
 wangarr-inaba-*ntha*].
 corroborree-ABL-DAT
 'A big mob watched us dancing the corroborree.' (Evans 1995:544)

Referential continuity, however, is least likely between subjects, and this tendency can easily grammaticalize into a syntactic constraint. This suggests the possibility that the different-subject condition in American languages, too, arose from competition with competing coreference-indicating forms. Indeed, all languages of this part of the world which show a development from absolute case to different-subject marking also have same-subject converbs used in a similar subordinate position. While in Muskogean it is likely that the same-subject converbs derive from nominative-marked conjunct participles (in *-t*), thus further strengthening the parallel to Indo-European, they seem to have had a different origin in Uto-Aztec and Yuman (cf. Jacobsen 1983).

In SE Kiranti languages, the situation is radically different: Here, absolute constructions do not compete with coreference-indicating forms. While they exist, such forms are limited to supines (in *-si*, e.g., *hissi* 'in order to look' in (9) above) and tightly embedded adverbial converbs (in *-sa*, e.g., *coksa* 'doing' in (8) above). Both these forms have a completely different distribution in discourse than the *erg. abs.* construction (see Bickel 1993). In the absence of any pragmatic pressure, there is no reason for the *erg. abs.* construction to develop a ban on referential interlacing, and, as examples (8) and (9) attest, it indeed freely tolerates subject continuity. Instead of developing into a switch-reference marker, the Kiranti *erg. abs.* constructions have elaborated on the discourse function of absolutes and have thereby become general markers of sentential topics. This, and the observation that the development of switch-reference in other languages results from pragmatic competition with other forms, suggests that, from a universal perspective, the fundamental issue in absolute constructions is not referential discontinuity. Rather, what is important is that a case marker is used to establish an erstwhile attribute as a predicate with a backgrounded, often topical discourse value.

Notes

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¹ Abbreviations: A 'actor argument of a transitive verb', ABL 'ablative', ACC 'accusative', ACT 'actual', ADD 'additive', ART 'article', ASS 'associative', AUX 'auxiliary', COM 'comitative', CONV 'converb', d 'dual', DAT 'dative', DEM 'demonstrative', DIST 'distal', DISTR 'distributive', DS 'different subject', e 'exclusive', EMPH 'emphatic', ERG 'ergative', FOC 'focus', GEN 'genitive', ILLAT 'illative', INC 'inceptive', IND 'indicative', INF 'infinitive', IMPERF 'imperfect' IP 'imperfective participle', IPFV 'imperfective', IRR 'irrealis', LOC 'locative', M 'masculine', MED 'middle voice', NEG 'negative', NOM 'nominative', NPT 'non-past', ns 'non-singular', NZR 'nominalizer', OPT 'optative', p 'plural', PART 'partitive', PASS 'passive', PERF 'perfect', PFV 'perfective', PPP 'past passive participle', PRES 'present', PRIOR 'prior', PROPR 'proprietary (case)', POSS 'possessive', POT 'potential', PT 'past', PTCL 'particle', PURP 'purposive', RED 'reduplicated sequence', REP 'reportative', s 'singular', SEQ 'sequential', SUB 'subordinator', SUBJ 'subjunctive (mood)', SUP 'supine', TRANS 'transitive', TOP 'topic', U 'undergoer argument of transitive verb'. '=' marks a clitic boundary, '>' a transitive relationship.

² *-na-a* is realized tautosyllabically, i.e., as [na:]. In a preliminary report (Bickel 1993), I misinterpreted the lengthening as a top-down effect of clause-final 'comma' intonation and wrote *-na* in the practical orthography (vocalic length is not phonemic in Belhare). After that, my friend and consultant Lekh Bahādūr Rāi insisted on two distinct vowels. He furthermore proposed that the subordinators *-na-a* and *-na-ŋa* are parallel to the two allomorphs of the ergative on vowel-final nouns (e.g., *maŋia* ~ *maŋiŋa* 'person-ERG') and that it is my task to find out why. Here is, then, my response, which I offer in deep gratitude to Lekh Bahādūr's never-tiring help in studying his mother-tongue.

³ Southern and Eastern languages appear to form a typological unit in several other respects as well (Ebert 1994). Given the current state of research, it is uncertain whether this is also a genetic unit.

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Complex noun, multiple inheritance, and internally headed relativization in Korean*

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1. Introduction

One of the major tasks in linguistics is to account for some peripheral or idiosyncratic phenomena through general principles which are relatively well-accepted cross-linguistically. The goal of this paper is to explore an account of the mixed-categorial and mixed-functional properties of the Korean Internally Headed Relative Clause (IHRC) construction from this perspective. Theoretically, our analysis is based on the notions of argument composition (Hinrich and Nakazawa 1994) and construction type inheritance (Sag 1997 and Malouf (To appear), among others). The organization of this paper is as follows. Section 2 discusses the syntactic and semantic properties of the IHRC.¹ Section 3 proposes how the properties are accounted for by the notions of multiple inheritance and argument composition. Section 4 is the conclusion.

2. Properties of the IHRC construction

2.1. Middle-distance dependency

Consider the typical example of the IHRC in (1):

- (1) Na-nun [[totwuk_i-i unhayng-eyse nao-nun] kes_i-ul] capassta.

I-Top thief-Nom bank-from come-out-Adn KES-Acc caught

'I arrested the thief who was coming out of the bank.'

In (1), the locality principle seems to be violated in the sense that the object, *totwuk-i* 'thief', subcategorized for by the matrix verb, *capassta* 'caught', appears within the embedded constituent. To account for this fact, arbitrary coindexation between an element within a relative clause and the head of the IHRC *kes* is generally assumed (e.g., Jhang 1991, Kuroda 1992, and Hoshi 1994, Chung 1996, among others).²

As shown in (2), however, the IHRC construction in Korean cannot be considered as an instance of the genuine unbounded dependency:

- (2) a. Na-nun [kutul-i [___ unhayng-eyse nawassta-ko] malha-n]

I-Top they-Nom bank-from came-out-Comp say-Adn

totwuk_i-ul capassta.

thief-Acc caught

'I arrested the thief who they said was coming out of the bank.'

- b. *Na-nun [kutul-i [totwuk-i unhayng-eyse nawassta-ko]

I-Top they-Nom thief-Nom bank-from came-out-Comp

malha-n] kes_i-ul capassta.

say-Adn KES-Acc caught

In (2a), which is an instance of the externally headed relative clause construction, the head of the EHRC phrase, *totwuk*, is construed with the gap within the embedded clause like the English relative clause. However, in (2b), the head of the IHRC phrase, *kes*, cannot be construed with the embedded subject, *totwuk*, showing that the Korean IHRC is not an instance of the genuine unbounded dependency construction.

2.2. Mixed-categorical properties of the IHRC phrase

The IHRC phrase externally has the nominal property in that it bears accusative, nominative, or genitive case as shown in (1) and (3), while the typical clause cannot bear such case.

- (3) a. [Mwul-i nemchin kes-i] alay chung-ulo hulessta.
 water-Nom overflow-Adn KES-Nom lower floor-to flowed
 Lit. 'The overflowed water flowed to the lower floor.'
- b. [totwuk-i unhayng-eyse nao-nun kes-uy] chepho
 thief-Nom bank-from come-out-Adn KES-Gen arrest
 'the arrest of the thief who was coming out of the bank.'

However, the IHRC phrase also has a verbal property in that it allows subject-to-object raising:

- (4) Na-nun totwuk-ul unhayng-eyse nao-nun kes-ul capassta.
 I-Top thief-Acc bank-out-of come-out-Adn KES-Acc caught
 'I arrested the thief who was coming out of the bank.'

In (4), the embedded nominative subject *totwuk-i* in (1) is realized as an accusative NP *totwuk-ul*, which suggests that the embedded subject can be "raised" to the object of the matrix verb *capassta*. Thus if we simply assume that the IHRC phrase is an NP reanalyzed from an S (e.g., Jhang 1991, Kuroda 1992, and Hoshi 1994, among others), we encounter some difficulties in the account of the raising fact. That is, such raising is generally not allowed across two bounding nodes such as an S and an NP.

We may consider that (4) is not the raising construction derived from (1) but a totally different construction where the constituent [*unhayng-eyse nao-nun kes-ul*] is a kind of appositive parenthetical expression. The typical example of the parenthetical is in (5), where the head of the parenthetical is non-expletive *nom-ul* 'guy':

- (5) Na-nun totwuk-ul, ku khi-ka ku-n nom-ul, capassta.
 I-Top thief-Acc the height-Nom tall-Mod guy-Acc caught
 'I arrested the thief, the guy who was tall.'

It seems, however, that (4) cannot be considered as the parenthetical construction. If (4) and (5) are the same parenthetical construction, the head noun of the parenthetical *nom-ul* in (5) may be substituted by *kes*, as in (4). However, this prediction is not born out, as shown in (6):

- (6) ??Na-nun totwuk-ul khi-ka khu-n kes-ul capassta.
 I-Top thief-Acc height-Nom tall-Mod KES-Acc caught
 'I arrested the thief, the one who was tall.'

In the analysis where (6) is considered as an instance of the IHRC, however, the sentence is naturally ruled out simply because its non-raised version is also ill-formed:

- (7) ??Na-nun [totwuk-i khi-ka khu-n kes-ul] capassta.
 I-Top thief-Nom height-Nom tall-Mod KES-Acc caught
 'I arrested the thief who was tall.'

According to Ohara (1996), the Japanese IHRC has the function of event reporting, and thus it tends to allow only the stage-level verb to be the head which denotes a temporarily bounded situation. We may assume that the constraint is also imposed on the Korean IHRC to account for the awkwardness of (7) where the head verb of the IHRC is a verb of an individual-level which denotes a temporarily unbounded situation.

The case marking and raising facts suggest that the IHRC phrase has mixed categorial properties of a nominal and a verbal.

2.3. Mixed-functional properties of the adnominal verb

The adnominal verb in the IHRC phrase semantically plays the role of an adjunct, which is apparently indicated by the morphological ending of the verb, -(n)un, and by the meaning of the whole sentence. However, there exist some syntactic parallelisms between the constituency of the "adnominal-verb+kes" in the IHRC phrase and that of the verbal complex. (The verbal complex is usually analyzed as a combination of "verb+auxiliary verb", e.g., Cho 1988, Sells 1995, and Chung 1998, among others.) The parallelisms suggest that the adnominal verb also needs to be considered as a kind of verbal complement.

In the traditional Korean grammar, *kes* in the IHRC is called a "dependent noun" in that it always requires a verb of an adnominal form and cannot exist alone as a word:

- (8) (Na-nun totwuk-i unhayng-eyse) *(nao-nun) kes-ul capassta.
 I-Top thief-Nom bank-from come-out-Adn KES-Acc caught

Example (8) shows that the adnominal verb of the IHRC phrase, *nao-nun* 'come-out', is neither optional nor can be realized as an empty category. It shows a sharp contrast with the typical EHRC construction in (9), where the entire relative clause, including the adnominal verb, is optional.

- (9) (Na-nun unhayng-eyse nao-nun) totwuk-ul capassta.
 I-Top bank-from come-out-Adn thief-Acc caught
 'I arrested the thief who was coming out of the bank.'

In the Korean verbal complex construction, the same observation can be made:

- (10) (Na-nun sakwa-lul) *(mek-e) poassta.
 I-Top apple-Acc eat try as a test (AUX)
 'I tried an apple.'

Here the auxiliary verb *poassta* itself cannot exist as an independent word but must be accompanied by its governed verb. However, in other constructions, such as control verb constructions, the matrix verb can exist as an independent word, without the governed verb:

- (11) (Na-nun John-hanthey sakwa-lul mek-ulako) seltukhayssta.
 I-Top J-Dat apple-Acc eat persuaded
 'I persuaded John to eat an apple.'

Another example showing the parallelism between the IHRC and verbal complex constructions arises from the afterthought expression construction:

- (12) a. *Na-nun kes-ul capassta, totwuk-i unhayng-eyse nao-nun.
 I-Top KES-Acc arrested thief-Nom bank-from come-out-Adn
 'I arrested the thief who was coming out of the bank.'
 b. Na-nun totwuk-ul capassta, unhayng-eyse nao-nun.
 I-Top thief-Acc arrested bank-from come-out-Adn

Sentence (12a) is an instance of the IHRC construction, where the IHRC is used as an afterthought expression. It shows that the IHRC cannot be used as an afterthought expression differently from the externally headed relative clause in (12b). It suggests that *kes* and the adnominal verb constitute a syntactic unit and that they cannot be separated. The same pattern is also observed in the verbal complex construction:

- (13) a. *Na-nun poassta, sakwa-lul mek-e.
 I-Top tried apple-Acc eat
 'I tried an apple.'
 b. Na-nun seltukhayssta, John-hanthey sakwa-lul mekulako.
 I-Top persuaded J-Dat apple-Acc eat
 'I persuaded John to eat an apple.'

(13a) is an instance of the verbal complex where the auxiliary verb and its governed verb cannot be separated, while (13b) is an instance of the control verb construction where the matrix verb and its complement are separable.

Besides the arguments based on the lexical integrity, another parallelism between the IHRC and verbal complex constructions arises from the fact that the heads of the constructions, namely, *kes* in the IHRC and the auxiliary verb in the verbal complex, are a kind of clitics diachronically derived from independent words whose phonetic forms are the same. For example, the auxiliary verb *pota* 'try as a test' in (10) and (13) has a non-auxiliary-verb counterpart *pota* 'see', which can be used as an independent word. The same observation can be made in the IHRC. The head *kes* in the IHRC can never be used as a referring expression and never takes a specifier such as *ku* 'the' and *ce* 'that':

- (14) *Na-nun totwuk-i unhayng-eyse nao-nun ku kes-ul capassta.
 I-Top thief-Nom bank-from come-out-Adn the KES-Acc caught
 'I arrested the thief who was coming out of the bank.'

However, there exists a referential noun counterpart *kes* 'thing', which can be used as a referring expression and can take a specifier:

- (15) Na-nun ku kes-ul sassta.
 I-Top the thing-Acc bought
 'I bought the thing (it).'

To sum up, there are some parallelisms between the verbal complex and the combination of "adnominal verb+*kes*" in the IHRC phrase. It suggests that the combination in the IHRC needs to be treated as a syntactic unit, namely, as a complex noun. It also suggests that the adnominal verb needs to be considered to have a dual function of a verbal complement and an adjunct.

2.4. Entity vs. event readings

Sentence (1) has only an entity reading, i.e., the object of the matrix verb of (1) is not the whole event but the thief. In contrast, sentence (16) has only an event reading, i.e., the object of the matrix verb is not the thief but the whole event.

- (16) Na-nun [totwuk-i unhayng-eyse nao-nun kes-ul] mallassta.
 I-Top thief-Nom bank-from come-out-Adn KES-Acc not-knew
 'I did not know that the thief was coming out of the bank.'

But not 'I did not know the thief who was coming out of the bank.'

The difference comes from the matrix verb. When the verb is a perception verb, only the event reading is available. When it is a physical action verb, however, only the entity reading is available. Then the question is how the difference can be predicted from the syntactic perspective. In other words, if the internal structure of the embedded constituent in (1) and (16) is assumed to be the same, and if the coindexation between *totwuk* and the embedded constituent is possible in both sentences, it may be hard to explain why only the physical action verb can have the entity reading.

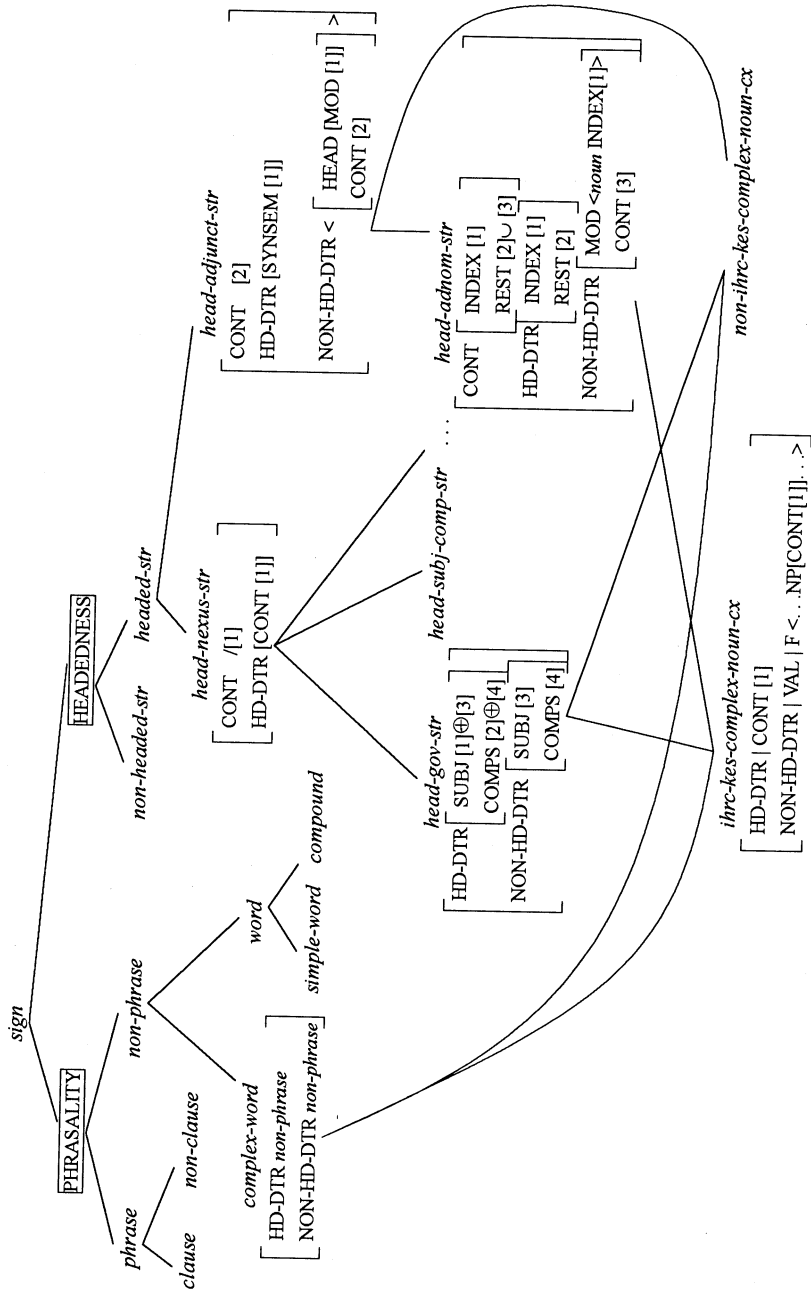
3. A new analysis

The goal of this section is to propose a new analysis of the IHRC through the notions of multiple inheritance of construction types and argument composition.

3.1. Multiple inheritance of construction types

The notion of the multiple inheritance is used in Construction Grammar to capture the fact that instances of some construction types seem to resist being uniquely categorized in a natural way (Goldberg 1995). Sag (1997) and Malouf (1998, To appear), among others, introduced the notion into the framework of the Head-driven Phrase Structure Grammar (HPSG, Pollard and Sag 1994).

(17) Multiple Inheritance Hierarchy



To account for the IHRC construction, I propose the type hierarchy in (17), adopting Sag (1997). Here the sort *sign* is divided into PHRASALITY and HEADEDNESS. Here the notion of PHRASALITY is introduced so as to introduce the sort *complex word* into the hierarchy. *Non-phrase* stands for a sign which does not have phrasal daughters. *Complex-word* stands for a non-phrase which has a non-phrasal daughters, i.e., *word* or *complex-word*.

Head-gov(ernee)-str is a sign which has a constraint that the non-head (governee) daughter's SUBJ and COMPS lists are appended to those of the head daughter.³ *Head-adnom-str* is a sign which has the semantics of the traditional relative clause construction.

In the next two subsections, I will discuss how this inheritance hierarchy works to account for the given properties of the IHRC construction.

3.2. Argument composition and syntax of the IHRC phrase

Hinrichs and Nakazawa (1994) introduced the mechanism of argument composition into the HPSG framework. The effect of argument composition is to "attract" or "raise" the arguments of the governed verb to the argument list of the governing verb: roughly, when a lexical category X takes Y as its argument, the non-discharged arguments of Y are raised to the argument(s) of X.

The notion of argument composition is used in Chung (1998) to account for the verbal complexes in Korean. On this approach to verbal complexes, the auxiliary verb (AUX) selects its verb by the GOV(ERNEE) feature, and the subject and complement lists of the selected verb are list-appended (or "raised") to those of the AUX. In this analysis, the argument structures of most of the AUXs are determined by the governed verb. And the AUX and its governed verb combine first, constituting a complex predicate.

Based on the observation of the parallelisms between the verbal complex and "verb+*kes*" in the IHRC, I propose the feature structure of the expletive dependent noun *kes* in (18):

$$(18) \left[\begin{array}{l} \text{HEAD } \textit{noun} \\ \text{VAL } \left[\begin{array}{l} \text{SUBJ } \langle \rangle \\ \text{SPR } \langle \rangle \\ \text{COMPS } \langle \rangle \\ \text{GOV } \langle \text{V[VFROM } \textit{adnom}] \rangle \end{array} \right] \\ \text{CONT } / \left[\begin{array}{l} \text{INDEX } \textit{non-referential} \\ \text{RESTR } \{ \} \end{array} \right] \end{array} \right]$$

Feature structure (18) simply states (i) that *kes* takes only a verb of adnominal form as its verbal complement (GOV) and (ii) that its default index value is non-referential, which entails that its default restriction value is an empty set. (Here the default value is represented by "/"). This default CONT(ENT) value can be

overridden by the construction-specific constraint of *ihrc-kes-complex-noun-cx* in (17), which states that the CONT value of an element in a VAL(ENCE) list of the adnominal verb is structure shared with that of *kes*.

On my complex-noun approach, the adnominal verb *nao-nun* and *kes* in (1) constitute a syntactic unit, namely a complex noun (CN henceforth). The VAL value of the CN is identical to that of the adnominal verb due to the argument composition constraint on *head-gov-str*. Note that here nominative case, not genitive case, is assigned to *totwuk* even though it is a sister to a noun. In my analysis, *totwuk* is the element of the SUBJ list of the CN, not that of SPR, because the valence structure of *kes* is identical to that of the verb *nao-nun* due to the argument composition constraint.

My analysis predicts that the combination of "verb+*kes*" will have mixed categorial properties. Its external category is nominal in that the HEAD value is *noun*, while its internal argument structure is verbal in that its VAL value is attracted from the adnominal verb through argument composition. Then this approach can relatively naturally account for the subject-to-object raising fact in the IHRC construction if we assume that the raising is a structure-sharing between the element in the SUBJ list of an embedded category and an element in the COMPS list of the matrix verb.⁴

The complex noun approach to the IHRC construction also has a theoretical advantage over Uda's (1998) complement clause approach. In HPSG, there is no natural way to guarantee the coindexation between *kes* and an element within the relative clause if we assume that *kes* takes an S as its complement. An S is a fully saturated sign where the dependents of the embedded verb (subject or complements) are already discharged, and thus the index value of a dependent is not locally accessible from *kes*. On the complex-noun approach, however, the index value of a dependent of the embedded verb is locally accessible from *kes* because *kes* takes as its complement the adnominal lexical verb where its dependents are not discharged yet.

My approach also accounts for the fact that the IHRC does not involve the unbounded dependency (e.g. (2b)). The coindexation between *kes* and an element within the relative clause is only locally guaranteed by argument composition rather than by the REL and SLASH features, which are used to license the EHRC construction in HPSG. In my analysis, the coindexation is possible only locally between *kes* and one of the arguments subcategorized for by a verb which is in turn selected by *kes*.

In the next section, I will discuss how the semantics part of the IHRC properties is accounted for by the mechanism of the multiple construction type inheritance.

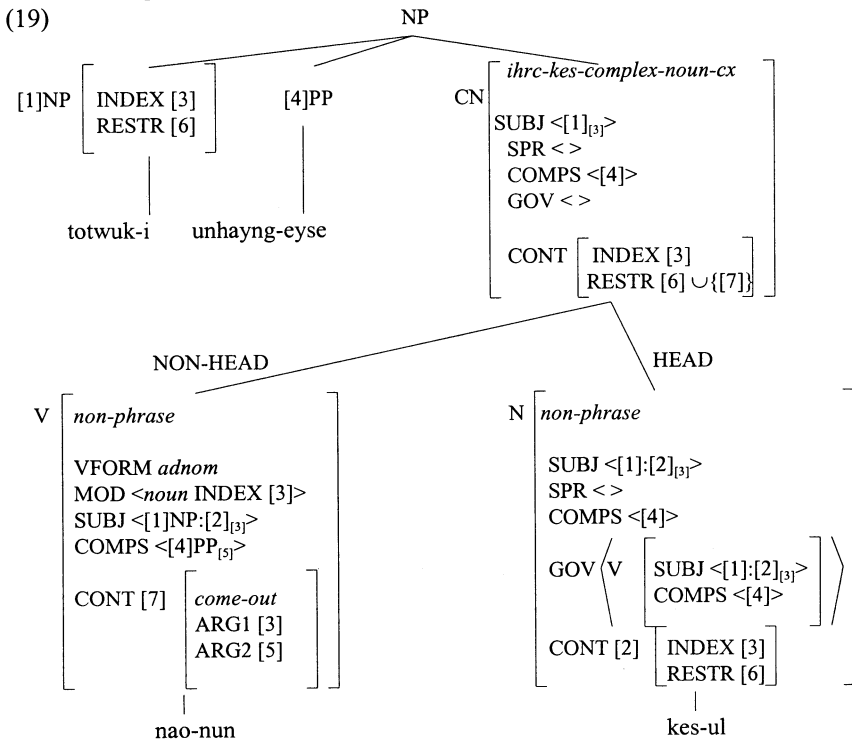
3.3. Semantics of the IHRC

Section 3.2 claims that the adnominal verbal expression in the IHRC has the

property of the verbal complement (governee) at the level of syntax. However, at the semantics level, it functions as an adjunct. With my approach, the dual function of the adnominal verb is accounted for by the multiple inheritance and by the default mechanism. According to the type hierarchy in (17), the complex noun of the IHRC phrase is a subtype of *head-gov-str*, which is a subtype of *head-nexus-str* and also a subtype of *head-adnom-str*, which is a subtype of *head-adjunct-str*. Note that the default value is used in *head-nexus-str* to represent that its CONT is the same as that of the head daughter. It means that the default value can be overridden by the CONT value of *head-adnom-str*, which has a constraint on the CONT value conflicted with that of *head-nexus-str*.

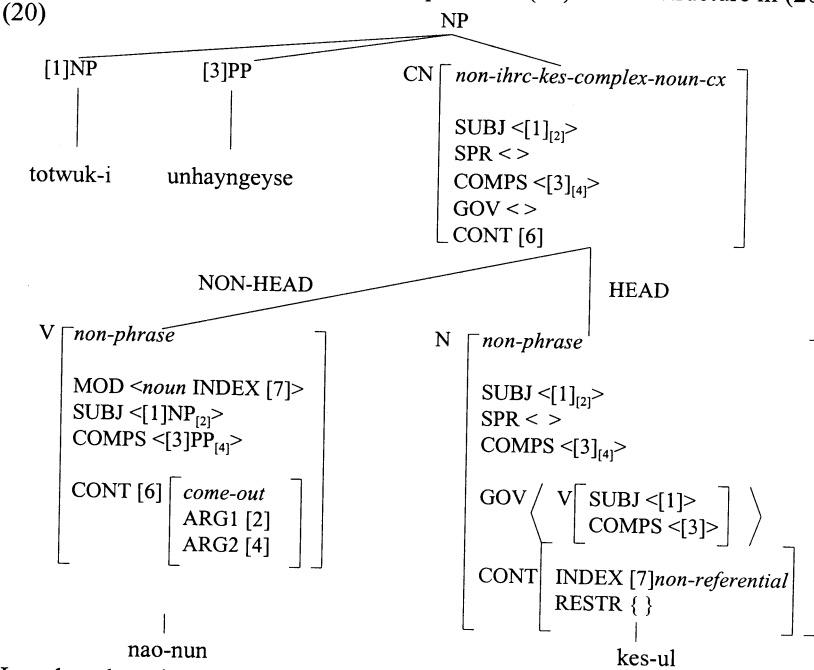
Hierarchy (17) indicates that the IHRC phrase's complex word (verb+*kes*) has only the one construction-specific constraint that the CONT value of an element in a VAL list of the adnominal verb is structure shared with that of *kes*. Then the semantics of the relative construction is inherited from *head-adnom-str*, and thus the whole complex noun has the semantics of the traditional relative construction.

To sum up, the IHRC phrase in sentence (1) has the structure in (19):



Following Uda (1998), the event reading of the NP headed by *kes* (e.g., (1) vs. (15)) is accounted for by the assumption that the event reading arises from the

structure-sharing between the semantic contents of the adnominal verb and *kes*. To this end, I assume another complex-noun construction which, differing from that of the IHRC construction, does not have the constraint of the CONT sharing. Also note that its CONT value is inherited from *head-adjunct-str*, not from *head-adnom-str*. On this approach, the IHRC phrase in (16) has the structure in (20):



Here the adnominal verb modifies a non-referential noun *kes* which does not have any specific meaning, and thus the CONTENT of the verbal complex is the same as that of the adnominal verb. That is, the complex noun has a proposition as its CONT value.

Note that here the CONT value of *head-nexus-str* is also overridden by the CONT value of *head-adjunct-str* because the constraint on the CONT value of *head-nexus-str* is specified as a default.

4. Conclusion

This paper proposes that the idiosyncratic properties of the Korean IHRC construction, such as the properties of the mixed-category/function and middle-distance dependency, are naturally accounted for through the notions of multiple inheritance and argument composition. It is also proposed that the default mechanism is crucial for a unified account of *kes* in the entity vs. event readings.

Note that my analysis assumes only one construction specific constraint on the complex noun in the IHRC phrase: the CONT value of an argument of the

adnominal verb is structure shared with that of *kes*. Then the idiosyncratic properties of the Korean IHRC construction are accounted for by collaboration of cross-linguistically well-motivated devices such as the default mechanism, multiple inheritance, and argument composition.

Through the proposed analysis, we can avoid using the under-motivated empty categories such as *pro* and empty predicate (Murasugi 1994 and Chung 1996, among others) and the exocentric rule such as NP→S (Jhang 1991 and Kuroda 1992).

Notes

* I would like to thank Andreas Kathol, Jong-Bok Kim, and the participants in BLS 25 for the valuable comments. All errors are, of course, mine. This work was supported by the '98 Academic Research Grant from Dongseo University.

¹ See Chung (To appear), Ohara (1996), Kim (1996), and Kuroda (1992) for the discourse properties of the Japanese and Korean IHRCs.

² In Korean, as in other languages, a non-subject can also be coindexed with the head of the IHRC phrase, *kes*.

³ My analysis assumes that argument composition is a property of certain constructions such as the verbal complex, light verb constructions, and the IHRC's complex noun. However, Andreas Kathol (in personal communication) points out that argument composition may be a property of some specific lexical entries. Our constructional approach can be converted to the lexical approach with no difficulty through revision of the lexical structure of *kes* in (18).

⁴ Of course argument composition itself does not fully account for the raising fact. To this end, we need to assume an IHRC raising lexical rule which states the following: (i) a physical-action verb that takes as its complement an NP headed by *kes* also takes an N' as its complement, and (ii) the subject of N', which is coindexed with the NP headed by *kes*, is list appended to the COMPS list of the physical action verb. A deeper generalization remains for further study.

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Aspects of locative doubling and resultative predication¹

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0. Introduction

In this paper we argue (following Freeze 1992 and Lyons 1967, among others) that the sentences in (1a) and (1b) are both locative assertions.

- (1) a. *There are many problems.*
b. *There are many problems in the world.*

Specifically, we claim that the morpheme *there* in such sentences is like a clitic double of the locative PP (*in the world* in (1b)). Our paper is organized as follows: in section 1 we outline our proposal concerning the derivation of such sentences, and provide arguments for the claim that *there* is a clitic-like morpheme. In section 2 we show that the locative PP in (1b) is not an adjunct, but rather, the main predicate of the sentence. In section 3 we provide a tentative proposal for the status of sentences such as (1a) (“pure” existentials), in which no overt locative PP is present. In section 4, we discuss the fact that *there* is compatible with a semantically coherent subset of location-denoting unaccusatives, and show how this fact serves as evidence in favor of our proposal.

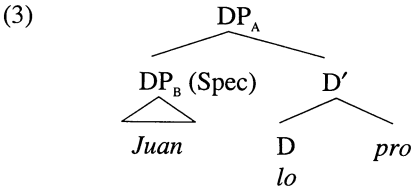
1. Locative doubling

1.1. The basic proposal

Following the work of Freeze (1992) (and references cited therein), we claim that both cases in (1) are essentially “locative” assertions, and that the existential interpretation of such sentences is derived from this more basic locative meaning. We propose that the morpheme *there* (and the clitic *ci* in similar constructions in Italian) is part of a “double” locative structure (2b), akin to clitic doubling structures in sentences such as that in (2a) (found in some varieties of Spanish).

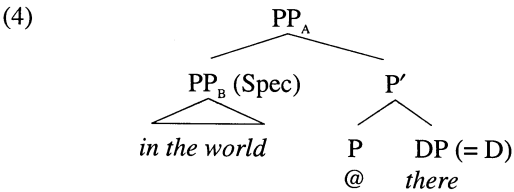
- (2) a. *Lo vi a Juan.*
him I-saw P Juan “I saw Juan.”
b. *There are many problems in the world.*

Uriagereka 1995 (see also Cecchetto & Chierchia 1997 and Torrego to appear) argues that the direct object of the verb *ver* ‘see’ in (2a) is a DP (labeled here as DP_A) which contains both the clitic *lo* and the DP *Juan* (labeled here as DP_B):

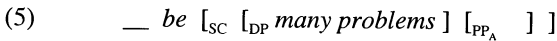


As can be seen in (3), Uriagereka proposes that *Juan* is base-generated in the specifier position of DP_A , which is headed by the clitic *lo*.

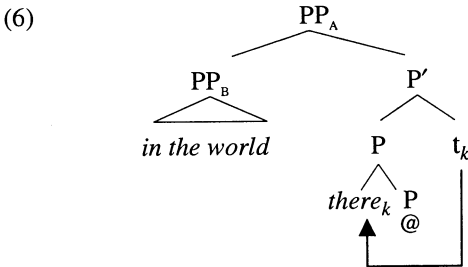
We would like to suggest here that the relation between the morpheme *there* and the locative PP *in the world* in (2b) can be expressed in the same way. In particular, we propose, on analogy with (3), that *there* and the PP are base-generated in a larger PP that contains both of these items:



Let us assume, following Moro (1997), that the larger PP (labeled here as PP_A) is the predicate of a small clause (SC) complement of the unaccusative verb *be* (the postverbal subject *many problems* is the subject of the SC):



In (4), the PP_B *in the world* (like the DP_B *Juan* in (3)) is analyzed as doubled by *there*, and occupies the specifier position of PP_A . On analogy with Uriagereka's analysis of the clitic *lo* in (3), we propose that PP_A is headed by an abstract (phonologically null) preposition, which we will label "@". We take this preposition to have the same semantic content as the English preposition *at*; in other words, $@' = \lambda x \lambda y$ [*y* is located at *x*]. On analogy with *pro* in (3), we propose that @ takes *there* as a complement. We assume that *there* can be analyzed either as an XP or as a head. We thus claim, following Chomsky (1995), that *there* is both minimal and maximal (see section 1.1 below). As can be seen in (6), we propose that *there* incorporates into the abstract preposition @, where it checks its locative feature:



Finally, along the lines of Moro (1997) and Tortora (1997), we propose that *there* raises to Spec, IP, as can be seen in (7) (see footnote 3 for an explanation for why raising must occur):

(7) *There_k be* [_{SC} [_{DP} *many problems*] [_{PP_A} *t_k*]]

1.2. *There* as a “clitic”

Given the ample evidence which shows that *there* is an XP, it may seem curious to claim it is a clitic. Here we show that *there* must be analyzed as a clitic-like XP, or a “weak” pronoun, in the sense of Cardinaletti & Starke (to appear).

Cardinaletti & Starke (C&S) claim that pronouns divide into three distinct grammatical classes: “strong”, “weak”, and clitics. In order to avoid confusion with similar terminology elsewhere, here we will use the terms “heavy” and “light” for the pronouns they call “strong” and “weak”, respectively. Heavy and light pronouns differ syntactically and semantically, even though they are both taken to be XPs. Let us discuss the properties which distinguish light pronouns from heavy pronouns. First, while light pronouns can refer to non-human entities, heavy pronouns cannot. This is illustrated with the two morphologically distinct third person plural feminine nominative pronouns in Italian, *loro* ‘they’ and *esse* ‘they’:²

(8) a. *Esse sono troppo alte.* (= the girls; the roses)
they-fem are very tall

b. *Loro sono troppo alte.* (= the girls; *the roses)
they-fem are very tall

The sentences in (8) show that *esse* can refer to [-human] entities, while *loro* is restricted to [+human] entities. Second, as C&S explain, it seems that light pronouns must move overtly to a Case-related position; consider (9):

(9) *Hanno mangiato loro / *esse.*
have eaten they-fem (cf.: *Esse hanno mangiato.*)

(9) shows that *esse*, unlike *loro*, cannot remain in its base position (Spec, VP).

There are several other syntactic differences exhibited by these two pronouns. (10a) shows that *loro* can be coordinated with another NP, whereas *esse* cannot; furthermore, *loro* can be modified, whereas *esse* cannot (10b); another syntactic difference between these two pronouns is that *loro* can occur in peripheral positions, such as in a cleft, right dislocation, and in isolation, while *esse* is allowed none of these options (10c-e) (examples all taken from C&S):

- (10) a. *Loro* / *Esse e quelle accanto sono troppo alte.
 they-fem and those besides are too tall
- b. *Anche loro* / *esse sono troppo alte.
 also they-fem are too tall
- c. *Sono loro* / *esse che sono belle.
 are they-fem that are beautiful
- d. *Arriveranno presto, loro* / *esse.
 will.arrive.3pl soon, they-fem
- e. *Quali sono belle?* *Loro.* / *Esse
 which are beautiful? They-fem.

In contrast to Italian, French has the single morphological form *elles* 'they (fem)'. Like Italian *esse*, French *elles* can refer to both human and non-human entities; this suggests that *elles* is a light pronoun, like *esse*. Yet unexpectedly, unlike *esse*, *elles* can be coordinated, thus exhibiting the syntactic behavior exhibited by the heavy pronoun *loro*. However, C&S note the revealing fact that when *elles* is coordinated with another NP, it can only refer to a [+human] entity:

- (11) a. *Elles sont trop grands.* (= the girls; the roses)
 they-fem are too big
 b. *Elles et celles d'à côté sont trop grands.* (= the girls; *the roses)
 they-fem and those besides are too big.

C&S propose that the behavior of *elles* can be understood in the context of Italian *esse* and *loro* if French, just like Italian, is analyzed as having two third person plural feminine nominative pronouns, one light and one heavy. The two pronouns in French, however, are homophonous; let us refer to them as *elles* (= light) and *ELLES* (= heavy).

In the context of the above discussion, we can hypothesize that English possesses a light *there* and a heavy *THERE*. In support of this hypothesis, note that the syntactic restrictions exhibited by the light pronoun *esse* in Italian are exactly the same restrictions exhibited by light *there* in English: light *there* cannot be coordinated (12a), modified (12b), clefted (12c), or used in isolation (12d) (cf. Allan 1971, who uses some of these tests also to show that this morpheme is

different from heavy “deictic” *there*). This contrasts with the behavior of heavy *THERE*, seen in (13):³

- (12) a. **Here / It and there are four women (in the room).*
 b. **Right / Even there are four women (in the room).*
 c. **It is there that are four women (in the room).*
 d. *Where are there four women (in the room)? *There.*
- (13) a. *Here and THERE are four women.*
 b. *Right / Even THERE are four women.*
 c. *It is THERE / that four women arrived.*
 d. *Where did four women arrive? THERE.*

The contrast between *there* / *THERE* is similar to the contrast seen with *him* / *HIM* in example (14), where *him*—but not *HIM*—can be a double of *John*:

- (14) a. *John, (I think) I like him.*
 b. **John, (I think) I like HIM.*

Given that light XPs behave like clitics, in that their syntactic distribution is limited, we can say that they are clitic-like. If we take *there* to be a light pronoun, then we have justification for treating it as a clitic-like element.

2. The status of the coda

Throughout the literature on *there* constructions, it is common to see a distinction between what is considered to be the postverbal subject DP and any material that follows. This latter part, which may or may not be (or include) a locative PP, is commonly referred to as a “coda”. Thus in a sentence like (15) below, the whole string *indebted to John in this room* could be identified as the coda of this construction.

- (15) *There are many people indebted to John in this room.*

It has been argued quite extensively that the postverbal DP and the coda do not form a constituent—or at least a certain kind of constituent. Since we claim that a postverbal subject with a following locative PP do form a (small clause) constituent, we need to examine these arguments in detail.

2.1. The coda according to Moro

The idea that *there* originates in postverbal position—rather than in canonical subject position (Spec, IP)—is not new. Moro (1997), for instance, proposes that *there* is the predicate in an SC structure as shown in the example in (16a) below (see also example (5) above). Moro also assumes a small clause structure for standard copular constructions like (16b); in this case, the predicate of the SC is

the PP *in the cellar*. However, when the PP is the coda element of a *there* construction, Moro analyzes it as an adjunct, as shown in (16c).

- (16) a. *There is a rat.*
 $be \left[{}_{SC} \left[{}_{DP} a \text{ rat} \right] \left[{}_{PRED} there \right] \right]$
- b. *A rat is in the cellar.*
 $be \left[{}_{SC} \left[{}_{DP} a \text{ rat} \right] \left[{}_{PRED} in \text{ the cellar} \right] \right]$
- c. *There is a rat in the cellar.*
 $be \left[{}_{SC} \left[{}_{DP} a \text{ rat} \right] \left[{}_{PRED} there \right] \right] \left[{}_{PP} in \text{ the cellar} \right]$

The structure in (16c) is in part motivated by the fact that *there* and the PP cannot share the PRED position of the SC; thus, since *there* is by hypothesis the main predicate of this construction, the PP must be located somewhere else. Unfortunately, the proposed structures do not straightforwardly reflect the fact that (16b) and (16c) have identical truth conditions. For even if we recognize that (16c) is subject to the Definiteness Restriction while (16b) is not, both are true in exactly the same situations, viz., when there is something which is a rat and which is in the (contextually salient) cellar. Keenan (1987), for instance, analyses *there* + coda constructions as in (17).

- (17) $\left[{}_{VP[there]} be \text{ DP XP} \right]$ is true in M iff $\left[XP \right]_M \in \left[DP \right]_M$

The “XP” element in (17) is intended to represent all coda material, including any locative PP. Thus Keenan’s analysis suggests that the coda is essentially the predicate of these constructions. The need for a special rule of interpretation such as (17)—which presumably applies to Moro’s analysis as well—is at least in part a consequence of the assumption that the coda cannot be a sister of the DP.

According to our proposal, the PP *in the cellar* in (16b) and (16c) is always the predicate of the small clause. The difference between the two constructions is that in the latter the element *there* appears as a “clitic” double of the PP, while in the former this element is absent; semantically, however, the doubled PP and the non-doubled PP are equivalent. Our analysis of (16b), then, is the same as Moro’s, but our treatment of (16c) is different; for this latter sentence we assume the structure in (18) below.

- (18) *There is a rat in the cellar.*
 $be \left[{}_{SC} \left[{}_{DP} a \text{ rat} \right] \left[{}_{PRED} \left[{}_{PP} in \text{ the cellar} \right] \left[{}_P there \right] \right] \right]$

Since $\left[\left[{}_{PP} in \text{ the cellar} \right] \right] = \left[\left[{}_{PP} in \text{ the cellar} \right] \left[{}_P there \right] \right]$, the truth conditions of (16b) and (18) are straightforwardly predicted to be identical, as desired.

The small clause in (18), however, is an instance of the kind of structure that has been challenged in the literature. Moro himself presents an argument against

the idea that the coda might be the predicate of the small clause in a *there* construction. This argument is based on facts about extraction out of certain kinds of coda elements. Consider the following pair of sentences:

- (19) a. *To whom_k does it seem that many people are indebted t_k?*
 b. **To whom_k does it seem that there are many people indebted t_k?*

The embedded clause in (19a) is a copular construction with the AP *indebted to whom* assumed to be the predicate of a small clause—see (20a) below; this example is meant to show that extraction out of such a predicate is generally allowed. Now, Moro argues, if this AP were also the predicate of a small clause in (19b), we should expect this sentence to be grammatical as well, contrary to fact. Moro thus proposes that the AP in (19b) is an adjunct, as in structure (20b).

- (20) a. *To whom_k ... many people_i are* [_{SC} *t_i* [_{AP} *indebted t_k*]]
 b. *To whom_k ... there_j are* [_{SC} *many people t_j*] [_{AP} *indebted t_k*]?

The degraded status of (19b) is then explained as a case of extraction out of an adjunct—an operation which is known to result in ungrammaticality.

The illformedness of (19b), however, can be given an alternative account. Suppose that the AP *indebted to whom* is part of the postverbal subject. In this case, (19b) would have the structure in (21):

- (21) *To whom_k ... there_j are* [_{SC} [_{DP} *many people indebted t_k*] *t_j*]?

Under this assumption, (19b) can be analyzed as a case of extraction out of DP, also an operation which tends to produce ungrammaticality. Evidence in favor of this latter analysis is provided by the fact that extraction from DP is known to be sensitive to the kind of determiner that heads the DP; for instance, a similar sentence involving a determinerless version of this DP might be expected to allow extraction more easily than in (19b). This expectation is indeed fulfilled:

- (22) *(?)To whom_k does it seem that there are people indebted t_k?*

Under the assumption that the AP is an adjunct, it remains mysterious why the kind of determiner in the postverbal subject would matter for the extraction facts.

In the next subsection, we will further motivate our analysis of the AP in (19b) and of other (putative) coda material.

2.2. Issues of constituency

In this subsection we review the remaining arguments that may be seen as posing a challenge to the kind of constituency we propose for *there* constructions.

Such arguments are essentially of two kinds: (a) the coda is not part of the subject DP; and (b) the coda is referentially distinct from the DP.

To our knowledge, argument (b) has only been made in reference to codas that are locative PPs; this is unproblematic for our analysis, since we consider the locative to be a predicate of the subject DP. Argument (a), however, poses an indirect challenge to our proposal, since under our analysis any part of the coda which is not part of a locative PP should be analyzed as being part of the DP. This is because we claim that this PP is a direct predicate of the DP, which in turn implies that the two constituents are sisters. Consequently, any (putative) coda material that precedes the PP must be inside the DP. For instance, consider again sentence (15), repeated here as (23).

- (23) *There are many people indebted to John in this room.*

According to our analysis, a non-locative coda is not the predicate of a small clause, because *there* constructions by definition involve locative predication. In the case of (23), then, the string *indebted to John in this room* is not a coda constituent; rather, we claim that the AP *indebted to John* is part of the postverbal subject, while the PP *in this room* is the SC predicate.

In order to defend our proposal, we will examine two representative structures for (23) which would be compatible with claim (a): one where the coda material is assumed to form an adjunct constituent to the DP, as in (24a); the other where the AP and the PP do not form a constituent, and are essentially independent adjuncts, as in (24b).

- (24) a. [_{YP} [_{DP} *many people*] [_{XP} [_{AP} *indebted to John*] [_{PP} *in this room*]]]
 b. [_{YP} [_{ZP} [_{DP} *many people*] [_{AP} *indebted to John*]] [_{PP} *in this room*]]

We will argue that (the d-structure of) (23) does not have either of these two types of structures.

The most compelling evidence in support of argument (a) is a simple constituency test: if the coda were part of the DP, then the DP+coda ought to be able to occur in standard argument positions, contrary to fact. For instance, in Keenan's example (25), the DP+coda cannot occur in subject position (25b); and similarly with a variant of (23), as shown in (26).

- (25) a. *There are two students who object to that enrolled in the course.*
 b. *?*Two students who object to that enrolled in the course just came in.*
- (26) a. *There are/arrived two people indebted to John in this room.*
 b. *??Two people indebted to John in this room just arrived/said hello.*

This test, however, does not take into account the possibility that the coda itself may not be a constituent. If it were, as suggested by the structure in (24a), we

would expect it to behave as such—not in a DP position, but perhaps in a predicative position, given the interpretation this element seems to have. As it turns out, the coda does not seem to behave like such a constituent:⁴

- (27) **Two students are who object to that enrolled in the course*.
 (28) a. ?*Two people are indebted to John in this room*.
 b. **Two people arrived indebted to John in this room*.

Interestingly, if we separate off the locative element in the examples above, the remaining material is perfectly capable of occurring in subject position:

- (29) *Two students who object to that are enrolled in the course*.
 (30) *Two people indebted to John are/arrived in this room*.

Crucially, these examples would be predicted ungrammatical if we assumed the structure (24a).

We now turn to the alternative structure (24b). The evidence from (29) and (30) already suggests that the “ZP” constituent of (24b) might be a DP, as we proposed earlier; but this is not the only evidence in support of our claim. Consider the following variant of (23).

- (31) *There are exactly two people indebted to John in this room*.

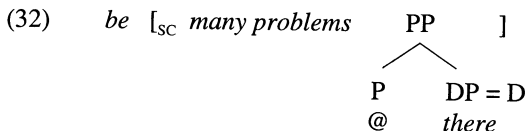
Intuitively, this sentence can be true in a situation where the room in question contains more than two people, provided that exactly two of them—no more, no less—are indebted to John. If (24b) were the correct structure for this sentence, we would have to add an extra rule of interpretation to the semantics to handle “complex” codas. Keenan’s rule (17) cannot treat the coda in this structure as its “XP” component because there is no such constituent. Perhaps the PP can be identified as the “XP” of rule (17), but then some other rule must handle the interpretation of the AP. This latter rule must be formulated in such a way that the AP functions as a restrictive modifier of the DP; we don’t want (31) to be true only in situations where the room contains exactly two people, who happen to be indebted to John.

On the other hand, the correct interpretation for (31) is straightforwardly obtained by analyzing the string *exactly two people indebted to John* as a DP, where *indebted to John* is a (restrictive) modifier of the noun *people*.

Our analysis, then, predicts that there is no “coda” in *there* constructions other than the locative PP; any other material is analyzed as part of the postverbal subject. This prediction is borne out by the data we have considered. We are not aware of cases that are incompatible with this analysis.

3. “Pure” existentials

In the preceding subsections we have presented and motivated our analysis of *there* constructions with an overt locative element. We have claimed that this element is essentially the main predicate in such constructions, and that furthermore the element *there* is a morphological reflex—a double—of this locative predication. This leads us to extend our analysis to all constructions involving the light *there*, including what are called “pure” existential constructions. Thus a sentence like (1a) is also analyzed as a locative structure (cf. Lyons 1967, Freeze 1992):



In the structure above, the null preposition @ is, as before, interpreted as the main two-place predicate @', and *there* is just like a pronoun whose antecedent is not overt. As with any pronoun, since the antecedent is not given in the sentence, it must be recovered from the context; hence the “location” in question will be the (maximal) salient location in the context of utterance of this sentence. In some contexts, such as an “out of the blue” utterance of (1a), the maximal salient location will be large enough (e.g. “planet Earth”) to yield a PP meaning which is essentially a predication of existence. In fact, the predicate *exists* could itself be thought of as an inherent locative with particular lexical requirements—e.g., *Santa Claus does not exist (in the actual world)*, *A cube does not exist in two-dimensional space*, but **Bob does not exist in Paris*.

4. Locative resultatives

It is a well known fact that *there* can only occur with certain unaccusatives:

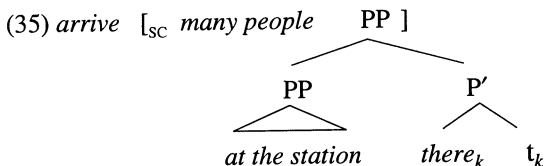
- (33) a. *There arrived many people at the station.*
 b. **There left many people from the station.*

Tortora (1997) argues that only unaccusatives which entail a reached location-goal can occur with *there*. Here we would like to provide an explanation for this restriction based on our locative-doubling hypothesis.

Tortora (1998) claims that the locative PPs in (34a) and (34b) are in some sense resultative XPs, much like the AP *open* in (34c):

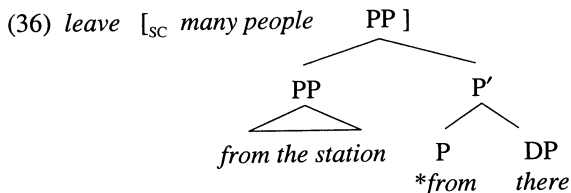
- (34) a. *Many people arrived at the station.*
 b. *Many people left from the station.*
 c. *John broke the vase open.*

Suppose then that we adopt a resultative analysis of (34a,b). Levin & Rappaport-Hovav (1994) have argued that resultative XPs are part of the argument structure of the verb (see also Hale & Keyser 1993 and Larson 1988). In the spirit of this general effort, we tentatively propose that a V can select an SC constituent, which is interpreted as the state that results from the event denoted by the V. Thus, *arrive* can select an SC such as [*many people at the station*], or even an SC with a “doubled” PP, as in (35).



This structure seems unproblematic. *There* raises to Spec, IP, yielding (33a) – or, if the PP is not doubled, the DP *many people* raises to Spec, IP, yielding (34a).

Let's turn now to the case of *leave*. Here it may be argued that *leave* is not, strictly speaking, resultative; but even assuming that it were, the kind of structure we would obtain, if we assume this V selects an SC, would not lend itself to doubling with *there*. In fact, as we can see in (36), even if we assume a “double” structure for the PP *from the station*, the head P of the structure is not of the appropriate kind.



Thus, a string like (33b) cannot be generated.

Notes

¹ We would like to thank Sam Epstein, Dan Seely, and the gracious audience at BLS 25.

² *Loro* is also used as the third person masculine pronoun, and is used as an accusative and dative, as well as a nominative.

³ Note, too, that as with Italian *esse*, these syntactic restrictions exhibited by light *there* correlate with a semantic distinction: light *there* does not have the same ability to refer to a contextual location as heavy *THERE*. Furthermore, the syntactic behavior exhibited by *esse* allows us to understand *there*'s obligatory occupation of Spec, IP: the obligatory overt movement of light *there* to subject position is not an isolated fact about *there*, but rather a general cross-linguistic fact about light pronouns that they cannot remain in their base positions (Tortora 1997).

⁴ (28a) seems fairly ok, as long as it is uttered with some emphasis on the AP *indebted to John*. This would be equivalent to the sentence *In this room, two people are indebted to John*. Hence it seems to us that sentence (28a), even if grammatical, does not provide much evidence that the AP and the PP form a constituent.

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Evidentiality in Dutch

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1. Introduction

This paper examines the properties of evidentiality in Dutch. In particular, it will be shown that there are good reasons to make a sharp distinction between evidentiality, the marking of the source of the statement, and epistemic modality, the degree of confidence a speaker has in his/her statement, even though these two notional categories are (partly) expressed by the same forms, namely modal verbs. Several scholars have analyzed evidentiality as a 'sub-category' of epistemic modality (see e.g., Palmer 1986, Willett 1988; and De Haan 1999 for discussion), but this analysis is suspect for a number of reasons. For one, evidentiality is frequently expressed by different forms from epistemic modality. As shown in (1), evidentiality in Dutch can be expressed by a variety of forms.

- (1) a. Modal verb *moeten* 'must'
De film *moet* uitstekend zijn.
'The film is said to be excellent.'
- b. Past tense modal verb *zou(den)* 'should'
Bij de brand *zouden* alle bewoners zijn omgekomen
'All inhabitants are said to have perished in the fire.'
- c. Raising verb *schijnen* 'seem'
Jan *schijnt* ziek te zijn.
'John seems to be ill.'
- d. Complements of perception verbs
Ik *hoor*, dat Jan ziek is.
'I hear that John is ill.'
- e. "Quotative"
"Douane controleert El Al niet"
'Customs [officers] do not check El Al [planes]'
(NOS Teletekst, February 11, 1999)

Only (1a), a sentence with the verb *moeten* 'must', and (1b), the past tense *zou(den)* 'should', have modal meanings beside the evidential reading. The use of the modal in sentence (1b) is equivalent to the use of the subjunctive in other Germanic languages. A raising verb like *schijnen* 'seem' (1c) is not normally considered to be evidential, even though it exhibits all properties of grammaticalized evidentials (see sections 2 and 4 below). The perception verbs *zien* 'see' and *horen* 'hear' (1d) also exhibit some grammaticalization properties: one, the use of the present tense *hoor*, even though the act of hearing has taken place in the past; two, the complement of *horen* in (1d) does not refer directly to John's illness (the speaker does not hear John's groans, for instance), but rather to the indirect event of someone's report of John's illness. See Dik and Hengeveld (1991) for a crosslinguistic discussion of this type of sentences. Finally, the use of

quotation marks in sentence (1e), common in journalistic prose, conveys the fact that the sentence is a direct quote. As a side-effect, it has also come to mean unverified information. In this paper, I will only deal with two evidentials, the verbs *moeten* 'must' and *schijnen* 'seem'.

2. Criteria for evidentials

It has often been asserted that evidentiality is an 'exotic' notion, mainly to be found in the languages of the Americas and in certain areas of Asia. However, with the appearance of such studies as Chafe and Nichols (1986) and Willett (1988), it is clear that evidentiality does not occupy a marginal position within the area of modality and in the broader picture of information structure, but that it must be viewed as an integral part of any theory that attempts to explain the linguistic interaction of speaker and hearer.

On the other hand, defining evidentiality is not an easy task. There is in general no real agreement on what exactly constitutes an evidential. Even though the semantic range of evidentials appears to be obvious, an evidential is a morpheme which shows the source of information the speaker has for his or her utterance, yet in the literature one can find numerous studies in which 'evidentials' are listed that do not have any evidential properties. Even if we agree on the definition given above, is it the case that all forms that show the source of evidence should be called evidentials? Adverbs like *yesterday* and *tomorrow* are not considered to be grammaticalized tense morphemes, so, following the same line of reasoning, adverbs like *evidently* and *seemingly* should not be considered grammaticalized evidentials.

Therefore we need criteria to distinguish grammaticalized evidentials from lexical evidentials. For the most part, the literature is silent on this matter. The notable exception is Anderson (1986), who proposed just such a list of criteria. Many of his criteria are not crosslinguistically valid or need to be amended in some way (see De Haan 1997:147-50 for discussion). Thus, in order for a given morpheme to be considered fully grammaticalized, I propose the following four criteria:

1. Evidentials are not themselves the main part of the clause (Anderson 1986:274). This criterion ensures that constructions like *It is evident that ...* and *I see that ...* are not considered fully grammaticalized. Such construction can of course be the basis for subsequent grammaticalization processes.
2. Evidentials do not show agreement with the speaker (De Haan 1997). This criterion goes with the first one: with grammaticalized evidentials, the speaker is not present as a syntactic role, usually the subject, in the sentence.
3. The morphemes have the expression of evidentiality as their primary meaning (Anderson 1986:274). This criterion is used to distinguish between true evidentials and those elements for which evidentiality is only inferentially present. Such a category is the English perfect. From the sentence *The toast has burned* (Anderson 1986:275), one may infer the event *The toast burned*. The

perfect then denotes, secondarily, the evidential notion of "evidence for an action." The perfect can then serve as the basis for grammaticalized evidentials, but is not in itself an evidential. Another such element is the English *must*. Unlike the Dutch cognate verb *moeten* (see below), *must* has not become a grammaticalized evidential, but is a true epistemic modal (see De Haan 1999 for details).

4. Evidentials cannot be in the scope of a negative element (De Haan 1997). This criterion is used to determine the place of evidentials in the structural hierarchy of the sentence. When an evidential and a negative element cooccur in the sentence, the evidential will have scope over the negation. This is the main reason for positing a separate evidential verb *moeten* in Dutch. As will be seen below, when *moeten* is an evidential, any negation present will have to be in the scope of the evidential verb.

3. Evidentiality expressed by modals: *moeten* 'must'

Looking through reference grammars of Dutch (e.g. the ANS (1984) or De Schutter and Van Hauwermeieren (1983)) or studies of Dutch modality, one can easily get the impression that evidentiality as a separate grammatical category does not exist in Dutch. At most, some evidential readings of *moeten* 'must' are included in the discussion of epistemic *moeten*, but without calling these readings evidential. Droste (1956) lists evidential *moeten* as one of his subcategories, though it is not labeled as being evidential. The exception is Nuyts (1994:140) who considers *moeten* to be an evidential verb rather than an epistemic one, or allows for the possibility of both an evidential and an epistemic (judgment) verb *moeten*.

We will start by comparing the behavior of the two categories when a negative element is present in the sentence. We will take sentence (2) as our starting point:

- (2) Het moet een goede film zijn.
 It must:3SG:PRS a good film be:INF¹
 'It is said to be a good film.'

Sentence (2) has three different interpretations, depending on the context. The deontic reading (*It is required to be a good film*) does not interest us very much here. Rather, we are interested in comparing the epistemic interpretation (*It is probable that it is a good film*) with the evidential interpretation (*There is evidence that this is a good film*).

In Dutch, and in the Germanic languages in general, strong modal verbs tend to allow only one scope reading when they are combined with negation. In De Haan (1997), such verbs are called *uniscopal* verbs. When the verb *moeten* is combined with a negative element, *moeten* will have scope over the negation. This is shown in (3) below:

- (3) Jan moet niet naar Amsterdam gaan.
 Jan must:3SG:PRS NEG to Amsterdam go:INF
 'John mustn't go to Amsterdam.'
 'It is necessary for John not to go to Amsterdam.'

In order for the negation to have scope over the modal verb and to express the notion of *not necessary*, a different modal verb must be used. This verb is *hoeven* 'need', and it is shown in (4):

- (4) Jan hoeft niet naar Amsterdam te gaan.
 Jan need:3SG:PRS NEG to Amsterdam to go:INF
 'John needn't go to Amsterdam.'
 'It is not necessary for John to go to Amsterdam.'

Alternatively, especially in epistemic contexts, the verb *kunnen* 'can' is used as the suppletive form:

- (5) Jan kan niet naar Amsterdam gaan.
 Jan can:3SG:PRS NEG to Amsterdam go:INF
 'John cannot go to Amsterdam.'
 'It is not possible for John to go to Amsterdam.'

However, this sentence is more ambiguous, since *kunnen* (as is English *can*) is a verb which allows both scope readings when negation is present. It is a *biscopal* verb, according to De Haan (1997). Sentence (5) can also have the interpretation *It is possible for Jan not to go to Amsterdam*, with the modal having scope over the negation.

We now turn to the behavior of evidential *moeten*. Consider sentence (6):

- (6) Het moet geen goede film zijn.
 it must:3SG:PRS no good film be:INF
 'It is said not to be a good film.'

As expected from the previous discussion, the verb *moeten* 'must' has scope over the negative element *geen* 'no'. In particular, sentence (6) does not have the interpretation *It is not said to be a good film*. This is of course unsurprising given the inherent characteristic that *moeten* always has the negative element in its scope, if one is present.

It also conforms to the criterion for grammaticalized evidentials that a negative element has to be in the scope of an evidential, if such an element is present. We can therefore ask ourselves what would happen if we replace *moeten* with a modal verb which is in the scope of a negative element. The prediction would be that such sentences are incompatible with an evidential reading, and this turns out to be the case. If we replace *moeten* by either *hoeven* or *kunnen*, we lose the evidential interpretation. Sentences (7) and (8) are only acceptable with a deontic or epistemic interpretation:

- (7) Het hoeft geen goede film te zijn.
 it must:3SG:PRS no good film to be:INF
 'It needn't be a good film.'

- (8) Het kan geen goede film zijn.
 it can:3SG:PRS no good film be:INF
 'It cannot be a good film.'

Thus, we can summarize in the following table the behavior of *moeten* 'must' with a negative element, where the asterisk signals ungrammaticality:

- (9) *Moeten and its negative reflexes*

	positive	negative	
		narrow scope neg.	wide scope negation
deontic mod.	<i>moeten</i>	<i>moeten</i>	<i>hoeven</i>
epistemic mod.	<i>moeten</i>	<i>moeten</i>	<i>kunnen</i>
evidentiality	<i>moeten</i>	<i>moeten</i>	*

In addition to criterion 4, the criterion that evidential morphemes always have scope over a negative element, we can demonstrate that the other evidential criteria mentioned in section 2 also hold.

The verb *moeten* is not used in a separate clause, nor does it show agreement with the speaker (criteria 1 and 2, respectively). If we pluralize the subject of (1a), *moeten* changes to its plural form. If *moeten* agreed with the speaker, this would of course not happen. We have already shown above that evidentiality is a separate grammatical category in Dutch, due to its behavior in negative sentences. Because of this, it can be maintained that evidentiality is the primary meaning of the verb *moeten* in a sentence such as (2). Although sentence (2) can be construed to be ambiguous, when out of context, between an epistemic, evidential and deontic (root) interpretation, there would be no doubt as to its interpretation in context. Just as there is sometimes ambiguity between an epistemic and deontic interpretation of modals, there is sometimes ambiguity between an epistemic and evidential interpretation. This ambiguity does not invalidate the existence of evidentiality as a separate category.

The primary meaning of evidential *moeten* in sentence (2) is the expression of the presence of evidence for the statement. The speaker makes no mention of the truth value of the sentence. As far as the speaker is concerned, he or she is not interested in whether the statement is true or not; the only purpose of the verb *moeten* is to denote the presence of evidence (specifically, the presence of indirect evidence). I have argued in De Haan (1999) that this is the difference between Dutch *moeten* and English *must*: *must* is always evaluative.

Having shown that judgments and evidentiality are two distinct, but related, categories in Dutch, we are left with the question: What is the diachronic path for these two categories? Assuming the standard analysis that epistemic modality develops from deontic (root) modality, we will posit here that judgmental *moeten* developed before evidential *moeten*. Bear further in mind that inference from available evidence is present in all judgments as a secondary layer. Given these two premises, then we can say that evidential *moeten* arises from epistemic (judgmental) *moeten* by grammaticalization. The primary meaning of probability is *bleached out* (see e.g., Hopper and Traugott 1993) of the modal, and the

secondary meaning of inference becomes the primary one. We can posit the following stages for *moeten*:

- I deontic
- II epistemic judgment: *probability based on evidence*
- III evidential: *evidence*

All three stages are attested in Modern Standard Dutch, creating a sometimes three-way ambiguity between the three notions, as can be seen in sentence (2), which is in isolation three-way ambiguous. There are good reasons for keeping judgments and evidentiality as separate categories, based on the diachronic pattern given above.

This grammaticalization process has occurred in other Germanic languages (for instance in German with the verb *sollen*), but not in English. The verb *must* has not (yet) reached stage III, and a sentence such as *John must be in school* is therefore only two-way ambiguous.

4. Raising verbs

This section is devoted to an analysis of the semantic and syntactic properties of the verb *schijnen* 'seem.' Just like its English translation, *schijnen* is generally analyzed as being a Raising verb. Raising has been studied extensively in the formal literature, but for the most part, attention was focused on the syntactic properties of Raising verbs. See e.g. Radford (1988) for the standard treatment of Raising verbs in the GB paradigm. The semantic aspect has been almost completely disregarded (an exception is Newman 1981).

Since *schijnen* is a verb which can appear in a variety of syntactic contexts, we must first discuss exactly in which contexts evidentiality can appear. Sentences (10a)–(10c) show the various contexts of *schijnen*. In (10a), *schijnen* is a full verb with the meaning *shine*; in (10b), *schijnen* appears as an impersonal verb with a dummy subject, while in (10c) *schijnen* appears as part of the matrix clause with a regular, non-impersonal subject:

- (10) a. De zon schijnt.
 the sun shine:3SG:PRS
 'The sun is shining.'
- b. Het schijnt, dat Jan ziek is.
 it seem:3SG:PRS COMP John ill be:3SG:PRS
 'It seems that John is ill.'
- c. Jan schijnt ziek te zijn.
 John seem:3SG:PRS ill to be:INF
 'John seems to be ill.'

Whereas sentence (10a) has no evidential meaning whatsoever, both sentences (10b) and (c) are evidential in meaning. They are in fact synonymous and can be used interchangeably. Sentence (10c) is more grammaticalized than (10b), however. If we apply the four criteria listed above, we see that *schijnt* in sentence (10b) fails two of the test, while *schijnt* in (10c) passes all four.

In (10b), the evidential is in a clause by itself with its own subject. In (10c) it is part of the main clause. Thus, *schijnt* in (10b) fails the first test, but the same form in (10c) passes the first test. As far as the second criterion goes, both instances of *schijnen* show agreement with the grammatical subject of the sentence, and not with the speaker. Both occurrences of *schijnen* therefore pass the second test. The primary meaning of the verb *schijnen* in sentences (10b) and (c), but not in (10a), is the expression of evidentiality. The verb *schijnen* is used when the speaker has no direct evidence of the event described, but he or she does have indirect evidence.

The question of whether *schijnen* can appear in the scope of a negation is a somewhat complex one. Consider the following pair of sentences:

- (11) a. Het schijnt niet, dat Jan ziek is.
 it seem:3SG:PRS NEG COMP Jan ill be:3SG:PRS
 ‘It does not seem that Jan is ill.’
 b. Jan schijnt niet ziek te zijn
 Jan seem:3SG:PRS NEG ill to be: INF
 ‘Jan doesn’t seem to be ill.’

Since *schijnen* is the main verb in the matrix clause of sentence (11a), it is in the scope of the sentential negation. On the other hand, the linear order of sentence is an accurate reflection of the scope relation, since the negation *niet* is in the scope of *schijnen*. Therefore, *schijnt* in (11a) fails the fourth test, *schijnt* in (11b) passes it. The placement of the negation in the matrix clause of (11a) is no doubt due to NEG-raising, but it is still a problem for the tests. The verb *schijnen* is certainly a evidential verb semantically in a sentence with a biclausal structure, like (10b) and (11a), because its primary meaning is that of showing that knowledge about the event in the embedded clause stems from indirect evidence. However it is obvious that biclausal *schijnen* is less grammaticalized than monoclausal *schijnen*.

This takes us to a discussion of how *schijnen* acquired its evidential meaning. I present here a diachronic analysis of the semantic shifts that *schijnen* has undergone. I base this analysis on the entry on *schijnen* in Verwijs and Verdam’s (1912) dictionary of Middle Dutch, and on some additional texts.² Although this is not meant to be an in-depth study on *schijnen*, it appears clear that in the earliest texts, the verb *schijnen* was decidedly less common than in later texts. In general, an increase in text frequency is usually a sign that a lexical item is becoming grammaticalized (cf. Thompson and Mulac 1991).

I will point here to a number of stages in the semantic development of *schijnen*. Most of these stages are still present in Modern Dutch, but the stages seem to have appeared chronologically as follows:

Stage I: full verb: ‘to shine’.

Most grammaticalization processes go from the concrete to the abstract (cf. Hopper and Traugott 1993), and *schijnen* is no exception. Its original meaning is that of ‘to shine’ with a celestial body as subject:

- (12) Die mane scheen scone ende claer.
 the moon shine:3SG:PST bright and clear
 'The moon shone bright and clear.'

As can be seen from sentence (10a), the full lexical meaning is still present in Modern Dutch.

Stage II: extension of meaning: 'to be(come) visible'

The first extension of *schijnen* is that this verb came to be used to denote physical appearance of concrete objects, as is shown in (13)

- (13) Haer arme, ..., haer been, haer hooft, daer bloet dor sceen.
 her arm, ..., her leg, her head, there blood through shine:3SG:PST
 'Her arm, her leg, her head, there was blood visible.'

The extension went from appearance of light source (moon, sun) to any physical appearance.

Stage III: extension of meaning: abstract properties of physical objects

The next stage is the extension of *schijnen* to denote abstract properties as well, as can be seen in (14):

- (14) Nonne die ooc heilich scinen.
 nun:PL that also holy appear
 'Nuns which appear holy as well.'

The extension of physical (appearance) to abstract (appearance) is a well-attested development in numerous grammaticalization studies.

Stage IV: abstract situations

Up until stage III, there was still a connection to the physical world. In sentence (14), for instance, the deduction of the abstract concept of holiness is still based on physical appearance; the speaker has to have seen the subjects. This is no longer a necessary requirement at this stage, as can be seen from (15) and (16):

- (15) Nu saelt scinen wat wi doen sulen.
 now shall:it seem:INF what we do:INF shall:1PL
 'Now will it become apparent what we will do.'
- (16) In groter ellendichede hebbic gheweest,
 in greater misery have:I been:PTC
 alst mi wel scijnt.
 if:it me:DAT so seem:3SG:PRS
 'I have been in greater misery, so it seems to me.'

The syntactic environments of evidential *schijnen* in the Middle Dutch texts fall into two broad categories:

1. *schijnen* as full verb with a NP complement, as seen in sentences (13) and (14) above.
2. *schijnen* as impersonal verb with dummy subject (15) or with an experiencer subject in the dative case (16).

Modern Dutch sentences which display subject raising, such as sentence (10c) above, do not appear until later. This is consistent with the development of German *scheinen* 'seem' (Newman 1981) and English *seem* (Denison 1993). Newman (1981:157-68) reconstructs the following syntactic stages for *scheinen*:

Stage I, Old High German: There appear to be no occurrences of *scinan* 'seem' with any complement (1981:157). Although there are some occurrences of *scinan* with an infinitival complement, those can be analyzed as being direct translations from Latin. Denison (1993:220-1) claims much the same for similar sentences in English.

Stage II, Middle High German: The verb *scinen* (< *scinan*) could appear with non-infinitival complements, such as adjectives, nouns, past participles, and PPs (1981:161-2). This mirrors the development of *schijnen* in Dutch, as can be seen in sentences (13) and (14) above.

Stage III, Early Modern High German: Infinitival complements start to appear, but only the verb *sein* 'to be' can appear as such (1981:162-3). This extension from non-infinitival complements to complements with *sein* 'to be' can be explained by noting that non-infinitival complements necessarily denote stative events. Since complements with a verb of being also denote stative events, this extension is not far-fetched. Denison (1993:222) gives other examples of infinitival complements with a stative interpretation in English, most notably *to have*.

I have been unable to reconstruct a similar syntactic stage in Dutch *schijnen*, due to the paucity of material. This stage does correspond to the semantic development of *schijnen*, however.

Stage IV: Modern German: Once the verb *scinen* became subcategorized for infinitives, the path was clear for other verbs to appear as complements, including verbs which denote active events, such as *machen* 'do' and *essen* 'eat.' This represents a broadening from stative events to all types of events.

This stage also took place in the development of *schijnen* in Dutch. In the 16th and early 17th century texts I examined³ all occurrences of evidential *schijnen* are in the form of the biclausal structure exemplified in sentence (10b) above. *Schijnen* in Raising environments (monoclausal) does not appear until later, so the analysis here is that monoclausal *schijnen* represents a further stage of the grammaticalization of evidential *schijnen*. The grammaticalization process probably went the following way:

- (17) *Grammaticalization of schijnen*
 impersonal biclausal > personal biclausal > personal monoclausal

The evidence for the intermediate step comes from the presence of very few examples of this type:

- (18) Si schinen, dat si weten algader die verborgenheit des Vader.
 they seem that they know all the mystery of the Father
 'They seem to all know the mysteriousness of the Father.'

See also Denison (1993:241) for English examples of this construction. This type of sentence is no longer grammatical in Modern Dutch. The analysis is then that the biclausal structure was reanalyzed into a monoclausal structure. This type of reanalysis is not uncommon. See Harris and Campbell (1995) for several examples of this type of monoclausalization, including an analysis on the development of Quotative constructions.

Now that we have sketched the outline of the development of evidential *schijnen*, we can explain the peculiar raising properties of *schijnen*. Evidentiality is generally assumed to be in the outermost layer of the sentence, or, to put it differently, evidential markers have the entire sentence in its scope. Since *schijnen* is an evidential verb, it has the entire sentence in its scope and is therefore by necessity transparent with respect to most verbal properties. An example is case assignment in those Germanic languages (German, Icelandic) that still have morphological case. In these languages, the subject of the sentence receives its case from the main verb in the embedded VP, and not from the *seem*-verb. This can be demonstrated by examples from German:

- (19) a. Ihm geht es schlecht.
 he:DAT go:3SG:PRS it bad
 'He is doing badly.'
- b. Ihm scheint es schlecht zu gehen.
 he:DAT seem:3SG:PRS it bad to go:INF
 'He seems to be doing badly.'
- (20) a. Er geht zur Schule.
 he:NOM go:3SG:PRS to school
 'He goes to school.'
- b. Er scheint zur Schule zu gehen.
 he:NOM seem:3SG:PRS to school to go:INF
 'He seems to go to school.'

The only remaining verbal property is that of tense and agreement-bearing elements. A future development might be the loss of these properties as well, in which case only a modal particle-like element would remain. This is what appears to have happened in Afrikaans, in which the verb *glo* 'believe' developed into a modal morpheme *glo*, which developed evidential properties:

- (21) Sy boeke was glo baie populêr.
 his books were PRT very popular earlier
 'His books were said to be very popular earlier.'

Since *glo* is now incapable of bearing tense and agreement, the only remaining verb in the sentence, *wees* 'to be' must be used as inflected verb, rather than infinitive (as in the English translation).

5. Conclusions

It was shown in the previous sections that evidentials in Dutch can arise by very divergent ways, and that there is no *a priori* link between evidentiality and epistemic modality, as has been claimed in the past. The findings in the paper are consistent with crosslinguistic findings (see De Haan 1999).

The relationship between evidentiality and epistemic modality is an equal one, not one of subordination. The two categories encode different things: evidentiality asserts the presence of evidence, but does not evaluate the statement. Epistemic modality is evaluative in nature. Evaluation can be based on evidence, which makes it plausible for epistemic modals to turn into evidentials (and vice versa) but this is by no means a necessary step.

Evidentiality is a more widespread phenomenon than generally assumed. It is not just an exotic category found only in Native American and Tibeto-Burman languages, but in fact can be found in most language families around the globe. As was shown in the discussion on Raising verbs (section 4), an understanding of the mechanisms of evidentiality can help explain syntactic and semantic phenomena of a seemingly unrelated nature.

Notes

¹ The following abbreviations are used: COMP-complementizer; DAT-dative; INF-infinitive; NEG-negation; NOM-nominative; PL-plural; PRS-present tense; PRT-particle; PST-past tense; PTC-participle; SG-singular.

² These texts come from the Coster project, a project devoted to providing electronic versions of Dutch texts. It can be found on the World Wide Web at <http://www.dds.nl/~ljcoster>.

³ The texts used are all the texts in Van der Heijden (1968), with the exception of those texts which were either translations or adaptations from classical stories.

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Why complement clauses do not include a *that*-complementizer in early child language

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1. The problem and data

It has been repeatedly noted that complement clauses are virtually never marked by a *that*-complementizer in early child language (cf. Limber 1973; Phinney 1981; Pinker 1984; Bloom et al. 1989). In this paper we show that the absence of *that* in complement clauses is due to the particular structure of complex sentences that young children use. Specifically, we argue that children don't use a *that*-complementizer because early complement clauses are not embedded.

Our study is based on data from six children from the CHILDES database (MacWhinney & Snow 1990). As shown in (1), the children are between 1;2 and 5;1 years of age.

(1) Age of children

	Age range	Number of complement clauses (Total: 1238)
Naomi	1;2 - 4;9	32
Eve	1;6 - 2;3	46
Peter	1;9 - 3;2	163
Nina	1;11 - 3;3	141
Sarah	2;3 - 5;1	370
Adam	2;3 - 4;10	486

Our data include 1238 complement clauses. We restricted our investigation to finite complement clauses marked by *that* or by zero. So we did not consider infinitive constructions, *if* clauses, and embedded *wh*-sentences that function as complement clauses. There are only 14 complement clauses introduced by *that* in our data. All other clauses are marked by zero. That means that almost 99 percent of the sentences in our sample do not include a complementizer. This number is in stark contrast to the number of *that*-complement clauses that previous studies have found in adult language. Elsness (1984) reports, for instance, that in the BROWN corpus more than 60 percent of all complement clauses are marked by a *that*; McDavid (1964) examined a sample of written academic language in which more than 90 percent of all complement clauses include a *that*-complementizer. Compare the figures in (2).

(2) Number of complement clauses marked by *that* or by zero

	THAT	ZERO	TOTAL
Our sample	14 (1.2%)	1224 (98.8%)	1238
Elsness (1984)	406 (60.5%)	265 (39.5%)	671
McDavid (1964)	415 (91%)	40 (9%)	455

The absence of *that* in early complement clauses has been attributed to various factors. Pinker (1984:224) argues, for instance, that complementizers and other functional categories are often omitted because they are “perceptually nonsalient” and “semantically empty”. And Bloom et al. (1989) suggest that the use of *that* as a demonstrative might inhibit young children from learning the same form as a complementizer (cf. the ‘Principle of Contrast’; e.g. Clark 1987).

We think that these explanations are inadequate to account for the absence of *that* in early complement clauses. The lack of perceptual salience and semantic substance cannot be the reason why *that* is omitted because other functional categories, including other conjunctions such as *and* or *when*, are widely used in our data. And the multifunctionality of *that* is probably not a sufficient reason either, because other function words with multiple meanings such as *to*, which is used as a directional preposition and an infinitive marker, do not seem to cause any delay in the acquisition process. In fact, in an earlier study Bloom et al. (1984) argued that the directional sense of *to* may facilitate the acquisition of *to* as an infinitive marker. Obviously, only one of these claims can be true.

In contrast to Pinker and Bloom, we maintain that the absence of *that* in complement clauses is due to the conceptual and syntactic structure of complex sentences that English-speaking children first learn. Pinker and Bloom assume that sentences like those in (3) and (4) (which we adopted from Bloom et al. 1989:106-8)

(3) I think the children go to bed.

(4) I know I open it up.

are complex sentences that consist of two clauses: (i) a matrix clause and (ii) a complement clause marked by zero. Challenging this view, we maintain that (3) and (4), which are similar to the sentences in our sample, do not consist of two propositions. Rather, they are simple utterances in which the matrix clause functions as an evidential marker. What we claim then is the following: Children don’t use a *that*-complementizer because constructions that appear to be early complement clauses are really independent sentences accompanied by parenthetical matrix clauses (e.g. *I think*) that do not make an independent assertion.

Parenthetical matrix clauses are characterized by a number of features that distinguish them from ordinary main clauses: The verb of a parenthetical matrix clause is usually a cognition verb in the present tense. The subject is either a first or, less frequently, a second person pronoun. The apparent matrix clause is short and

formulaic and may precede or follow the associated proposition. Auxiliary verbs, adverbs, and prepositional phrases are almost entirely absent in the parenthetical clause. And the associated 'complement clause' is usually not marked by *that* (cf. Bolinger 1972; Hooper and Thompson 1973; Hooper 1975; Noonan 1985; Thompson and Mulac 1991). Table (5) shows the most frequent matrix verbs in our sample; only those verbs that occur ten times or more are given.

(5) Most frequent matrix verbs (others: *find, hear, forget, be glad, be afraid, show*)

	Naomi	Eve	Peter	Nina	Sarah	Adam	Total	<i>that</i> tokens
Think	11	12	49	19	87	193	371	2
See	2	14	29	34	83	73	235	1
Say	9	3	18	29	41	28	128	2
Look	2	3	13	31	10	41	100	-
Know	4	1	6	7	32	35	85	1
Mean	-	-	2	4	20	14	40	-
Guess	-	1	7	1	14	13	36	-
Bet	-	-	1	3	14	18	36	-
Pretend	1	1	3	18	2	9	34	3
Wish	-	-	-	-	5	26	31	-
Tell	1	2	4	6	7	5	25	4
Watch	-	-	3	8	2	5	18	-
Hope	-	-	1	-	6	10	17	-
Remember	-	6	1	1	5	4	17	1
Total:								14

As can be seen in table (5), there are only seven verbs that occur with a *that*-complementizer in our sample: *think, see, say, know, pretend, tell, and remember*. None of the other verbs (including those not shown in (5)) ever occur with a clause introduced by *that*. Table (6) shows that all 14 *that*-complement clauses were produced by a child over three years of age. None of the complement clauses produced by children below this age included a *that*-complementizer.

(6) Number of complement clauses with *that* or with ZERO

Age:	1;2-2;11	3;0-3;11	4;0-5;1
ZERO	325 (100%)	338 (97.4%)	561 (99.1%)
THAT	0 (0%)	9 (2.6%)	5 (0.9%)
TOTAL	325	347	566

In the remainder of this paper, we take a closer look at the sentences that include one of the verbs in table (5). We show that the vast majority of clauses that include one of these verbs are parentheticals, which do not make an independent assertion.

2. Evidential markers: *think*, *guess*, *bet*, *mean*, and *know*

Five verbs are commonly used as evidential markers: *think*, *guess*, *bet*, *mean*, and *know*. Nearly 50 percent of all sentences in our sample occur with one of these five verbs. The following examples show the first fifteen sentences that Sarah used with the apparent matrix verb *think*.

(7) Sarah (first sentences including <i>think</i> as a 'matrix verb')	age
<u>I think</u> I'm go in here.	3;1
And <u>I think</u> (pause) we need dishes.	3;2
<u>Think</u> some toys over here too.	3;3
<u>I think</u> I play jingle bells xx with the record player .	3;5
<u>I think</u> he's gone.	3;5
Oh (pause) <u>I think</u> it's a ball.	3;5
It's a crazy bone (pause) <u>I think</u> .	3;5
<u>I think</u> it's in here.	3;5
<u>I think</u> it's in here # Mommy.	3;5
<u>think</u> it's in there.	3;5
<u>I think</u> I don't know that one.	3;6
I'm get my carriage (pause) <u>I think</u> .	3;6
<u>Think</u> it's in this.	3;6
<u>I think</u> that your hands are dirty.	3;6
<u>I think</u> my daddy took it.	3;7

At first glance, the sentences in (7) seem to consist of two propositions, a matrix clause and a complement clause marked by zero, but there is good evidence that the matrix clauses in (7) are not full propositions. In all 15 sentences, the matrix clause is short and formulaic. There is hardly any variation: *think* is always used in the present tense and with the first person pronoun *I* as subject. Apart from the pronominal subject, there is no other element that co-occurs with *think* in these clauses: *think* is never accompanied by an auxiliary verb or modified by an adverb (or prepositional phrase). The 'matrix clause' usually precedes the 'complement clause', but there are two examples in which *I think* occurs at the end of the sentence. All this suggests that the matrix clauses do not make an independent assertion; rather, they are used as parenthetical evidentials that indicate the speaker's degree of certainty towards the associated proposition (cf. Chafe and Nichols 1986).

The following examples illustrate the use of *guess*, *bet*, *mean*, and *know*.

(8) Sarah (first sentences including <i>guess</i> as a 'matrix verb')	age
<u>I guess</u> I better come xx.	3;5
<u>Guess</u> I'll write xx some more white.	3;9

<u>Guess</u> I lay it down.	3;10
<u>I guess</u> saw me break them.	3;10
<u>Guess</u> who we spun?	4;1
<u>Guess</u> who we spun (pause) all up?	4;1
<u>I guess</u> I have no more.	4;4
That goes right here but it don't fit (pause) <u>I guess</u> .	4;4
(9) Adam (first sentences including <i>bet</i> as a 'matrix verb')	
Yeah (pause) <u>I bet</u> now it's too big.	4;4
<u>I bet</u> I know.	4;4
<u>I bet</u> I could play it.	4;6
<u>I bet</u> Smokey can tear off dose bears.	4;6
<u>I bet</u> I can do dat one.	4;6
<u>I bet</u> I can put something in through here.	4;6
<u>I bet</u> you have something else.	4;6
<u>I bet</u> you don't know what this is.	4;10
(10) Adam (first sentences including <i>mean</i> as a 'matrix verb')	
Down (pause) <u>I mean</u> (pause) I have to do all (pause) of this.	3;9
<u>You mean</u> I do xx .	3;9
You getting crisscross (pause) <u>I mean</u> .	4;6
<u>Y(ou) mean</u> (pause) put that up?	4;6
<u>I mean</u> he's big.	4;7
<u>I mean</u> um (pause) I don't know what the name is.	4;7
<u>I mean</u> that teacher was gonna color in school but not today.	4;7
<u>I mean</u> I'm awful stupid today.	4;8.
(11) Sarah (first sentences including <i>know</i> as a 'matrix verb')	
<u>I know</u> he sit right here.	3;2
<u>Know</u> (pause) I'm not.	3;5
<u>I know</u> you get a princess telephone.	3;6
<u>She knows</u> she gets some stickerbirds.	3;7
<u>I know</u> got different colors.	3;10
<u>Do you know</u> I'm really xx?	4;0
<u>I didn't know</u> it was that late.	4;1
That can go on my bike too (pause) <u>you know</u> .	4;2

The examples in (8) to (11) are the earliest sentences that Sarah and Adam used in which *guess*, *bet*, *mean*, and *know* seem to function as matrix verbs. These sentences basically have the same structure as the sentences in (7), in which the matrix clauses function as parenthetical evidential markers. *Guess*, *bet*, *mean*, and *know* are always used in the present tense, and they are never accompanied by an auxiliary verb or adverb. Table (12) shows that the subject of these verbs is almost always a first or a second person pronoun.

(12) Subjects of *guess*, *bet*, *mean*, *know* and *think*

	1 person	2 person	3 person	lexical noun	imperative	Total
<i>guess</i>	36	-	-	-	-	36
<i>bet</i>	36	-	-	-	-	36
<i>mean</i>	13	12	-	-	-	25
<i>know</i>	30	47	5	3	-	85
<i>think</i>	315	50	5	1	-	371
TOTAL	430 (78%)	109 (20%)	10 (2%)	4 (0.7%)	- (0%)	553

98 percent of all sentences in which *guess*, *bet*, *mean*, *know*, and *think* seem to function as matrix verbs include a first or second person pronoun as subject; *guess* and *bet* occur only with *I* in subject position. *You* is especially common with *know*; *you know* accounts for more than 50 percent of all sentences including *know* in our sample. Third person pronouns and lexical NPs are extremely rare in subject position; they occur in fewer than 3 percent of all 'matrix clauses'.

Note that some of the apparent matrix clauses in (8) to (11) follow the associated clause, as does *I think* in (7). There are twenty-eight sentences in the data where *I think*, *I guess*, *I mean*, and *you know* occur sentence-finally. These sentences provide, perhaps, the strongest support for our hypothesis that the matrix clauses in our sample are parentheticals. They do not have the status of an independent assertion. Rather, they function as evidential markers, somewhat similar to an epistemic adverb such as *maybe*.

3. Deontic modality markers: *wish* and *hope*

We turn now to two other 'matrix verbs', *wish* and *hope*, that are commonly used to indicate the speaker's desire. Like *think*, *guess*, *bet*, *mean*, and *know*, these two verbs are used as parentheticals in our sample.

- (13) Adam (first sentences including *wish* as a 'matrix verb') age
- I wish I could play with dis [= a Christmas present]. 3;5
- I wish I can keep it (pause) for writing on. 3;5
- I wish I can keep dat so I can tick (pause) tick it. 3;5
- I wish we can eat... 3;8
- I wish we could eat that. 3;8
- I wish I could have a tractor to drive in them. 3;8
- I wish (pause) could (pause) make some more just like dat. 3;8
- I wish you could color all dese. 3;9
- (14) Adam (first sentences including *hope* as a 'matrix verb')
- Hope he tipped again. 3;6
- I hope he won't bother you. 4;0
- I hope my cat friends are alright. 4;4
- I hope dey alright. 4;4

<u>I hope</u> I can knock dese pretty bowling balls down with only one strike.	4;9
<u>I hope</u> de house won't be on fire.	4;9
<u>I hope</u> dat kitty's not getting into trouble.	4;9
<u>I hope</u> I put my sponge in here.	4;9

The sentences in (13) and (14) basically have the same structure as the sentences we examined in the preceding section. Table (15) shows that *wish* and *hope* are almost exclusively used with a first person pronoun as subject.

(15) Subjects of *wish* and *hope*

	1 person	2 person	3 person	lexical noun	imperative	Total
wish	30	-	-	1	-	31
hope	15	2	-	-	-	17
TOTAL	46 (96%)	2 (4%)	- (0%)	1 (2%)	- (0%)	48

With three exceptions, the subject of *wish* and *hope* is the first person pronoun *I*. *Wish* and *hope* are never accompanied by an auxiliary verb or modified by an adverb, and they occur invariably in the present tense. The lack of variability suggests that *I wish* and *I hope* are parentheticals. They are distinguished from the verbs in the previous section due to their meaning or function. *I wish* and *I hope* do not mark the degree of certainty with which the speaker asserts the associated proposition; rather, they indicate the speaker's desire. *I wish* and *I hope* can be viewed as deontic modality markers, serving basically the same function as a modal adverb such as *hopefully*.

4. Discourse directives: *see*, *look*, *watch*, and *remember*

Apart from the epistemic and deontic modality verbs considered in the previous two sections, there are four other 'matrix verbs' in our sample that are commonly used as parentheticals: *see*, *look*, *watch*, and *remember*. Table (16) shows that 94 percent of these verbs occur with no overt subject in the imperative form.

(16) Subjects of *see*, *look*, *watch*, *remember*

	1 person	2 person	3 person	lexical noun	imperative	Total
see	16	3	2	-	214	235
look	-	-	-	-	100	100
watch	-	-	2	-	16	18
remember	1	1	-	-	15	17
TOTAL	17 (4.5%)	4 (1%)	4 (1%)	- (0%)	345 (94%)	370

- (17) Nina (first sentences including *see* as 'matrix verb')
- | | |
|---|-----|
| <u>See</u> that monkey crying. | 2;1 |
| <u>I see</u> Becca sleeping. | 2;1 |
| <u>See</u> Becca sleeping. | 2;1 |
| <u>See</u> that go. | 2;1 |
| <u>You see</u> that have a hole. | 2;1 |
| That's a that's a zoo <u>see</u> . | 2;3 |
| <u>See</u> cars going on the train too. | 2;3 |
| <u>See</u> Snoopy have those feet. | 2;3 |
- (18) Adam (first seven sentences including *look* as a 'matrix verb')
- | | |
|---|------|
| <u>Look</u> birdie fly. | 2;5 |
| <u>Look</u> (pause) Mommy (pause) cowboy reach. | 2;6 |
| <u>Look</u> (pause) Daddy put it on a wall. | 2;8 |
| Fell down (pause) <u>look</u> . | 2;9 |
| <u>Look</u> (pause) dat man doing. | 2;10 |
| <u>Look</u> (pause) see new wheel. | 2;10 |
| <u>Look</u> (pause) dat me talking. | 2;11 |
| We (pause) all (pause) <u>look</u> (pause) mail come out. | 2;11 |
- (19) Adam and Sarah (first sentences including *watch* as a 'matrix verb')
- | | |
|--|-----|
| <u>Watch</u> get it. | 2;8 |
| <u>Watch</u> Mommy make it. | 3;1 |
| <u>Watch</u> it jump through the hole. | 3;6 |
| <u>Watch</u> me do it again by myself now. | 4;1 |
| I can make that disappear (pause) <u>watch</u> . | 4;4 |
| <u>Watch</u> push it up and see. | 4;5 |
| This is a valentine (pause) <u>watch</u> . | 4;5 |
| This fits me <u>watch</u> . | 4;5 |
- (20) Sarah and Adam (first sentences including *remember* as a 'matrix verb')
- | | |
|---|-----|
| Mom (pause) <u>remember</u> we went to to Rhode Island? | 2;0 |
| <u>Remember</u> we goed to Peabody School and have... | 2;1 |
| <u>Remember</u> we had some macaroni for supper? | 2;2 |
| <u>Remember</u> we remember we fixed the beans this morning? | 2;2 |
| <u>Remember</u> we had some macaroni for supper? | 2;2 |
| <u>Remember</u> you reading de puzzle (pause) I put it in there? | 3;2 |
| <u>You remember</u> I broke my window. | 4;0 |
| Put it (pause) you have to put it in the barn (pause) <u>remember</u> ? | 4;1 |

See, *look*, and *watch* are common perception verbs, but in our data they serve a pragmatic function: They can be viewed as attention getters that focus the hearer's attention on entities in the speech situation (cf. Tomasello 1992). *Remember* denotes a cognitive activity in its most common meaning, but in our data it functions to qualify the information expressed in the associated clause. It does not serve as the main verb of an imperative sentence. Rather, it indicates that the co-occurring clause

conveys information that is familiar to the interlocutors due to shared experience. Like *see*, *look*, and *watch*, *remember* has a discourse pragmatic function.

5. *Say, tell and pretend*

Finally, there are three other verbs that we need to consider: *say*, *tell* and *pretend*. These three verbs have more semantic weight and a less abstract meaning than all other verbs in our sample. *Say* and *tell* refer to a verbal activity, an act of speaking. *Pretend* seems to have a more abstract meaning. In adult language, *pretend* is commonly used to indicate that somebody acts contrary to his or her beliefs or desires. But children use *pretend* in a more concrete sense, denoting a game in which objects are manipulated in particular ways. In their use, *pretend* means something like 'acting' or 'staging' and is thus not a cognition verb as in adult language (Tomasello 1999).

- (21) Nina (first sentences including *say* as a 'matrix verb') age
- | | |
|---|------|
| <u>She says</u> "justin don't eat it". | 2;5 |
| <u>The cowboy say</u> (pause) "I'm angry at you". | 2;9 |
| <u>He sayed</u> he has something to play with for me. | 2;9 |
| That means <u>peoples say</u> "put the kitty down". | 2;10 |
| <u>She gonna say</u> I have a pretty dress on. | 2;10 |
| <u>The kitty says</u> he wants to come in. | 2;10 |
| <u>He say</u> the alligator's gonna bite him up. | 2;10 |
| You make a rabbit and a bear <u>I said</u> . | 2;10 |
- (22) Nina and Sarah (first sentences including *tell* as a 'matrix verb')
- | | |
|--|------|
| <u>She telled me</u> she for get the doll carriage for me. | 2;10 |
| <u>He telled me</u> (pause) me don't scream again. | 3;0 |
| <u>Tell me</u> (pause) I would like to come to your house again. | 3;0 |
| <u>I'm gonna tell</u> him I wanna go to his house. | 3;3 |
| <u>You tell me</u> that I hate God. | 3;4 |
| <u>I told you</u> I could make a carrot. | 4;2 |
| <u>I told you</u> you are cuckoo. | 4;6 |
| <u>Tell Daddy</u> I'm sick. | 4;10 |
- (23) Adam and Sarah (first sentences including *pretend* as a 'matrix verb')
- | | |
|---|------|
| <u>Let's pretend</u> we taking he all of de clothes off. | 3;4 |
| <u>And pretend</u> we ride a firetruck? | 3;4 |
| <u>We pretend</u> we (pause) the milk is coming. | 3;5 |
| <u>I can pretend</u> too that I the baby dragonfly. | 3;8 |
| <u>Mommy, let's pretend</u> dat we (pause) de animal men (pause) alright? | 4;1 |
| <u>Let's pretend</u> dat we can drive dis car. | 4;1 |
| <u>Hey (pause) let's pretend</u> it went down dere. | 4;10 |
| <u>Mommy, let's pretend</u> it's raining. | 5;2 |

The sentences in (21) to (23) differ significantly from those that we have seen in the previous three sections. The matrix clauses occur in the present AND past tense and frequently include a third person pronoun or a full noun phrase as subject:

(24) Subjects of *say*, *tell*, and *pretend*

	1 person	2 person	3 person	lexical noun	imperative	Total
say	45	14	35	29	21	144
tell	10	2	5	1	7	25
pretend	5	2	1	4	22	34
TOTAL	60 (29.5%)	18 (9%)	41 (20%)	34 (16.5%)	50 (24.5%)	203

Say, *tell*, and *pretend* are the only matrix verbs in our sample that are commonly used with a complement clause that is really embedded. Note, however, that *say* frequently introduces a direct quote, which is not a typical embedded clause. On the contrary, the quoted sentence is usually the main proposition, which is reflected in the fact that the *say*-clause is often postposed, as in the final example in (21). We therefore assume that only some of the sentences introduced by *say* are dependent complement clauses.

Not counting the sentences in which *say* is used with a direct quote, there are 97 clauses in our data introduced by *say*, *tell* or *pretend*. Table (25) shows that 9 out of 14 *that*-complementizers in the entire sample occur with one of these three verbs. This means that *say*, *tell*, and *pretend* are 20 times more likely to occur with a *that*-complement clause than all other verbs in our sample. This is a clear indication that these three verbs have a special status. They are the first 'real' matrix verbs that English-speaking children older than age three commonly use in a bi-clausal construction including a complement clause. All other verbs are always (or almost always) used in a parenthetical matrix clause functioning as an evidential marker, an attention getter, or a deontic modality marker.

(25) The number and percentage of *that* with different matrix verbs

	THAT	ZERO	TOTAL
<i>Say, tell, pretend:</i>	9 (9.25%)	88 (90.75%)	97
Other verbs (including <i>say</i> + direct quote)	5 (0.46%)	1070 (99.53%)	1075
TOTAL:	14 (1.2%)	1224 (98.8%)	1172

6. Complement clauses in adult speech

In the linguistics literature, it is commonly assumed that the parenthetical use of cognition and perception verbs is secondary compared to their use as matrix verbs of (embedded) complement clauses. Thompson and Mulac (1991) have argued, for

instance, that the use of *I think* and *I guess* as evidential markers developed historically via grammaticalization from ordinary matrix clauses. If their analysis is correct, one has to ask why children learn the secondary use of these constructions first? The answer to this question is very simple: Children learn the parenthetical use first because this is what they hear in the speech addressed to them. Table (26) shows that fewer than 3 percent of all complement clauses used by the parents in talking to their children include a *that*-complementizer.

(26) Percentage of complementizers in the complement clauses of the parents

	COMP-clauses marked by <i>that</i>		COMP-clauses marked by zero		Total
Naomi's mother	13	(4.5%)	280	(95.5%)	293
Eve's mother	2	(0.9%)	230	(99.1%)	232
Peter's mother	2	(1.3%)	147	(98.7%)	149
Nina's mother	43	(2.9%)	1459	(97.1%)	1502
Sarah's mother	26	(2%)	1222	(98%)	1248
Adam's mother	36	(3.9%)	899	(96.1%)	935
TOTAL:	122	(2.9%)	4237	(77.1%)	4359

The parents basically use the same kind of sentences that we have seen in the speech of their children. They consist of an evidential marker or an attention getter and an associated clause without *that*. Both the children and their parents do not use embedded complement clauses in this informal speech setting. The absence of a complementizer in the speech of young children is thus expected and does not require an account as suggested by Pinker or Bloom, who compare the utterances of young children with complex sentences that are primarily used in written genres, which preschool children do not know.

7. Conclusion

To summarize, we have argued that the six children whose speech we examined do not use complementizers because most of the sentences that appear to be sentential complements turned out to be independent main clauses. More than 80 percent of the complex sentences in our sample are monoclausal. They consist of a single proposition and a parenthetical phrase that functions as an evidential marker, an attention getter, or a deontic modality marker. There are only three verbs that are commonly used with a 'true' complement clause: *say*, *tell* and *pretend* (all after 3 years of age). These three verbs have a more concrete meaning than all other verbs in our sample. They are the first matrix verbs that children use, which is reflected, among other things, in the fact that they are much more likely to occur with a *that*-complementizer than all other verbs in our sample.

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Tmesis and verb second in Early Irish syntax

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0. Introduction

The syntax of Early Irish largely resembles that of Modern Irish in that VSO order is general at even the earliest attested stages:^{1,2}

- (1) **béoigidir** in spirut in corp in fecht so (Old Irish) Wb. 13d7
 béoigidir.3SG.PRES the spirit the body the time this
 'The spirit vivifies the body now.'
- (2) **beonn** an spiorad an corp an feacht seo (Modern Irish)
 vivifies the spirit the body the time this
 'The spirit vivifies the body now.'

Nonetheless, a number of exceptions to verb-initial order are present in Old Irish syntax, found mostly in poetry and rhyming prose. The most celebrated examples are 'Bergin's Construction' (Bergin 1938, Binchy 1979-80) and the archaic construction known as 'Tmesis' (Greene 1977, Watkins 1963). In recent work (Doherty 1998, Koch 1987), it has been shown that Bergin's Construction reduces to a Verb Second construction (also §2 below). In addition to other evidence, this strongly suggests that Old Irish is a 'residual Verb Second' language, i.e. that at some stage prior to the Old Irish record, Verb Second was productive in Irish.³

Tmesis occurs with compound verbs and consists in placing a phrase in a position intermediate between a preverb and the verbal root, 'splitting' the compound verb apart. In the following example with the compound verb *ad-cí* 'see', the subject is reposed:

- (3)a. **ad-** cruth caín **-cichither** (Tmesis) (Watkins 1963:32)
 ad form fair ad-cí.3SG.FUT.PASS
 'fair form will be seen.'
- b. **ad-cichither** cruth caín (normal order)

This constituent is not limited to subjects: preposed objects and oblique phrases are also attested, reminiscent of Verb Second topicalization.

Tmesis is usually taken to reflect an inherited Indo European V-final word order (e.g. Watkins 1963:35).⁴ The purpose of this paper, however, is to argue that another explanation is possible, in particular, that Tmesis plausibly reduces to a Verb Second residue. The crux of the argument is that preverbs (*ad*, above) are in the C° position and that Tmesis, therefore, reduces to Verb Second in the presence of overt C°, analogous to 'embedded Verb Second' in languages like Yiddish and Icelandic (albeit in root clauses). In addition to providing the basis for an explanation of an otherwise mysterious construction, this proposal has some theoretical implications for the competing analyses of (embedded) Verb Second, discussed in §4 below.

1. Residual Verb Second in Old Irish

1.1. Bergin's Construction

This construction is attested exclusively in poetry and high-register texts (the alliterative prose of 'rhetorics', *rosc* and the rhythmical portions of the laws); see Bergin (1938:197); Carney (1977-9:431). The construction is exceptional in two respects: (i) the verb is non-initial; (ii) it bears special 'conjunct' or 'prototonic' morphology, normally reserved for verbs immediately following C° (§2 below):

- (4) [XP] V_[CONJ/PROTO]... (Bergin's Construction)

This construction reduces to Verb Second in a fairly obvious way. The verb is in second position and is preceded by a syntactic constituent, either a subject, an object or an oblique phrase, respectively:

Verb-medial

Subject-initial

- (5) [Lugaib Luath] **loisc** trebthu trīn tuath
 L. Swift loiscid.3SG.PRET.CONJ dwellings strong peoples
 'Lugaib the Swift, burned the dwellings of strong peoples.'
 (Carney 1977-9:432)

Object-initial

- (6) [BÇngluinn] **gnÿ** glenn gaeth
 bloodless.deed gníid.3SG.PRES.CONJ valleys.GEN wind
 'The wind of the valleys does a bloodless deed'
 (Carney 1977-9:433)

Adjunct-initial

- (7) [srethaib sluag] **soí** Crimthan Coscrach cing
 lines.DAT hosts sóid.3SG.PRET.CONJ C. victorious champion
 céit catha
 100 battles
 'With lines of hosts, C. the Victorious the champion won (turned) a hundred battles.'
 (Carney 1977-9:433)

Verb-final

Subject-initial

- (8) [molad cóir] **canar**
 praise just canaid.3SG.PRES.PASS.CONJ
 'Fitting praise is sung.'
 (Watkins 1963:34)

Object-initial

- (9) [maicni nAilb] **áirmi**
 sons.ACC Alb.GEN ad-rími.2SG.PRES.PROTO
 'You reckon the sons of Alb.'
 (Carney 1977-9:433)

Adjunct-initial

- (10) [*ý* *testaib* *cýraib*] **cengur**
 from witnesses.DAT just.DAT cingid.3SG.PASS.PRES.CONJ
 ‘One proceeds from proper witnesses.’ (Watkins 1963:34)

In addition to this structural evidence, there is morphological evidence for a Verb Second analysis from the use of conjunct and prototonic verbal forms, as discussed in §2 below.^{5,6}

1.2. Interrogatives

There are two main strategies for forming constituent questions in Old Irish, and in both the verb is in second position. In one strategy, the verb appears in the relative form:

- (11)a. *cía* **rannas** *dúib*?
 who rannid.3SG.PRES.REL for.2PL
 ‘Who (is it that) divides for you?’ (GOI 288)
- b. *cid* **as** *dénti*?
 what COP.3SG.PRES.REL to.be.done
 ‘What (is it which is) to be done?’ (GOI:288)

As the verb is in relative form, this strategy is possibly based on cleft sentences, as indicated in the translations above.

The other strategy, which Bergin (1938) claims to be older, differs in that the verb is non-relative. Instead it is in the special conjunct or prototonic form which usually follows overt complementizers (Bergin 1938:205):

- (12)a. *cia* **beir** *búar o thig Temrach*?
 who beirid.3SG.PRES.CONJ cattle from house Tara.GEN
 ‘Who brings cattle from the house of Tara? ...’ (Bergin 1938, 205)
- b. *cia* **acca**?
 who ad-cí.2SG.PRET.PROTO
 ‘Who did you see?’ (Bergin 1938:206)
- c. *co* **·acci** *in slúag*?
 how ad-cí.2SG.PRES.PROTO the host
 ‘How seest thou the host?’ (GOI:290)

While these constructions do not definitively indicate Verb Second, they are at least descriptively Verb Second and are, therefore, plausible instances of Verb Second residues.

1.3. Quotative Construction

Another construction which can be interpreted as a Verb Second residue involves the defective verb *ol* (which does not inflect for person, number or tense):

- (13) **ol** Ísu sòn
say Jesus that
'Jesus said that.'

Wb. 6c30

In addition to verb-initial sentences (13), it is also found in second position, with the quoted clause preposed to initial position, (14):

- (14)a. 'is sochrudiu láam oldó-sa' **ol** coss
COP.3SG.PRES comlier hand than.I say foot
'Hand is comelier than I' says Foot.'

Wb. 12b21

- b. 'anatammresa' **ol** Dia
when-at-reig.1SG.FUT.EMPH say God
'When I shall arise', says God'.

Ml. 31c14

Again, this construction is descriptively Verb Second and therefore a plausible instance of a Verb Second residue.

1.4. Summary

In addition to Bergin's Construction, other constructions in Old Irish syntax are consistent with an analysis as Verb Second residues. While neither interrogatives or the quotative construction discussed above in themselves definitively indicate an earlier Verb Second stage, together with Bergin's Construction, they provide additional support for the proposal that Old Irish is a residual Verb Second language.

In following sections, it will be argued that Tmesis provides further support for the same conclusion. First, however, we must take a closer look at Old Irish verbal morphology and at compound verbs, in particular.

2. Old Irish Verbal Morphology

The verbal morphology of Old Irish is notoriously complex in that simple verbs distinguish two paradigms, varying with syntactic position, i.e. the 'absolute' and 'conjunct' endings, illustrated below for the simple verb *beirid* 'carry' in the present indicative:

- | | | | |
|--------|-----------------|-----------------|-----------|
| (15) | <i>Absolute</i> | <i>Conjunct</i> | |
| Sg. 1. | biru | ·biur | |
| 2. | biri | ·bir | |
| 3. | berid, -ith | ·beir | |
| Pl. 1. | berm(a)i | ·beram | |
| 2. | beirthe | ·berid -ith | |
| 3. | ber(a)it | ·berat | (GOI:360) |

Conjunct endings typically appear on a verb which immediately follows one of the 'conjunct particles', examples of which are provided below, (see GOI:28):

(16)	in	INTERROGATIVE	<i>Conjunct Particles</i>
	ní	NEG	
	co / con	'so that'	
	dia	'if'	
	ara	'in order that'	

Only conjunct endings may appear immediately following a conjunct particle:

(17)	beirid	'carries'	ní-beir (*ní-beirid)	'does not carry'
	gairid	'calls'	ní-gair (*ní-gairid)	'does not call'

Compound verbs (§3 below) also distinguish a special morphological form following conjunct particles, i.e. the 'prototonic' form, which contrasts with the default 'deuterotonic' form. These often differ radically in appearance:

	<i>Deuterotonic</i>	<i>Prototonic</i>	
(18)	as-beir	ní-epir	'does not say'
	ad-cí	ní-aicci	'does not see'
	do-beir	ní-tab(a)ir	'does not give'
	do-gní	ní-déni	'does not do'

As the syntactic distribution of prototonic forms is (more or less) identical to that of conjunct forms of simple verbs, the term 'dependent' is often used as a cover term for conjunct and prototonic forms and 'independent' for absolute and deuterotonic forms.

A number of properties indicates that the 'conjunct particles' are functional heads of the C° class (complementizers). First, they are stressless, presentential, proclitic elements which introduce different clause-types. Second, they host enclitic pronouns:

(19)	ní-m	·charat-sa	Wb.5c6
	NEG-CL.1SG	caraid.3PL.PRES.CONJ.EMPH	
	'They do not love me.'		

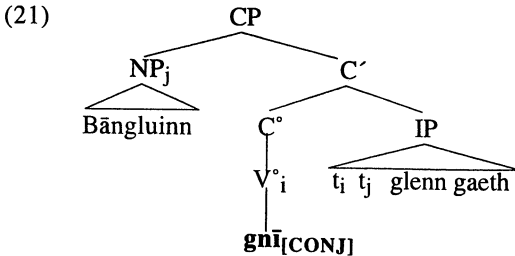
If these are viewed as C° -oriented clitic pronouns which indicate the IP/CP boundary (analogous to similar pronouns in Germanic), then the presence of the conjunct particle in C° is clearly shown (see also Carnie *et al.* 1995).

The basic generalization governing the distribution of dependent and independent forms is straightforward, therefore:⁷

- (20) Dependent verbal forms are associated with clauses which project to CP (C° selects for a +DEP feature on I°). Independent forms are associated with minimal clauses which project only to IP.

This generalization is also supported by the observation that dependent forms appear in clauses with no overt complementizer, but in which CP is projected under usual assumptions, e.g. *wh*-interrogatives (§ 1.2. above) and imperatives (Doherty 1999). Furthermore, it predicts that dependent forms will appear in Verb Second sentences, as under standard assumptions CP is projected in these clauses. Remarkably, this prediction is borne out in Bergin's Construction (§1.1.), in which

the verb uniformly bears dependent morphology, assuming that the Verb Second topic appears in the Specifier of CP:



Finally, this proposal has some implications for the historical debate on the origins of the absolute and conjunct endings, which are traditionally thought to reflect Indo-European primary and secondary endings (Sims-Williams 1984). In particular, the system outlined above entails that conjunct endings must have been general at the previous Verb Second stage, as (almost) all clauses would involve the projection of CP. Although this issue cannot be discussed in any detail here, this hypothesis is consistent with the recent proposals of Sims-Williams (1984), who claims that the absolute/conjunct distinction is not, in fact, a reflex of the Indo-European primary/secondary endings. Rather the absolute endings are a relatively recent innovation, derived from the conjunct paradigm by syntactic processes.

3. Compound Verbs

Before we can investigate Tmesis further, we must first examine compound verbs in more detail. Old Irish makes extensive use of compound verbs. They consist of a verbal root compounded with one or more prepositional preverbs:

(22)	<i>gairid</i>	'calls'	V
	<i>do·gair</i>	'summons'	P·V
	<i>for·cum·gair</i>	'commands'	P·PV
	<i>do·air·n·gair</i>	'promises'	P·PPV

(McCone 1987:1)

There is strong syntactic evidence that compound verbs involve the obligatory projection of CP and, in particular, that the initial preverb occupies the C° position.

First, compound verbs obligatorily take conjunct endings. The verbal root cannot appear in absolute form in a compound verb, (*gairid*, below):

(23)	* <i>do·gairid</i>	'summons'
	* <i>for·cum·gairid</i>	'commands'
	* <i>do·air·n·gairid</i>	'promises'

Second, preverbs are syntactically identical to conjunct particles (C°), in that they also host enclitic pronouns, indicating the presence of the preverb in C°:

(24)	<i>imm·um</i>	<i>-ruidbed</i>
	<i>imm·CL1SG</i>	<i>imm·d·fben.PERF.PASS</i>
	'I have been circumcised.'	

Wb. 23d30

Furthermore, Old Irish lacks a general subordinating C° corresponding to Modern Irish *go* 'that', but instead often uses initial mutation (nasalization) as a marker of subordination:

- (25) *frisalear* *mbís* *qui ar chintech* Sg. 207a3
 fris·acci.3SG.PRES be.3SG.CONS.PRES.REL(NAS) qui for definite
 'He expects that *qui* is used for the definite.'

Note that with compound verbs, however, the nasalization appears to the *right* of the initial preverb:

- (26) *bad* *nertad* *dúib* in so as *n-éirsid* Wb. 25b25
 COP.3SG.IMP strengthening for.2PL this, a-t-reig.2PL.FUT.(NAS)
 'Let this be a strengthening for you, that ye will rise again.'

Assuming that subordinating nasalization is associated with the CP projection, examples such as (26) above clearly indicate the presence of the preverb in C° .

It is not immediately obvious, however, why the preverb should appear in C° . There are two logical possibilities. First, the preverb moves to C° , due to a filled C° requirement, either prosodic (Adger 1998) or syntactic (Carnie *et al* 1995):

- (27) [CP [C° for_j] [IP [I' [I [v_i t_j ·con-gair] [v_P [v t_i]]]]]]]

The second possibility is that the preverbs are merged in C° , entailing an anti-lexicalist approach to morphology:

- (28) [CP for [CP con [IP [I' [I [v_i ·gair] [v_P [v t_i]]]]]]]

Whichever option ultimately turns out to be correct, the syntactic evidence in favor of the preverb being in the C° position is overwhelming.

4. Tmesis

This rare construction is not productive in Old Irish syntax, but is mostly attested in archaic sources (see Greene 1977), precisely the environment in which residual syntax is expected. In tmetic sentences, an argument of a compound verb (a subject, object or oblique phrase) intervenes between the verbal root and the preverb. The following examples illustrate the pattern. Note that unlike Bergin's Construction, many examples of Tmesis appear in relative clauses:⁸

- (29)a. *ad-* [*cruth caín*] -*cichither* (Watkins 1963:32)
 form fair ad·cí.3SG.FUT.PASS
 'Fair form will be seen.'

- b. *ad-* [*mlechti márbóis*] -*moínigter* (AM§18)
 milk-yields great.cattle.GEN ad·maínigid.3PL.PRES
 'Milk-yields of great cattle are maintained'

- (30)a. *ath-* [*mórchathu fri crícha connámat*] -*cuirethar* (AM§15)
 great.battallions against borders enemies ath.cuirethar.3SG.PRES
 '(He) dispatches (great) battalions to the borders of hostile neighbours.'

- b. ónd rí **do-** [rea] **rúasat** (GOI:327)
 from.the king spaces do-fuissim.3SG.PERF
 'From the King who has created (celestial) spaces.'

- (31)a. **immus-** [hua Chorc] **-ebla** (Watkins 1963:32)
 imm.CL-3PL from Cork imm-aigid.3SG.FUT.CONJ
 'He shall drive them from Cork?'

- b. **inde-** coruib **-cuirithur** (Watkins 1963:32)
 in.CL-3PL contracts.DAT in-cuirethar.3SG.PRES.REL
 'Who puts them in with contracts.'

The usual Verb Second topicalization pattern is observed in these examples: a phrase (subject, object, oblique) immediately precedes the verb. Assuming that preverbs are in C°, it follows that Tmesis reduces to Verb Second in the presence of overt C° (the preverb).

In order for this proposal to be tenable, Tmesis (Verb Second) should also be attested with simple verbs preceded by non-lexical complementizers (i.e. conjunct particles). This prediction is clearly borne out. Tmesis is also found with particles such as *ma* 'if', the tense/aspect markers *ro* and *no* and the negative marker *ní*.⁹

- (32)a. **ma** ratha **roiset** Kelly (1986:6)
 if guarantors ro-saig.3PL.FUT.CONJ
 'If guarantors arrive'

- b. **ma ro-** láidib **-lammis** Kelly (1986:1)
 if ro lays.DAT lamaid.1PL.IMPF.SUBJ
 'If we dare in lays'

- c. **nom** Choimmdiu **coíma** Sg. 290.11
 PRT.CL-1SG Lord cóemaid.3SG.PRES.SUBJ.CONJ
 'May the Lord cherish me.'

- d. **ní** mmo guin **-immgabaim** Kelly (1986:2)
 NEG my death imm-imgaib.1SG.PRES
 'I do not shun my death.'

Tmesis (Verb Second) is also found in embedded clauses with the complementizer particle *co* 'so, that, and', Kelly (1986, 6):

- (33)a. **con** Níell **noífether**
 PRT Níell nóebaid.FUT.PASS
 'And [so that] Niell shall be extolled';
- b. **cu** Loígaire lonn **lénfether** inda Táilcend techt,
 PRT Loígaire fierce lénaid.FUT.PASS the Adze-heads come.INF
 'And fierce Loígaire will be grieved by the coming of the Adze-heads.'

- c. forcedar cin co fercach,
attach.PRES.PASS.3SG liability to angry.one

con fri fuili **foichlit[h]er**

PRT against wounds fu-*c*allathar.PASS

'Liability is attached to the angry man, and [so that] heed is paid to wounds.'

- d. **con**-den Daire Drechlethan -**dailfa**

(Watkins 1963, 32)

PRT -3SG Daire Drechlethan *dáilid*.3SG.FUT

'And [so that] D.D will distribute it.'

Although *co* is often translated 'and' by text-editors, it is syntactically a conjunct particle, rather than a conjunction. Note that it hosts enclitic pronouns, as in (33)d. Furthermore, *co* is a stressless proclitic and is the source for the Middle / Modern Irish subordinating *C° go* 'that'. Therefore, it is clearly a *C°* element rather than a conjunction.

4.1. Theoretical Implications

If Tmesis reduces to embedded Verb Second, it is an interesting question which of the two competing analyses of this phenomenon are more appropriate for the Irish data. Initially, it seems that both the 'recursive CP' analysis (e.g. Holmberg 1986) and the 'Spec of IP' analysis (e.g. Diesing 1990) are compatible with Tmesis, assuming the preverb is in *C°*:

- (34) [CP [C **ad** [CP [XP cruth caín] [IP [I' **cichither**]]]]] (Recursive CP)

- (35) [CP [C **ad** [IP [XP cruth caín] [I' **cichither**]]]] (Spec IP)

However, if Spec IP is available as a Verb Second position in tmetc sentences, it is unclear why CP should project in other Verb Second clauses (e.g. Bergin's Construction). Under the generalization about verbal morphology proposed in §2 above, if only IP projects in Bergin's Construction, then the verb should bear independent, rather than dependent, morphology. At this stage in the language, therefore, the evidence favors a recursive CP analysis of Tmesis and embedded Verb Second. If an IP-internal Verb Second position were admitted to the grammar, then the fact that other Verb Second sentences bear dependent morphology would not be predicted.¹⁰

5. Conclusions

In sum, the purpose of this paper has been to show that Tmesis plausibly reduces to a Verb Second residue, for which there is considerable syntactic evidence: (i) Tmesis is largely restricted to archaic sources, in which residual syntax is expected; (ii) the preposed constituent is thematically diverse, as in Verb Second topicalization; (iii) there is strong evidence that the (leftmost) preverb of a compound verb is in the *C°* position; and (iv) Tmesis is also attested with simple verbs preceded by non-lexical *C°* (conjunct particles).

It is important to point out, however, that in almost every example of Tmesis discussed here, the verb is in final position:

- (36) P [XP] V

In the historical literature, this observation is usually taken to reflect an inherited Indo-European V-final order, rather than residual Verb Second (e.g. Watkins 1963:35).¹¹

Unfortunately, Tmesis is a rare construction, however, and very few good examples of it are attested (McCone 1979:19). The data which would definitively distinguish Verb Second from verb-final word order in Tmesis of compound verbs (e.g. examples with both lexical subject and object) seem to be unattested. Therefore, this issue remains essentially unresolved, unless some more decisive examples come to light. Nonetheless, the observation that no attested examples are verb-medial may simply represent a gap in the data. This conclusion is rendered more likely by the fact that some examples of Tmesis with simple verbs and conjunct particles are, in fact, verb-medial, e.g. (32)b above, and so indicate Verb Second over verb-final order.

Notes

¹I would like to thank Andrew Garrett for very helpful comments on this paper. The author alone is responsible for any errors or omissions, however.

²As Old Irish verbal morphology often leads to quite opaque verbal forms, all verbs are glossed by their citation form (third singular present indicative), rather than the English translation. In addition, verbs are boldfaced throughout the text for clarity. Primary sources are cited using standard abbreviations (after *Dictionary of the Irish Language*, Royal Irish Academy), a key for which is provided at the end of the paper.

³Continuous Irish prose is attested from about the beginning of the eighth century. The term 'Early Irish' is used as a cover term for both Old Irish and Middle Irish, which are dated from 700-900AD, and from 900-1200AD, respectively, following the usage of McCone (1994) and Greene (1977). The main sources of reliable Old Irish prose from contemporary manuscripts are glosses and commentaries on Latin texts, which survived in continental Europe and which are known by their medieval locations, e.g. the Würzburg, Milan and St. Gall glosses, published in Whitley Stokes and John Strachan (eds.) *Thesaurus Paleohibernicus* 1901-3. The Würzburg glosses are generally regarded as being the earliest (c. 700AD). A great deal of native literature and other material is also attested. See the introduction to Thurneysen (1946) for further references.

⁴Constructions similar to Old Irish Tmesis are also attested in Hittite, Vedic and Homeric Greek (Watkins 1963: 37-8). These are beyond the scope of this paper, however.

⁵As noted by Watkins (1963:33; 49), there are no (or very few) examples of this construction in relative clauses. Given that Verb Second word order is often excluded from relative environments (e.g. in German), this finding is unsurprising under a Verb Second analysis. See Kelly (1976:xxxvii) for some more possible examples of Bergin's Construction in relatives.

⁶There are also a significant number of examples of Bergin's Construction which are not obviously Verb Second. Instead, the verb appears in third position. See Doherty 1998.

⁷This generalization is actually too strong as it stands because the parallelism in syntactic distribution between prototonic forms of compound verbs and conjunct endings on simple verbs is not exact. For example, in the imperative, which effectively takes the conjunct endings, deuterotonic forms of the verb are used when an enclitic pronoun is present.

⁸It is important to point out that these examples are drawn from the discursive literature on Tmesis (in particular, Greene 1977, Kelly 1976, 1986 and Watkins 1963), not from an independent survey of the Old Irish corpus. Although it is not immediately obvious that the preposed material in (30)a is a single syntactic constituent, this example is included, as it is one of the few examples of a preposed object in the literature on Tmesis.

⁹In Greene's (1977) terminology, 'Tmesis I' is tmesis of a compound verb; 'Tmesis II' occurs with the negative particles and 'Tmesis III' with other preverbal particles, as in (32)-(33).

¹⁰In Doherty (1999), however, an IP-internal Verb Second position is proposed for Verb Second sentences with independent verbal forms, brought to light in Mac Cana (1973).

¹¹Thanks to Andrew Garrett for discussion surrounding this issue.

Abbreviations

- AM = *Audacht Morainn*, Fergus Kelly (ed.), Dublin: 1976.
 GOI = Rudolf Thurneysen, *A Grammar of Old Irish*, Dublin: 1946.
 MI. = Whitley Stokes and John Strachan (eds.), *The Milan glosses on the psalms, Thesaurus Paleohibernicus 1* (1901), Cambridge, 499-712.
 Sg. = Whitley Stokes and John Strachan (eds.), *Glosses on Priscian (St. Gall), Thesaurus Paleohibernicus 2* (1901), Cambridge, 49-224.
 Wb. = Whitley Stokes and John Strachan (eds.), *Glosses on the Pauline Epistles, Thesaurus Paleohibernicus 1* (1901), Cambridge, 499-712.

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The magic of the moment: What it means to be a punctual verb

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0. Introduction

Lexical-semantic theories often suffer from the imprecision of the concepts they employ in their representations. This leads to a considerable decrease in empirical strength by inviting circular argumentation. A demonstration of how to go about overcoming such shortcomings will be carried out, using the lexical semantic concept of 'punctuality' as an example. Firstly, I will argue that the distinction between punctuality and durativity plays a crucial role for the explanation of a wide range of syntactic and semantic phenomena. Secondly, I will discuss methodological issues involved in arriving at a more precise definition of punctuality and, finally, the notion of 'punctuality' will be given an interpretation on the basis of extensive consultation of research on cognitive time concepts.

1. Linguistic evidence for a notion of 'punctuality'

Among the linguistic constructions whose grammaticality is based on a punctuality restriction is the PP headed by *an* in German, which alternates with an accusative object.¹ The construction is restricted to verbs that express a change of state, i.e., refer to an event with a result state. Among these, only durative verbs like *schreiben* 'write', *bauen* 'build', *nähen* 'sew', but not punctual verbs like *sprengen* 'blast, blow up', *brechen* 'break', *knicken* 'fold' are admissible:

- (1) sie schrieb einen Roman / an einem Roman [durative; change of state]
'she wrote / was writing a novel (literally: "wrote at a novel")'
- (2) sie quälte ihren Pudel / *an ihrem Pudel [durative; no change of state]
'she teased / was teasing her poodle'
- (3) sie sprengte die Brücke / *an der Brücke [punctual; change of state]
'she blew up / was blowing up the bridge'
- (4) sie kniff ihren Freund / *an ihrem Freund [punctual; no change of state]
'she pinched / was pinching her friend'

Adverbials denoting a span of time (e.g., *in two hours*) usually combine with verbs referring to durative, resultative events, as in (5). Punctual verbs with a result state do not allow these adverbials (6) unless a preceding event is presupposed as in (7), where it is presupposed that Rebecca had been moving towards the summit:

- (5) Rebecca wrote the paper in six weeks
- (6) ??Rebecca noticed the painting in five minutes

- (7) Rebecca reached the summit in two hours

Durative adverbials (e.g., *for two hours*) which usually combine with non-resultative durative verbs (8) evoke an iterative interpretation when combined with punctual verbs (9). This even seems to hold when the temporal adverbial denotes an extremely short period of time (10):

- (8) she read / was reading for a couple of minutes
 (9) she knocked / was knocking for a couple of minutes (→ repeatedly)
 (10) she hopped / was hopping for two seconds (→ repeatedly)

While all (non-stative) durative verbs allow the progressive form, there are occurrence and interpretation restrictions for punctual verbs: Non-resultative punctual verbs occur in the progressive on an iterative interpretation (11). Punctual verbs that presuppose a preceding event can occur in the progressive, too, as in (12) where it is presupposed that Rebecca participated in the race or was nearing the completion of her journey; in these cases, the reference time is the time of the preceding event. Punctual verbs that do not belong to these two classes, especially those that lead to cognitive states, do not allow the progressive (13):

- (11) Rebecca was pinching Jamaal / was hopping (→ repeatedly)
 (12) Rebecca was winning the race / was arriving
 (13) ??Rebecca was noticing that / ??that was astonishing Rebecca

Punctuality is among the conditions that determine the occurrence of the expletive reflexive pronoun *sich* with those intransitive verbs that take part in the causative-inchoative alternation in German. According to Oya (1996), verbs that refer to punctual events (*zersplittern* 'to shatter', *abreißen* 'to tear off', *starten* 'to start'), to events that originate naturally (*schmelzen* 'to melt', *gären* 'to ferment'), or to movements of an object (*fahren* 'to drive', *rollen* 'to roll', *segeln* 'to sail') do not occur with the reflexive pronoun:

- (14) der Zweig biegt sich / *der Zweig biegt 'the twig bends'
 (15) *der Zweig bricht sich / der Zweig bricht 'the twig breaks'

Punctual verbs do not occur as complements of aspectual verbs like *to finish* and *to start* as in (16) unless they can get an iterative interpretation as in (17) which is usually available for non-resultative ones:

- (16) *the vase started / stopped breaking
 (17) he started / stopped hopping (→ repeatedly)

Thus, 'punctuality' does play an important role in the explanation of a wide range of different lexicon-driven syntactic and semantic phenomena. It accounts for valence phenomena (linking) like the *an*-construction and the reflexive pronoun with inchoative verbs, it serves to express selectional restrictions of aspectual adverbials, it explains grammatical categorial restrictions like the occurrence of verbs in the progressive, and it is involved in interpretation restrictions such as the iterative interpretation of verbs of certain classes in certain contexts.

2. Methodological problems in lexical semantics

2.1. Avoiding circularity

Lexical semantic theories, in particular decompositional or thematic role based theories of verb semantics, usually proceed by first describing certain syntactic properties of verbs such as particular subcategorization frames or valence alternations. Then they introduce semantic notions like 'agent' or 'cause' which are supposed to explain the syntactic patterns but are kept very vague in meaning. It is implicitly or explicitly suggested that the linguistic phenomena justify the semantic features or predicates employed in the lexical-semantic representations.

This procedure is the source of extensive circularity in a majority of lexical-semantic theories, in the sense that the syntactic phenomena tend to shape the semantic representations which in turn are what is supposed to "explain" the syntactic phenomena.² It should be clear that linguistic data can justify a rule like (18), but they do not justify a lexical entry that expresses something like (19).

(18) Lexical rule:

Verbs that lexically imply that the events they refer to are punctual do not occur with the *an*-construction.

(19) Lexical entry:

It is implied by *to hop* that the events it refers to are punctual.

The proposition in (19) is only justified by the states of affairs that hold in the world we are talking about, i.e., it is justified if and only if all the events we refer to with the verb *to hop* are punctual. And to make this a checkable condition we have to know what is in fact meant by 'punctual'.

To make the meaning of our lexical representations more precise and thereby increase the empirical value of our theory we have to answer three questions: I) What is the logical type of the predicates in our representations? II) What are the truth conditions of these predicates? III) What do the individual variables in our representations stand for?

Let us assume a Davidsonian event semantics framework in which verbal projections express relations between events and event participants and let's further assume we want to express that it is part of the meaning of the verb *to*

hop, $\lambda x \lambda e [\text{HOP}(x, e)]$, that it is punctual and involves an agent. Then, firstly, we have to determine what the logical type of the predicates PUNCTUAL and AGENT is. Is PUNCTUAL a first-order predicate ranging over events, PUNCTUAL(*e*), or is it a second-order predicate PUNCTUAL(HOP)? Is AGENT a relation or a function between events and thing-individuals? Or is it a relation between predicates and arguments? Secondly, we have to state as precisely as possible the conditions under which a proposition like PUNCTUAL(*e*) or AGENT(*x, e*) is true, and, thirdly, we have to determine what exactly the sorted individual variables such as *e* and *x* stand for by giving identity criteria for these sorts.

In the remainder of the paper I will pursue the first two questions with respect to the predicate 'PUNCTUAL'.

2.2. The psychology of time

It has of course long been noticed that even 'punctual' events, as expressed by *to break*, *to jump*, *to blast*, *to knock*, etc. have a certain duration; they are not punctual in the sense of temporal logic. But what does 'punctuality' refer to if not to logical instants? Attempts to characterize the notion of punctuality can be traced back to the early research on Aktionsarten in the last century.³ Pott (1859:178) assumed that with aspectual verb pairs in Slavic and pairs in German like *sitzen* 'to sit' / *sich setzen* 'to sit down' one can discover "[...] that in these pairs reference to the same kind of temporal property is made, which involves—to illustrate the matter briefly and aptly by borrowing a spatial metaphor—whether they are thought of as being p u n c t u a l in their duration (which, of course, is impossible in the strongest mathematical sense and therefore only relatively true) or as being l i n e a r"⁴.

This does not differ much from definitions in more recent work on aspectuality. According to Platzack (1979:93), punctual events are those, "that do not last in time (or rather, are not conceived of as lasting in time)", and Moens (1987:102) claims that "[...] processes and culminated processes can be »compressed« into points. This [...] does not mean that they cease to have a temporal duration, but rather that their internal structure is no longer of importance."

It might be asked if it makes much sense to pretend that we conceive of short events as having no duration or to assume that punctuality is not a property of the event described by the punctual verb but rather a property of the verbal predicate to present events as having no duration. Concrete events are characterized by some kind of change over time⁵. Thus, duration is essential to these events. Conceiving of events as having no duration is like stripping events of their eventhood. In particular, these approaches do not explain why only some verbs can refer to events such that they "are not conceived of as lasting in time" while others cannot.

Apart from these considerations, the question arises why languages—as they obviously do—distinguish between events that last for a very short period of time and those that last a little longer. Semantic distinctions that prove to be relevant for numerous syntactic and semantic phenomena like ‘agentivity’, ‘causation’, ‘will’ are rarely completely arbitrary with respect to our cognitive architecture: they usually denote central cognitive concepts. Thus, it can be expected that the distinction between short and long events has a cognitive basis, too. In the following I will have a look at some psychological research on the cognition of time.

Among the temporal units that have proven to be relevant for human cognition and which involve a very short period of time is an interval of about 2 to 3 seconds which seems to be responsible for our “feeling of nowness” (Pöppel 1978:716) and therefore has been called the ‘psychological present’ (Stern 1897), the ‘conscious present’ (Pöppel 1972), the ‘subjective present’ (Pöppel 1978), or the ‘auditory present’ (Turner and Pöppel 1983:298). For the purpose of the paper at hand I will refer to this interval as the ‘cognitive moment’ and in the following sections I will present the data that support the assumption that this interval is of crucial relevance for perception, speech, and behavior.

3. ‘Punctuality’ in cognitive psychology

3.1. Evidence from perceptual psychology

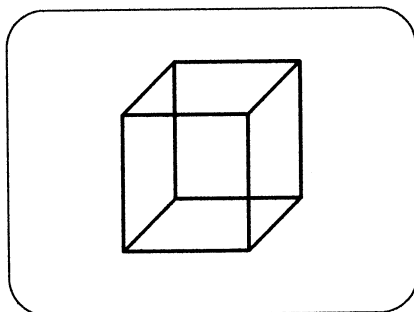
Certain phenomena that arise in connection with the perception of acoustic or visual stimuli involve an interval of about 2 or 3 seconds. A classic example concerns errors in estimating the length of intervals. When confronted with the task of reproducing acoustic or visual stimuli, subjects reproduce shorter stimuli as longer than the original stimulus and longer stimuli as shorter. The indifference interval, which is the duration that is reproduced correctly, was observed to be between 2 and 3 seconds (Pöppel 1972:226f, 233).⁶

A second phenomenon is related to the perceptual grouping of acoustic events: A metronome produces sequences of beats of exactly the same loudness and exactly the same distance to each other. But listening to a metronome, we hear a rhythm by placing a weight on every other beat. Two beats are perceived as a unit such that a “tick-tock” effect occurs. Two observations have been made with respect to this phenomenon. First, it has been noticed that it is equally possible to place a weight onto every third or fourth beat, thereby creating larger units, but there is an upper temporal limit in creating acoustic gestalts of this sort (cf. Stern 1897, Pöppel 1985:55). This temporal limit also shows up if we increase the distance between the beats. Second, Wundt (1911:6) observed that a sequence of beats is no longer perceived as a unit if the duration between two beats exceeds 2.5 seconds.

The third phenomenon involves ambivalent visual patterns that allow two perceptual readings like the Necker cube in (20), of which the lower left square can be seen as the front, or the back side of the cube. Once we have recognized

both readings we can willfully accelerate the oscillation speed and switch from one reading to the other in a split second. But if we try to slow down the oscillation speed, i.e., if try to stay with one perspective, we will notice that after a couple of seconds the perspective switches unintentionally.⁷ The upper limit for a constant perspective on the cube lies around three seconds with most subjects (Pöppel 1985:58).⁸

(20) The Necker cube:



Fourth, there is another less well investigated phenomenon that might fit into the picture, namely that of the oscillation of extremely faint sounds. Urbantschitsch (1875) observed that a weak auditory stimulus is only heard periodically. When a watch is held some distance from the ear such that its ticking is barely audible, the perception of the ticking disappears and reappears in a rhythm of a couple of seconds. The same effect has been observed for different sources of sound waves.

Finally, more evidence for the subjective present can be found in musical rhythms, where Pöppel (1985:86) claims to have shown that the tempo of music in the classical-romantic tradition is related to a three-second interval.

3.2. Evidence from speech production

More evidence for the cognitive relevance of an interval of around 3 seconds comes from speech production, especially the recitation of poetry. Turner and Pöppel (1983) investigated the rhythm of pauses in spoken poetry. Defining a "LINE" as a metrical unit preceded and followed by a distinct pause, which "divides the verse into clearly identifiable pieces" (Turner and Pöppel 1983:286), they observed that the vast majority of LINES take between 2 and 3 seconds to recite. The exact results can be found in (21), based on a sample of 200 poems (Turner and Pöppel 1983:288), where most of the LINES with a length of more than 4 seconds contain a caesura.⁹

(21)	LINE-length of under 2 seconds	3%
	LINE-length of 2-3 seconds	73%

LINE-length of 3-4 seconds	7%
LINE-length between 4 and 5 seconds	17%

The poems stemmed from different languages. Those from Latin, Greek, English, Chinese, Japanese, French, and German had been recorded and measured while the results from those from Ndembu (Niger-Congo), Eipu (Papua), Spanish, Italian, Hungarian, Celtic and Slavic languages had been gained by syllable count alone assuming an average syllable length of $\frac{1}{2}$ s for tonal and $\frac{1}{4}$ s for non-tonal languages (Turner and Pöppel 1983:286).

Results without significant differences have been obtained for languages with very different accent, tone, metric and syntactic systems. Furthermore, Turner and Pöppel (1983:288) found that the LINE as a fundamental unit is nearly always a semantic, syntactic, and rhythmic unit. The length of the LINES cannot be explained by requirements on breathing (Turner and Pöppel 1983:286). Turner and Pöppel (1983:306) conclude that the three-second LINE is a cultural universal related to the three-second auditory present.

According to Pöppel (1985:71), spoken language in general tends to scatter pauses into the articulatory stream every three seconds or so. They are conceived of as planning pauses that are not required for air intake but serve to plan the next part of an utterance. The independence of speech rhythm from breathing requirements has been revealed by other researchers, too. We do breathe when we pause but the function of the pause is to separate conceptual units (cf. Handel 1989:426). Turner and Pöppel (1983:296) assume that the interval of 3 seconds aids the synchronization of the activities of the speaker and the hearer. The speaker uses the pause after the interval for planning the finer structure of the next part of the utterance by making syntactic and lexical decisions, and the hearer needs the pause to integrate what he has heard during the last interval.

3.3. Evidence from behavioral studies

The temporal structure of short-term human actions was the subject of two investigations carried out by Schleidt (1988) and Feldhütter (1989). Schleidt analyzed filmed scenes of people of different cultures (Trobriand islanders, Europeans, Yanomami Indians, Kalahari Bushmen) performing unstaged simple repeated actions or sequences of short actions involving finger, hand, and arm (e.g., waving, pointing, clapping hands, poking, shaking, knocking, hitting, stroking, throwing, tickling), foot and leg (e.g., kicking, hopping, stomping, crawling), head (e.g. nodding, shaking), mouth (e.g., kissing, licking, blowing), and trunk (e.g., rocking, wobbling). The mean length of the single actions was around half a second, where the length of the episodes that consisted of single repeated actions or complex sequences of non-repetitive actions was between 2 and 3.5 seconds in more than 80% of the 255 cases.¹⁰ After this period the actions either stop or the action pattern alters. No significant differences could be found with respect to culture, sex, age, or the parameter of whether the action was

performed alone or during social contact. The results show "that persons obviously act in 'behavioral units' which last about 3 s" (Schleidt 1988:74). These units are interpreted as reflecting a universal human time constant that is due to a time-regulating mechanism in the central nervous system.

Another cross-cultural investigation of short-term behavior of Yanomami Indians, Trobriand islanders and the Southwest African Himba yielded similar results.¹¹ Feldhütter (1989) analyzed filmed scenes of movement units in work behavior (1091 cases, e.g., chopping, hitting, peeling, wiping, rubbing, cutting, stirring, sewing) and actions consisting of hand-body contact (451 cases, e.g., scratching, pinching, touching or rubbing a body part). A movement unit is defined as an action from its beginning either until its end (e.g., the movement of the hand and fingers stopped), until the beginning of a new action (e.g., after having peeled a piece of fruit the peel is thrown away), until the same action is performed in another place (e.g., the peeling of the fruit is continued at a different part of the fruit), or until the movement pattern of the action itself changes (e.g., the peeling movement is continued by using the index finger instead of the thumb). The same holds for the approximately 20% of the represented episodes that were repeated actions, where a movement unit consists of a sequence of at least three similar, uninterrupted actions and is separated from other movement units by the above-mentioned criteria.

The evaluation of the data revealed that only 7% of the units exceeded the duration of 4 seconds. The majority of movement units had a length between 2 and 3 seconds, where the units consisting of repeated actions were slightly longer (median length 2.9 s) than those consisting of single, non-repeated actions (median length 2 s) (Feldhütter 1989:15). No significant differences could be found with respect to culture, sex, age, the distinction between work behavior and hand-body contact, the parameter of social interaction, or the question whether the agent pays attention to the action or not. Furthermore, it could be shown that no functional requirements of the work process were responsible for the temporal structure of the actions. For example, a girl who planed a piece of wood planed 4 times (2.4 s), stopped, started again and planed two times (1.6 s) before getting stuck, starting over again, and then planing 6 times (2.6 s) (Feldhütter 1989:21). The length of the first and third sequence, which were inside the crucial interval, was neither due to an external interruption nor required by any functional aspect of planing. The temporal structure of these sequences is completely endogenously determined.

3.4. The 'cognitive moment'

In a discussion of data from perceptual psychology, involving the three-second interval, Pöppel (1985) assumes that the "feeling of nowness" is a subjective reality determined by a brain mechanism that integrates successive events into a perceptual gestalt whose duration is restricted to an upper limit of about three seconds (Pöppel 1985:53). This gestalt creates something like a window of

consciousness. The conclusion Stern (1897:334), Pöppel (1985:54), and others have drawn is that the present is more than just a borderline between past and future, or, as James (1918:609) puts it, it "is no knife-edge, but a saddle-back, with a certain breadth of its own on which we sit perched, and from which we look into two directions into time." The data from behavioral psychology furthermore suggest that not only the perception of events but also the structuring of actions is based on the cognitive moment.

Several interesting features are connected to the cognitive moment: The experiments with the oscillating ambiguous pattern show that only one content at a time is present in the window of consciousness. We don't see both patterns of the Necker cube simultaneously, nor do we see an amalgamation of both patterns (Pöppel 1985:61). Furthermore, the experiments with ambiguous patterns, metronome beats and action patterns reveal that the crucial 3 seconds are an upper, not a lower limit. Shorter action and perception gestalts are possible (Pöppel 1985:63, Feldhütter 1989:31). This is different for longer stimuli: The experiments designed to determine the length of the indifference interval show that in underestimating the length of stimuli which exceed the limit of 3 seconds, subjects try to perceptually press these longer events into the limits of this interval (Pöppel 1985:62).

Turner and Pöppel (1983:297) hint at a general function for the cognitive moment. Different information takes different amounts of time when processed by different perceptual media. The cognitive moment allows the cortex to collect and integrate all the information into coherent information bundles available to our conscious experience. In that every three seconds the old information in this window of consciousness is replaced by new information, the stream of consciousness is successively created.

4. 'Punctuality' and the lexicon

4.1. Punctual events

The perception of events is guided by the cognitive moment and our own actions are structured by the same three-seconds interval. Thus, it seems justified to assume that our general cognitive concept of events involves a classification into punctual and durative events. Simple or complex events are conceived of as punctual if their duration does not exceed an interval of around three seconds and they are conceived of as durative if they do. Since the distinction between 'punctuality' and 'durativity' is a central cognitive concept it is not surprising that the reference to punctual events on the one hand and durative ones on the other hand is—as has been shown in section 1—mirrored by the different semantic and syntactic behavior of the expressions.

By postulating the cognitive moment as the basis for our conception of punctuality I do not want to claim that there are never events that are punctual in the sense of temporal logic. Likely candidates for expressions related to logical

instants are those like the following, which refer to events that are not perceptible but come into being by sheer convention:

- (22) the contract came into force on Tuesday, twelve o'clock sharp
- (23) the armistice began exactly at twelve o'clock

According to the given definition these events are subsumed under the concept of punctuality since they do not exceed the crucial interval. As far as the data discussed in section 1 are concerned, a separation of logically punctual events from psychologically punctual events seems unnecessary.

4.2. Punctual verbs

So far we have seen what it means for an event to be punctual. Now, in what sense can we talk about verbs as being punctual, i.e., conceiving of punctuality as a second-order property of verbal predicates? An answer that suggests itself would be to say that those verbs are punctual which always refer to punctual events, like *to hop*, which can be expressed by a meaning postulate like (24):

- (24) $\forall x \forall e [\text{HOP}(x, e) \rightarrow \text{PUNCTUAL}(e)]$

But two things have to be taken into consideration. Firstly, there are some verbs which can refer to punctual or durative events, i.e., to events whose duration is either inside or outside the limits of the cognitive moment:

- (25) the ball rolled along the sideline (for two / twenty seconds)
- (26) she screamed (for two / twenty seconds)

Secondly, the definition of punctuality is based on a cognitive category that largely depends on properties of our perceptual apparatus and our short-term behavior. Of course, not all events we refer to are concrete events we can immediately perceive, or basic human actions. But I will assume that the basic readings of verbs are those readings in which they refer to concrete events that are—to put it this way—epistemologically accessible by immediate perception. That means that their existence and their properties can be checked by just perceiving them.

Besides the basic reading most event verbs have metaphorical readings, too, such that some of the semantic structure of the basic reading carries over into the metaphorical reading. With respect to the punctual-durative distinction for metaphorical readings three cases can be observed¹²: I) The temporal structure of the basic reading as in (27) or (28) is completely preserved as in (29) and (30), both of which still refer to events that are punctual. II) Part of the temporal structure can be preserved as in (31), (32), or (33), where we cannot determine the temporal boundaries of the events referred to very precisely, but probably would not want to say that the events last less than three seconds. The structure is insofar

preserved as the expressions refer to changes that are relatively short and sudden compared to the long lasting steady situation before; the temporal structure is mapped onto a different scale. III) Finally, there are cases where the temporal structure is not carried over into the derived reading, as in (34). Breaking a promise by not doing something does not take any time; it probably does not refer to an event at all.

- (27) Ron broke the vase
- (28) Rebecca broke her leg
- (29) the submarine broke (through) the surface
- (30) at last Rebecca broke the silence
- (31) this year Jamaal broke his close ties with the Detroit Pistons
- (32) Rebecca managed to break the deadlock
- (33) this decision could make or break her career
- (34) Rebecca broke the promise (by never giving Jamaal any flowers)

In conclusion, punctual verbs are verbs that refer to punctual events in their basic reading, i.e., verbs whose basic reading is connected to a meaning postulate as in (24). Thus, *to break* (27-34) is a punctual verb but *to roll* (25) and *to scream* (26) are not. But why do we need the notion 'punctual verb' at all? The syntactic phenomena discussed in section 1, such as the *an*-construction and the reflexive pronoun with inchoative verbs, are solely based on the temporal information connected to the basic reading. Even in non-basic readings as in (35) where we don't want to say that the expression refers to a punctual event, as *zerbrechen* 'to break' does in its basic reading, we still cannot add a reflexive pronoun. Similarly, (36) does not refer to an event that is punctual in a strict sense, but the *an*-construction is nevertheless impossible.

- (35) die Beziehung zerbrach (*sich)
'the relationship broke up'
- (36) sie spaltete die Partei / *an der Partei
'she split the party / was splitting the party'

Thus, the rules expressing the syntactic distribution phenomena are not immediately based on the actual reading of the verb and its reference to punctual vs. durative events but on the answer to the question of whether the verb is a punctual verb, i.e., refers to punctual events in its basic reading.

Notes

¹ For references and a more extensive discussion of the following phenomena cf. Engelberg (1998:64ff, 1999).

² For examples cf. Engelberg (1998).

³ In Engelberg (1999) the research history is presented in more detail.

⁴ My translation of: "[...] in beiden Rücksichtnahme auf eine gleiche Eigenschaft der Zeit, nämlich danach, ob sie - um die Sache durch ein vom Raume entlehntes Bild in Kürze und schlagend zu veranschaulichen - ihrer Dauer nach p u n k t u e l l gedacht wird (was freilich in strengster mathematischer Strenge unmöglich und demnach nur beziehungsweise wahr), oder l i n e a r."

⁵ Cf. Engelberg (1998:216ff) for a lengthy discussion of the ontology of events.

⁶ A number of experiments have been carried out by different researchers which yielded partly different results. Pöppel (1978) gives an overview and discusses the extent to which the different results were due to the setup of the experiments and the theoretical frameworks employed.

⁷ It is sometimes possible to overcome this effect by fixing one's eyes on a certain edge of the cube and thinking of something else.

⁸ Ditzinger and Haken (1989) give an overview on the research on this phenomenon and show that the length of the oscillation interval depends to a certain degree on the kind of pattern, on a possible dominance of one of the patterns, and on the length of the habituation time.

⁹ It's not quite clear why these lines have not been counted as two LINES in the first place which would correspond to the previously mentioned definition of 'LINE'.

¹⁰ Most of the other cases were significantly longer episodes (5 - 55 seconds). These episodes are explained as stereotyped movements that serve a regulatory biophysiological function in that they reduce the heart beat and thereby calm down the system.

¹¹ A summary of Feldhütter's (1989) dissertation can be found in Feldhütter, Schleidt and Eibl-Eibesfeldt (1990).

¹² Some of the following example sentences have been adapted from the Collins COBUILD English Language Dictionary.

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Roles and non-unique definites

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1. Introduction¹

The basic meaning of the definite article in English has often been analyzed as unique identifiability, that is, *the* indicates that the speaker presumes the addressee is able to pick out the unique referent of the definite description (Chafe 1994, Givón 1984, Gundel et al. 1993, Hawkins 1991, Hintikka and Kulas 1985, Kadmon 1990, Lambrecht 1994, Löbner 1985, Russell 1905, Searle 1969, inter alia). Nevertheless, researchers have long known about a class of NPs with *the* that seems to pose a serious difficulty for any theory which claims that uniqueness is a general characteristic of definite NPs. Several examples of this sort are shown in (1):

- (1) a. Towards evening we came to **the bank** of a river.
[from Christophersen 1939:140]
b. The boy scribbled on **the living-room wall**. [from Du Bois 1980:232]
c. Switch **the light** on. [from Löbner 1985:307]

The article is perfectly felicitous in each of the sentences in (1) even though rivers have two banks (1a), most living rooms have four walls (1b), and many rooms have more than one light (1c). These definite descriptions appear to be exceptions to the uniqueness requirement associated with *the* because they do not refer to uniquely identifiable individuals.

In this paper, however, I will argue that definite descriptions such as the ones in (1) do in fact refer uniquely and thus, do not represent counterexamples to the uniqueness requirement. I agree that these NPs do not refer to unique individuals. My claim is that they refer to unique 'role' functions rather than to any of the multiple potential individual instantiations ('values') of the roles. The paper is structured as follows: in section 2, I summarize the findings of other studies that treat these sorts of definite descriptions. In section 3, I present the analysis of the data in terms of (unique) roles within frames and show that these NPs do not constitute a special class of definites—as sometimes claimed (e.g. Kadmon 1987:187)—since the use of *the* to introduce roles is actually quite common. In the final section, I briefly suggest that although NPs such as (1) are not ultimately a problem for uniqueness theories of definiteness, other evidence does exist against the systematic uniqueness of definite descriptions.

2. Other Studies

Several researchers point to the existence of facts such as (1) but do not offer a solution to the questions they raise for uniqueness.² Christophersen (1939:140)

even calls them "strange" and talks about "the illogicality of the *the*-form" in these cases. Other studies, however, make insightful contributions towards the analysis of these facts (although none gives a completely satisfying account). Du Bois observes that the referents of these definite NPs "are often those which come in small symmetrical sets as part of a well-defined frame" (Du Bois 1980:233), e.g. four walls typically figure in the 'room frame' (1b). This observation is supported by the fact that some of the most frequently cited cases of apparently non-unique definites involve terms for body parts, which often come in small, well-defined sets that are part of the 'body frame': *Lee kissed Pat on **the** cheek*; *The dog bit him on **the** finger*; etc.³ The examples below in (2), (7), (9) and (10) provide evidence that it is not necessary for these referents to come in small symmetrical sets; however, my own account of the data, in section 3, will follow Du Bois in making crucial use of frames. Du Bois also makes the important point that the definite NPs in (1) are used in contexts where the exact identity of the particular referent within the small set does not matter. A speaker would only utter the sentence in (1b) when it makes no difference to the addressee which one of the four walls was scribbled on.

Du Bois treats the NPs in (1) as referring to particular, though non-uniquely identifiable referents (whose complete identity is considered superfluous). In contrast, Löbner (1985:304-307) argues that sentences such as those in (1) refer only to "abstract situations" and that the definite NPs in question are "not really referential", but rather, generic (Löbner 1985:304). In a sentence such as (1c), *Switch the light on* (spoken, say, in a room with three lights), *the light* refers not to a concrete (non-unique) token but rather to an abstract (unique) type. Like Löbner, Ojeda (1993) maintains that these definite NPs do not contravene the uniqueness requirement. But Ojeda (1993:247) rejects Löbner's notion of an abstract situation, proposing instead that a sentence such as *John was hit on the arm* is "not about any one of John's two arms, but rather about John's unique *group* of arms" (Ojeda 1993:249; italics in the original). I agree with both Löbner and Ojeda that the definite NPs in (1) do not directly refer to particular individual entities, but it seems incorrect to analyze these NPs as having generic reference or as referring to groups. Ojeda himself notes that it would not be natural to say *John was hit on the arm* if, in fact, John had been struck on both arms, i.e. on the group of arms.⁴ I will also argue in the next section that the notions of 'abstract situation' and 'group' do not supply the proper constraints for predicting which NPs with *the* can (or cannot) be used felicitously in a manner similar to the definites in (1).

One of the most detailed analyses of these apparently non-unique definite NPs is presented in Birner and Ward (1994). Unlike Löbner and Ojeda, Birner and Ward (1994:93) claim that sentences such as *Could you please open **the** window?* (uttered in a room with three equally salient windows) and *Take **the** elevator to the sixth floor* (uttered by a hotel concierge to a guest in a hotel with four elevators) do violate the uniqueness requirement. They conclude that "uniqueness is not a necessary condition for the felicitous use of the definite [article]" (Birner and Ward 1994:95). In effect, they recast Du Bois' analysis in terms of Relevance theory,

arguing that the definite article may be used to refer to a non-unique referent as long as there is "no relevant basis for differentiating it from other referents denoted by the NP" (Birner and Ward 1994:101). Thus, at a table containing four pitchers of milk, it is possible to say *Please pass **the milk*** (their example 10) as long as no individual container of milk can be distinguished from any other container in a way that might be relevant for the purposes of the exchange, i.e. as long as it makes no difference which pitcher of milk is passed. If the pitchers of milk can be distinguished in a way that might be relevant—for example, if two contain whole milk and two contain skim milk—then the non-unique definite becomes infelicitous (Birner and Ward 1994:97).

Birner and Ward (1994:97-98) also attempt to specify the types of definite descriptions that can be used with non-unique reference. They suggest that these uses generally occur with NPs whose heads are mass nouns (*the milk*) or plural nouns, e.g. *Pass **the rolls*** (which can be used to request a single basket of rolls at a dinner table containing three—undifferentiated—baskets of rolls). Furthermore, they claim that non-unique definite descriptions with singular countable head nouns can only occur in a highly restricted class of cases, namely, NPs referring to locations, e.g. *I spent a week in **the hospital***; *I need to go to **the bank***. In support of this claim, they note that in the aforementioned dinner table scenario it would not be appropriate to say *Pass **the roll***, using a count noun in the singular form, even if the speaker just wants one roll (because a roll, presumably, is not a location).⁵

Let us examine some of Birner and Ward's arguments more closely. First, although non-unique definite descriptions with singular count nouns do commonly refer to locations, it is easy to find examples that do not. For instance, NPs involving kinship terms are standard cases in the literature on exceptions to uniqueness, e.g. *He was **the son of a poor farmer*** (Löbner 1985:304; also cited in Kadmon 1987:182). This sentence does not imply that *He* was the only son of the farmer (other kinship terms can be found in note 2 and in example 3 below). Consider also the data in (2):

- (2) a. No problem, I'll get **the maid** to do it.
- b. Waiter, I demand to see **the menu**!
- c. I read it in **the paper** this morning.

The sentence in (2a) may be used in either a hotel or a home in which there are several maids; (2b) would be felicitous in a situation where both the speaker and the waiter can see an entire stack of menus on the counter; and (2c) is possible even if the speaker reads several newspapers every day. However, none of these nouns designates a location.

Next, although Birner and Ward's argument that the various potential referents of a non-unique definite description must not be relevantly differentiable seems true in most cases, this requirement may not be strictly necessary, as suggested by (3):

- (3) In January, Patricia Arquette hit the big time ... And Arquette, **the granddaughter** of comic Cliff Arquette and sister of actress Rosanna, has proven to be the real thing. [LAT 3/9/93 p.F1]

Patricia Arquette is not the unique granddaughter of Cliff, but the difference between her and Rosanna is indeed relevant in this context (for one thing, Patricia is highly topical but Rosanna is not). As Du Bois (1980:235) observes, even when they come in small, well-defined sets (e.g. the set of someone's grandchildren), the differences between human beings are generally highly salient.

Finally, do the facts we have been discussing really represent instances of non-unique definite descriptions, as Birner and Ward argue? We have already mentioned that Löbner (1985) and Ojeda (1993) do not consider this to be the case. Ojeda (1993:251) offers the contrast in (4) as evidence that the uniqueness requirement on the use of *the* remains in force in these examples:

- (4) a. John was hit on an arm and John was not hit on an arm.
b. ?John was hit on the arm and John was not hit on the arm.

Since indefinites are not associated with uniqueness implications, (4a) is not a contradictory statement because each conjunct is understood as predicating information about a different one of John's arms. However, the sentence in (4b) is quite odd, presumably because it makes contradictory predications about the same referent. Only one referent for *the arm* must be therefore available in the context of (4b)—in other words, the referent of *the arm* is unique. If this referent is not one of John's individual arms (assuming John has two arms, then neither one is unique) nor the group consisting of John's two arms (as Ojeda argues), then what kind of referent is it? I shall address this question in the next section.

3. Roles

An important, though often overlooked, use of the definite article is in setting up 'role' functions ('value-free' interpretations of NPs, in the terminology of Barwise and Perry 1983:150-151). When a NP designates a role, it refers to a fixed property, not to a particular individual. The 'value' taken by the role—the individual instantiating the role—is not fixed; typically, it varies from one occasion to another (Fauconnier 1994:40). Whether a definite description refers to a role or a value depends on the context in which the description occurs, as illustrated in the following sentences:

- (5) a. The President is elected every four years.
b. The President is giving a speech tonight.

In (5a), the NP *the President* is most likely to be interpreted as a role designating the property of 'being President'. This property remains constant regardless of which

individual happens to fill the role at any given time. In (5b), the same NP is most likely to be interpreted as designating not a role but a single value of the role 'President', that is, the particular individual filling the role at the time of utterance (for more on roles and definite descriptions, see Fauconnier 1994:39ff., Epstein forthcoming).

Crucially, for our purposes, it is a typical characteristic of roles to have multiple potential instantiations. For instance, the role of 'President' may be instantiated by a range of individual values, such as Lincoln, Truman, Clinton, etc. In general, only one value of a role will apply in any given context (relevant contexts can be delimited by a variety of parameters, e.g. time, place, etc.). To illustrate, for the year 1864, the value of the role 'President' can only be Lincoln; in 1946, it must be Truman; and so on (assuming, of course, that we are talking about U.S. Presidents). We shall see below, however, that it is also possible for a role to have multiple instantiations in a single context.

Definite descriptions frequently refer to roles representing stereotypical elements within cognitive frames (in the sense of Fillmore 1982). For example, talking about a race, one may say *The winner will receive \$100*. In this sentence, no particular person can be identified as the winner at the time of utterance, yet the definite article is appropriate in the NP *the winner* because its referent is a role which is uniquely identifiable thanks to knowledge of the 'race frame', i.e. everyone knows that a race has a unique winner. In fact, speakers commonly opt to employ a definite article (as opposed to, say, an indefinite article) precisely as a means of indicating that a NP should be interpreted as referring to a role instead of an individual value:

- (6) Recently it has become possible to buy space in someone else's womb, and we are promised that embryos, and tissues grown from them, are soon to be available from **the catalogue**. [NYT 1/23/99 p.A19]

In this passage, the definite article signals that *the catalogue* is to be read as a role which is uniquely identifiable as a salient aspect of the 'commercial event frame' (evoked by mention of *buy*). The referent of this NP cannot be read as a uniquely identifiable individual because, at present, there are no catalogues that sell human embryos or tissues (nor had any specific catalogue been previously mentioned). Notice that the indefinite *a catalogue* could also have been selected in this context, but then the NP would be construed as an unidentifiable, arbitrary instance of the type 'catalogue'.

Now that the main elements are in place, I turn next to the analysis of the definite descriptions presented in (1) and throughout section 2. My principal claim is that each of these NPs refers to a salient role within a frame. The role itself is uniquely identifiable since the frame to which it belongs is part of the general background knowledge shared by all members of the speech community. The uniqueness requirement on use of the definite article is therefore met in these NPs.

What makes these data especially interesting is that the (unique) roles occur in situations in which they can take more than one individual value, i.e. multiple potential instantiations of the roles are available in a single context. The existence of non-unique values of the role does not, however, give rise to infelicities in the use of the definite descriptions since the precise identity of the actual individual satisfying the description does not matter. By saying, for instance, *The boy scribbled on the living-room wall* as in (1b) or *I demand to see the menu!* as in (2b)—instead of *The boy scribbled on a living-room wall* or *I demand to see a menu!*, with the indefinite article—we indirectly access an entity of relatively low salience (a value whose precise identity is of little importance) via the direct mention of a highly salient entity, the role, which itself is very relevant. Choosing to mention the role instead of the value is a strategy which focuses on the conventionalized and highly stereotypical aspects of a situation rather than the specific details.

This analysis in terms of roles within frames provides an explanation of the 'relational' nature of the entities commonly found in these definite descriptions. Du Bois, Löbner (1985:305-306), Kadmon (1987:186), Ojeda (1993:250) and others have noted that, in these cases, there is an 'association' of some sort between the referent of the definite NP and some other entity present in the context: "the reference ... is partly identifiable due to association with a specific object" (Du Bois 1980:233). For example, a wall is associated with a room, a menu is associated with a restaurant, a body part is associated with a person, etc. Within the present analysis, the association in question is characterized as the link between the role and the frame of which it is a stereotypical element. We are able to say such things as *The boy scribbled on the living-room wall* because the 'room frame' contains a slot (role) for four walls; it is possible to say *I demand to see the menu!* because a menu is a typical aspect of any meal in a restaurant; *I read it in the paper this morning* (2c) refers to the newspaper as a stereotypical role in a 'mass media frame' (in contrast to other media, e.g. the television, the radio, etc.). The rest of the examples in this paper can be explained in parallel fashion.⁶

Treating these definite descriptions as referring to stereotypical roles within frames allows us to explain certain constraints on their use. In particular, when such NPs do not designate salient roles, they cannot be used felicitously even in situations in which the exact identity of the speaker's intended referent is not relevant. To illustrate, let us return to Birner and Ward's example of the dinner table with three baskets of rolls. As they point out (Birner and Ward 1994:97-98), in such a situation, it is possible to say *Pass the rolls* (with a plural noun) but it would be strange to use the singular form *Pass the roll* (even if the speaker wants only one roll and it does not matter which one). Under the account I am proposing here, the reason is that the 'dinner table frame' contains a salient, uniquely identifiable role for a set (i.e. a basketful) of rolls (plural) but not for an individual roll (no individual roll is salient in this context, and we do not typically find a single roll on the table). In contrast, the infelicity of the singular *Pass the roll* cannot be explained under the accounts of Löbner or Ojeda since this sentence should be capable of referring to either an

abstract situation (Löbner 1985) or a group of rolls (Ojeda 1993), in the same way as *Pass the rolls* (or *John was hit on the arm*, etc.).⁷

Birner and Ward (1994:99) reject the need to invoke the notion of frames in analyzing these data. They cite the facts in (7) as evidence against the frame analysis:

- (7) a. The first thing we did upon arriving in Santiago was to go to **the park** and have a relaxing picnic lunch.
- b. Somebody left their shopping cart outside here where it could roll into a car ... I'll just leave it up front near **the cash register**.
- c. When I was six years old, I had to spend a night in **the hospital**, and I was terrified.

They note that (7a) (their example 16a) is "felicitous despite the fact that there is typically more than a single park within a given city" (Birner and Ward 1994:99). As this remark shows, though, a park does represent a stereotypical element (a role) within the 'city frame'. And because it is not relevant which exact park the speaker went to, *the park* in (7a) turns out to be nice illustration of a (unique) role (with multiple potential values) in a frame. Regarding (7b) (their 17), they state: "bringing in a shopping cart from outside and leaving it nearby is not a prototypical event with respect to any plausible frame for a cash register" (Birner and Ward 1994:99). This argument is flawed because the relevant frame that guides our understanding of the events in (7b) is not associated with the concept of a cash register but is rather a more general 'store frame' (e.g. a supermarket or a department store), within which the cash register has a salient role. Lastly, they say that in (7c) (their 16b) "there is no mention of a city or any similar scene to give rise to a frame that might plausibly contain a hospital" (Birner and Ward 1994:99). However, the availability of frame-knowledge is not dependent on explicit mention of the frame itself in the surrounding discourse, as shown in (8):

- (8) So we lost the Rams and Raiders. Lost our innocence. But hold **the flowers**. Put away **the handkerchiefs**. Stop **the sobbing**.
 We still have the Rose Bowl, don't we?! [LAT 12/31/95 p.C1]

The three NPs *the flowers*, *the handkerchiefs*, and *the sobbing* are interpreted in (8) as roles linked to a 'funeral frame'. This frame is easily accessed in the context of (8) despite the absence of any overt mentions of a funeral. In the same way, mention of a city is not needed in (7c) to trigger activation of a frame in which *the hospital* is a salient role. Consequently, rather than providing counterevidence, each of the examples in (7) actually supports the roles-in-frames analysis.

Summing up thus far, the facts under investigation in this paper are not exceptions to the uniqueness requirement on definite NPs because they represent unique roles (though not unique individuals). An examination of naturally-occurring

discourse reveals that these definite descriptions are actually quite common and occur in a wider range of circumstances—involving a wider variety of NP types—than suggested by previous research. Let us briefly consider a few more examples, starting with (9):

- (9) "If speaking *for* someone else seems to be a mysterious process," Stanley Cavell has remarked, "that may be because speaking *to* someone does not seem mysterious enough."

Looked at in this way, **the aim of anthropology** is the enlargement of the universe of human discourse. That is not, of course, its only aim—instruction, amusement, practical counsel, moral advance, and the discovery of natural order in human behavior are others; nor is anthropology the only discipline which pursues it. But it is an aim to which a semiotic concept of culture is peculiarly well adapted. [Geertz 1973:13-14; italics in the original]

In the first sentence of the second paragraph of (9), the subject NP *the aim of anthropology* represents a salient role inasmuch as any intellectual endeavor (anthropology or otherwise) typically has an aim. The predicate nominal, *the enlargement of the universe of human discourse*, is a value instantiating the role. In the next sentence, the author explicitly states that the role has more than one value (*That is not, of course, its only aim*) and goes on to list some other aims of anthropology (*instruction, amusement, practical counsel, etc.*). This example is similar to the ones analyzed above in that it is a definite description with several potential referents in a single context. The definite article is felicitous in (9)—and the uniqueness requirement is satisfied—because the referent of the NP in which it occurs is actually a role (not one of the non-unique values), which is uniquely identifiable due to its stereotypical nature.

Role NPs with *the* are frequently found in copular sentences, either in subject position (as in 9) or in predicate nominal position, as in (10). In the latter case, as in the former, the role can have non-unique values:

- (10) While he has rejected a theory, put forward by his former lawyers, that he was driven to insanity by "black rage," Mr. Ferguson argued today that as a black man, he, like other blacks, was **the target** of a conspiracy to destroy him. [NYT 1/27/95 p.A12]

The *target* is a uniquely identifiable role in the frame associated with the concept 'conspiracy', i.e. part of the widely shared background knowledge concerning conspiracies is that they are typically directed against people whom we may describe as 'targets'. This sentence explicitly evokes the existence of more than one target in the context (*he, like other blacks*), so (10) is parallel to (9) insofar as both involve a unique role instantiated by non-unique values.

Notice that expressions asserting non-uniqueness (viz. *That is not, of course, its only aim* and *like other blacks*) are not necessary for the definite descriptions in (9) and (10) to be construed as roles with multiple values. If these expressions were omitted, *the aim of anthropology* (in 9) and *the target of a conspiracy* (in 10) would remain compatible with the interpretations in which several aims of anthropology exist or in which Mr. Ferguson is not the only target of a conspiracy to destroy him. But apart from the overt presence of the expressions of non-uniqueness, (9) and (10) are not significantly different from examples such as (11):

- (11) To avoid such violations of intimacy, one would have to live without love, without friendship. Is that what we want in political leaders? All politicians, not just Presidents, are now fair game for **the prying journalist, the obsessed prosecutor**. [NYT 9/8/98 p.A25]

The definite NPs *the prying journalist* and *the obsessed prosecutor* represent highly salient roles within the frame of the current political situation in American politics (relating to the impeachment of President Clinton). Just as in (9) and (10), we do not assume that either of these definites refers to a unique individual (journalist or prosecutor). Moreover, it would be unproblematic to add the names of several prying journalists or obsessed prosecutors into the text, which would make (11) resemble (9) and (10) even more closely. Therefore, (11) is also similar to (1), (2), (3), (7) and the other standard cases of "non-unique" definites analyzed in this paper—all these examples consist of a definite description whose referent is a unique role with non-unique potential values.

Data such as (9)-(11) are not at all unusual. The fact that NPs with *the* commonly refer to (unique) roles with multiple values lends further plausibility to the principal claim of this paper, according to which the standard cases of "non-unique" definites are roles, too. The main difference between the standard cases (the NPs in 1, the body-part expressions, the kinship terms, etc.) and those in (9)-(11) is that, in the former cases, the speaker uses a role NP to indirectly evoke a value of that role (because while the role is highly relevant, the precise identity of the value does not matter).⁸ The existence of multiple values is inferred from knowledge of the frame to which the role belongs. In the latter cases, the speaker refers directly to a role. The values of the role are either left implicit (but can be inferred from background knowledge, as in 11) or are overtly specified elsewhere in the discourse (as in 9 and 10).

In conclusion, definite descriptions such as (1), (2), (3), (7) are not counterexamples to the uniqueness requirement on definite NPs because they refer to unique roles. In addition, they do not constitute a special class of definites, nor are they "restricted in distribution" (Kadmon 1987:187), because NPs with *the* often refer to roles (see 5a and 6) and many roles have non-unique potential values in a single context (see 9-11). More generally, it is a fundamental characteristic of roles to have multiple instantiations.

4. Postscript

I have argued that none of the definite descriptions examined in the previous sections is an exception to the uniqueness requirement. However, this does not mean that I believe that no counterexamples can be found. In other work, I have attempted to demonstrate the existence of various classes of *the*-NPs whose referents are not uniquely identifiable. In these cases, the article fulfills other functions—it indicates that a referent is highly prominent, that the referent is accessible from a non-canonical point of view, or that the referent should be construed as a role. To illustrate, let us look again at role NPs. The example in (12) contains two NPs with *the* referring to non-unique roles:

- (12) Researchers who reported in July that family history appeared to play a slightly smaller role in breast cancer than previously believed backed off, saying they had erred ... "We took **the wrong number** and multiplied it by **the wrong number**," said Dr. Graham A. Colditz, a co-author of the study. [LAT 10/7/93 p.A20]⁹

The definite article is used in both occurrences of *the wrong number* to indicate that the referents of these NPs are roles (belonging to the frame evoked by the verb *multiplied*). As in the examples discussed previously in this paper, the values of these roles are not uniquely identifiable. In contrast to the previous examples, however, in (12) the roles themselves are also non-unique. These definite descriptions are nonetheless felicitous because the referents are 'accessible' (in the sense of Ariel 1990, Fauconnier 1994, inter alia) by virtue of the frame-based knowledge according to which multiplication problems are stereotypically associated with slots (roles) for two numbers (see Epstein 1996, 1998, forthcoming, for other examples of definite descriptions with non-uniquely identifiable referents).

Sources of Data

Geertz, Clifford. 1973. *The interpretation of cultures*. New York: Basic Books.

[LAT] = *Los Angeles Times*

[NYT] = *The New York Times*

Notes

1. Thanks to Michael Israel and Ritva Laury for helpful comments on an earlier version of this paper. Any remaining errors are my own responsibility.

2. See, for instance, Kadmon (1987:182-187). Russell, too, was aware of these facts, but avoided them: "Now *the*, when it is strictly used, involves uniqueness; we do, it is true, speak of '*the* son of So-and-so' even when So-and-so has several sons, but it would be more correct to say '*a* son of So-and-so'. Thus for our purposes we take *the* as involving uniqueness" (Russell 1905:481).

3. Body part expressions with a possessive determiner—*She put her hand on his knee; I broke my toe*, etc.—also pose a problem for uniqueness theories (though discussion of possessives falls beyond the scope of this paper).
4. Ojeda nevertheless maintains that the 'group' analysis is correct because if John were hit on both arms, then the sentence *John was hit on the arm* would, strictly speaking, still be true (though perhaps not entirely cooperative).
5. I will give an alternative analysis of the infelicity of this example in section 3.
6. Ojeda (1993:250) characterizes the 'association' in question as follows: "each group ... must be *inherently* related to a distinct entity" (emphasis added). For example, body parts are inherently related to their possessors, banks are inherently related to rivers (1a), walls are inherently related to rooms, etc. However, this requirement that the relation be an inherent one appears too strong. For example, maids are not an inherent element of a household (2a), not even of a wealthy one (there are wealthy people who do not have maids). Nor is milk an inherent part of a meal (cf. Birner and Ward's example *Please pass the milk* mentioned above). It is not even clear that a light is an inherent part of a room (1c). Instead, the association need only be a stereotypical or highly conventional one, that is, the referent must be a likely element of a frame.
7. Similarly, it would be strange to say to a clerk in a bookstore: *#I'd like to return this book, the page is torn* (meaning that only one of the pages is torn, but it does not matter which one). In the context of an entire book, an individual page is of such low salience that it cannot be accessed with a *the*-NP. During the question period after my talk, audience members also came up with the following interesting contrast: *The writer had a great idea, so she {#picked up the pen / sat down at the computer}, and began to write* (once again, meaning that although more than one pen or computer are present in the context, any one will do). Computers are—perceptually, at least—much more salient than pens. Nevertheless, why is a pen not salient enough in this context to be felicitous with the definite (at the very least, it would seem to be more salient than a single page in a book or a roll on a table)? Ultimately, it would be helpful in understanding such cases to have independent (psycholinguistic?) evidence of the relative salience of elements within frames.
8. Langacker (1993) discusses many other instances in which we employ an expression referring to a highly salient entity in order to evoke a less salient one.
9. Thanks to Gilles Fauconnier for bringing this example to my attention.

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Imitation as a basis for phonetic learning after the critical period

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1. Overview

Imitation by humans of one another is pervasive. I suggest that its occurrence serves two closely related functions. It fosters interpersonal coordination and, hence, cooperation. When coordination occurs between more and less competent participants in a culture, it facilitates cultural learning by the less competent participant (typically an infant or child). More central to present purposes, however, is the observation that, for humans, imitation is easy to do—so easy, in fact, that infants imitate from birth. I suggest that exploration of the reasons why imitation is easy can be illuminating about the nature of the perceptual systems that are engaged by the imitative disposition. Specifically, exploration of the bases for imitation of speech, in the context of an analysis of the bases for imitation generally, tends to confirm claims that the speech perception system, like every other perceptual system, functions to expose the environment to the perceiver. In the case of speech perception, the exposed aspect of the environment includes the phonological gestures of the vocal tract being produced by a talker. Perception of gestures makes reproduction of those gestures easier than it would be were acoustic speech signals themselves objects of speech perception. Finally, I suggest that the imitative disposition, grounded in the perception of gestures, underlies the subtle phonetic learning that occurs among linguistically displaced individuals even when they are well beyond the critical period for language acquisition.

2. Imitation as an index of cooperativity

In his book, *Using Language* (1996), Herbert Clark suggests that public use of language occurs characteristically in the context of “joint activities.” Prototypically, these are cooperative activities involving two or more individuals. Research of three general kinds has shown that individuals engaged in cooperative activities in which talk occurs exhibit a variety of forms of entrainment, many of which are imitative.

Condon (e.g., 1976; 1982) coded video tapes of speakers and listeners for the body movements that interlocutors showed while talk occurred. He suggested that speakers move in time with the rhythms of their own speech (exhibiting “self-synchrony”) and that listeners, including infants (Condon and Sanders, 1974), move in time with the speech they hear (exhibiting “interactional synchrony”). (See also Bernieri, Reznick, and Rosenthal, 1988.)

In describing his discovery of interactional synchrony, Condon (1982) observed that he had had “an erroneous view of the universe that communication takes place *between* people” (p. 55). Within-person coordination (say, between the jaw and lips in production of /b/; e.g., Kelso, Tuller, Vatikiotis-Bateson and Fowler, 1984; or among the limbs in locomotion) eventuates in logically independent articulators functioning as a single entity (“a special purpose device” according to Fowler and Turvey, 1978). Condon is commenting, likewise, that between-person coordination during talk forges a unitary system (here, a communicative system)

out of the interactions of logically independent individuals (see also, Schmidt and O'Brien, 1997).

LaFrance (1982) reported a different form of entrainment. She found "posture mirroring" on the part of individuals listening to a lecturer under conditions in which the listeners later judged themselves to have been engaged by the speaker. Under those conditions, listeners were inclined to match aspects of the speaker's posture. (For example, if the speaker had placed a hand on his neck, members of his audience tended to adopt the same posture.) Interestingly, LaFrance ran cross-lag correlations between measures of posture mirroring at an earlier time and later ratings of engagement, and between measures of engagement at an earlier time and later ratings of posture mirroring. These measures are sometimes used as a way of drawing inferences about causation from correlational data. She found larger correlations from posture mirroring to engagement judgments ($r = .77$) than in the opposite direction ($r = .58$). If the difference is meaningful in terms of causation, it would imply that dispositional posture mirroring may bring about impressions of rapport more than impressions of rapport foster posture mirroring. That is, the imitative tendency may be primary in relation to the between-person coordination that accompanies talk.

Finally, researchers have found evidence of various kinds of "accommodations" (Giles, Coupland and Coupland, 1991) of cooperating interlocutors' speech. These include convergences in dialect (Giles, 1973), in speaking rate (Street, 1983), vocal intensity (Natale, 1975), and rate and average duration of pauses (Jaffe and Feldstein, 1971).

Why should interlocutors exhibit these kinds of convergences? In this literature, investigators write that listeners and speakers entrain to one another (Condon, 1976; McGrath and Kelly, 1986) or that they get on one another's wavelength (LaFrance, 1982). These characterizations suggest an idea that imitations or entrainments reflect an effort on the part of individuals to coordinate as indeed they must do in the course of joint activities. Evidence in favor of this interpretation derives from findings of divergences, for example in dialect, in noncooperative interactions. (See Giles, *et al.*, 1991 for a review.)

Despite these clear indications that imitation is associated with interpersonal coordination during talk, evidence shows that imitation is not tied exclusively to social, cooperative settings. It occurs dispositionally in humans even in nonsocial settings as shown by research that I will summarize below. I propose, nonetheless, that the "reason why" humans are disposed to imitate reflects the disposition to cooperate, including dispositions for competent members of cultural communities to initiate less competent members into the culture, and dispositions for less competent members to learn from more competent members. Cooperation, in turn requires coordination, and imitation is, perhaps, the most fundamental or primitive way to coordinate oneself with someone else.

Examination of imitation outside of a social context reveals that imitation is very easy for humans to do. Examining why imitation is easy uncovers a basis for imitation in the universal character of perceptual function.

3. The basis for imitation: perception of distal events

Newborn infants imitate facial gestures. For example, Meltzoff and Moore (1977) showed that, confronted with an adult protruding his tongue, 12 to 21 day old infants were more likely to protrude their own tongue than in the context of an adult opening his mouth. Meltzoff and Moore (1983) extended the findings to infants tested on average 32 hours after birth. The reason that infants imitate may

have to do with the coordinative tendencies of humans as just suggested and it may have more specifically to do with one way that infants learn from more competent members of their society (see, e.g., Meltzoff and Moore, 1997). These are reasons why the infant imitates, but the question here is how they pull off an imitation. Their performance in the research by Meltzoff and Moore (see Meltzoff and Moore, 1997 for a review) is quite remarkable. The infants can see the adult's tongue but not their own tongue. The infants can proprioceptively feel their own tongue, but not the adult's tongue. In order to imitate, and protrude their tongue (not, say, their lips, which they do not do when they are confronted with a protruding tongue (Meltzoff and Moore, 1977)), infants have to establish what Meltzoff and Moore (1997) call "organ identification." That is, they have to somehow identify their own tongue with the adult model's tongue. Moreover, they have to establish "gesture identification." They have to know what potential action of their own will match or approximate the action of the adult model. Infants must establish these identifications on the basis of information provided by different sensory modalities about the two tongues and their actions or possible actions.

Meltzoff and Moore (1997) suggest that infants achieve organ identification by establishing a supramodal representation of body parts and their actions. In their view, positing a mediational representation is required on two grounds. Infants can exhibit imitative behavior that lags a model's behavior by up to 24 hours (Meltzoff and Moore, 1994), and imitation is not compulsory. If, lacking a mediational representation, sensory inputs were mapped directly onto motor outputs (as in the findings of Rizzolati and colleagues on "mirror neurons," e.g., Rizzolati and Arbib, 1998), Meltzoff and Moore (1997) argue, delayed imitation would not occur and imitation would be compulsory. (However, in fact, despite the existence of mirror neurons that respond both when a monkey grasps something and when it sees something being grasped, imitation is not elicited by observation.) Because the mediating representation is supramodal, the infants' representations of the two tongues can be determined to correspond; that is, organ identification can occur.

Another way to think about the infants' accomplishment does not invoke the idea of a mediational representation. Rather, it invokes the universal character of perceptual systems. The function of perceptual systems universally (see Gibson, 1966), is to allow perceiver/actors to know their environment. Perceptual systems allow that achievement in one general way. They intercept structure in a medium, light for seeing, air for hearing, etc., and they use the structure, not as something to be perceived itself, but as information for the cause of the structure in the world.

When an infant looks at an adult model protruding his tongue, s/he intercepts light that has been causally structured by reflecting off of the adult's tongue. Generally, different visible objects or events (e.g., protruding tongues or lips) structure light distinctively so that light structure tends to specify its cause. Given a patterning in the light as it changes over time (e.g., as the adult produces the action of tongue protrusion), a perceiver can know from the light structure what event occurred in the world.

Haptic perception works in the same way. As we explore an object with a hand, the object deforms the skin of the hand. Different objects deform the skin differently, and so patternings of skin deformations, like patternings of light structure, can serve as information for their cause. We feel the rigidity of a pen that we hold, or the softness and flexibility of a blanket that we explore. We feel those things because the skin deformations are intercepted by receptors below the skin, and the haptic perceptual system uses the sensed deformations, not as something to be perceived themselves, but as information for their causal source in the world.

Proprioceptive perception is like haptic perception. Proprioceptors in the oral cavity provide information about its structure and composition (e.g., Bosma, 1967; 1970). Infants can use proprioceptive information to know about their own tongue and its possibilities for action.

Accordingly, rather than suggesting that infants develop a supramodal representation of body parts and the actions in which they participate, we can say that infants perceive the adult model's tongue protruding, and they perceive their own tongue. Organ identification occurs because both sensory modalities yield perception of the causal source of stimulation that they intercept. Organ identification allows, but does not elicit imitation. Accordingly, as Meltzoff and Moore (1997) observe, imitation can be delayed or it can fail to occur at all.

Infants are not the only humans who are disposed to imitate facial expressions. Adults do too. McHugo, Lanzetta, Sullivan, Masters and Englis (1985) presented video clips of Ronald Reagan either on the presidential campaign trail or in televised news conferences after his election to participants who differed in their views of Reagan and his political ideology. In one condition of the experiment, the video clips were presented without sound, and they showed Reagan expressing happiness/reassurance, fear/evasion, or anger/threat. Of the viewers, some favored a Reagan presidency and shared his political views. Others opposed a Reagan presidency. Surface electrodes were placed on the corrugator supercilli muscle of the subjects' brow that is active when people frown and on the zygomaticus major muscle of the cheek that is active when people smile. Both groups of subjects exhibited imitation. When Reagan expressed either fear or anger, the corrugator muscle of viewers was more active than when he expressed happiness. When Reagan expressed happiness, the zygomaticus muscle of viewers was more active than when he exhibited fear or anger. Interestingly, these effects did not interact with viewer group. Whether or not viewers had, by self report, approved of Reagan, they exhibited imitation.

This imitation, like that of the infants, involves cross modal matching of information. Viewers saw Reagan's face, but not their own; they felt their own face proprioceptively, but not Reagan's. The reason for their imitations may be the fundamentally social and cooperative nature of humans; the basis for imitation is perception of "distal" events (that is, events in the environment), not "proximal" stimulation (at the sense organ).

Infants also dispositionally imitate speech. There is no reason to suppose that the reason why they can imitate speech or that the reason why they do is different from the reasons why they can and do imitate facial gestures.

Kuhl and Meltzoff (1996) showed infants a videotape of an adult speaker producing an isolated vowel, for different infants, /i/, /a/ or /u/. Infants were 12, 16 or 20 weeks of age. Any vocalizations by the infants were recorded, and cooing vocalizations that did not overlap with the model's speech were analyzed both acoustically and by transcription. At all three ages, infants' vocalizations were influenced by the vowel to which they were exposed. That is, infants exposed to a model producing /i/ themselves produced vowels judged more /i/-like than infants exposed to /a/ or /u/, and likewise for infants exposed to the other two vowels.

In this research by Kuhl and Meltzoff, infants had to establish organ identification. That is, they had to determine that their own vocal-tract articulators corresponded to the bodily causes of the acoustic signals produced by the adult model. And they had to establish action correspondence; they had to determine which actions of their articulators would match or approximate those of the adult model. At least before they produced any sound, the basis for organ identification

was cross modal information: auditory information about the model's organs and actions, proprioceptive information about their own. Either, following Meltzoff and Moore, infants established supramodal representations of their organs and those of the model, or, following Gibson, they perceived the actions of the model's articulators and the possible actions ("affordances" in the terminology of Gibson, 1979) of their own corresponding ones.

This latter account especially relates speech perception to the universal function of perceptual systems to which I alluded earlier. Dispositional imitation of speech implies extraction of information about articulation from acoustic speech signals as the motor theory (e.g., Liberman and Mattingly, 1985) and direct realist theory (e.g., Fowler, 1986; 1996) of speech perception have long claimed. If perceptual systems universally extract information from stimulation about the causal sources of stimulation in the environment, then speech perception is not special in perceiving gestures, in contrast to the proposal of motor theorists (e.g., Liberman & Mattingly, 1985). It is, in respect to its function, consistent with that of perceptual systems generally.

Infants have to extract information about articulation from acoustic signals in order to learn to speak. Perhaps, however, having learned to speak, they no longer extract articulatory information from acoustic signals because it has become extraneous. Two findings jointly suggest that extraction of articulatory information continues to occur. Imitation of speech by adults occurs dispositionally (e.g., Goldinger, 1998), and it can occur remarkably fast (Porter and Castellanos, 1980; Porter and Lubker, 1980).

Goldinger (1998) collected tokens of spoken words produced by speakers who read them aloud from their printed forms on a computer screen. The speakers then also produced the same words as shadowing responses to words spoken by someone else. (I will call the shadowed speaker the "model".) The former productions, of course, could not be imitations of the model; subjects had not heard the model's speech yet when they performed the reading task. However, shadowing productions could be imitations if speakers are disposed to imitate. To determine whether imitation occurred in productions of shadowed words, Goldinger constructed an AXB discrimination task. X productions were the model's productions that subjects had shadowed. As (or Bs) were the shadowed productions, and Bs (or As) were words produced by the same speaker who produced the A (B) tokens, but these were reading responses to printed words. Listeners were asked to decide which of A or B was more like X. Listeners reliably chose the shadowing production as more like X showing that, in the shadowing task, subjects had imitated. Imitations of low frequency words were more detectable than those of high frequency words, and repeated exposure to the to-be-shadowed productions increased the detectability (and so, presumably, the strength) of the imitation tendency. However, imitations occurred even to high frequency words and to word tokens that listeners heard for the first time in the shadowing task.

Evidence that speakers can imitate speech remarkably fast comes from research by Porter and colleagues. In Porter and Lubker's research (1980; see also Porter and Castellanos, 1980), speeded vocal responses were collected from subjects who participated in both simple and choice response time tasks. In a generic simple response time task, subjects make a single detection response indicating that any one of a variety of possible stimuli had occurred. For example, subjects might press a response button having detected a light flash of any color. In a choice reaction time task, subjects make different responses to different stimuli.

They might, for example, press a button with the right hand when a red light flashes and with the left hand when a blue light flashes. Characteristically choice response times are slower by 100 ms or more than are simple response times (Luce, 1986). Following earlier work by Chistovich and colleagues (1962), Porter and Lubker showed that this difference can be eliminated or nearly so when the tasks are speech tasks and the choice task invites imitation.

In their simple response time task, Porter and Lubker presented the speech of a model who began by producing the vowel /a/ for an unpredictable period of time between 2 and 5 seconds. The model then shifted unpredictably to one of three vowels, /o/, /i/ or /æ/. The subjects' task was to produce the /a/ vowel along with the model and to shift to /o/ when the model shifted to /o/, /i/ or /æ/. This is a simple response time task because the subjects' shift to /o/ marked only their detection of a shift in the vowel. The choice response task was identical to the simple task except for the subjects' responses. Now, when the model shifted to /o/ the subject shifted to /o/. When the model shifted to /i/ so did the subject, and likewise for /æ/. That is, the choice task was a shadowing task, possibly invoking imitation. In contrast to prototypical comparisons of simple and choice response latencies, Porter and Lubker found that, on comparable trial types (in which both the model and the subject shifted to /o/), latencies in the simple and choice tasks differed by a nonsignificant 11 ms on average. Moreover both response latencies (169 ms and 180 ms respectively) were in the vicinity of prototypical simple, not choice, response latencies.

What enables choice responses to be so fast? My answer, which is similar to that of Porter and Lubker, is that the choice task invites imitation. If listeners to speech recover vocal tract gestures from acoustic speech signals, then (and only then) to hear the model's productions is to receive articulatory instructions for an imitative response.

In short, Goldinger's (1998) study shows that dispositional imitation occurs among adults even in nonsocial settings; Porter and Lubker's study (1980) shows that imitating (or at least shadowing) is like producing a response in a simple response task, not a choice task. It must be supposed that listeners extract gestural information from acoustic speech signals, and their doing so appears to serve as a goad for an imitative response.

Possibly, the disposition to imitate can help to explain some phonetic learning that takes place even among adults and even when there is no obvious social motivation for the learning.

4. Imitation as a basis for phonetic learning after the critical period for language acquisition.

It is well known that speakers gradually lose the ability to acquire a new language with native fluency. Whether or not they acquire fluency with the syntax of the language, if they learn the language after the "critical period" (e.g., Lenneberg, 1967), they speak with an accent. Even so, it appears that phonetic learning continues to occur over the life span, albeit at a much reduced rate than the rate characteristic of infants and young children. Many of us are aware of examples of people who move from one dialect or language community to another who are judged by their acquaintances "back home" to speak with an accent representative of their new language community. Members of their new community, however, easily detect their original accent. That is, there is an accent migration toward that of the ambient dialect or language, but it is far from complete.

When a shift in language community is across dialect but within language (for example, among English speakers, when a person moves from New England to a southern state of the US, or from the US to England), the reason or reasons for the dialect shift is/are unclear. The shift in accent may reflect an intended effort to affiliate with members of the new language community, or it may reflect an unintended disposition to imitate, regardless of the social benefits or costs of the shift.

Phonetic learning after the critical period that occurs cross linguistically may be more interpretable. Flege (1987) has shown that native speakers of English who have lived in France for an average of 12 years and who speak French as their principal language, produce English voiceless stops with shorter VOTs than do monolingual speakers of English. Likewise native French speakers who have lived in the Chicago area for an average of 12 years and speak English as their principal language, produce French voiceless stops with VOTs longer than those of monolingual French speakers. The acquisition of French-accented English by native English speakers or of English accented French by native French speakers does not carry any obvious social benefits. Accordingly, it is more likely that the change is an unintended consequence either of the exposure to a different language or of producing a different language or of both sources of effect. A disposition to imitate is a likely source of the phonetic learning.

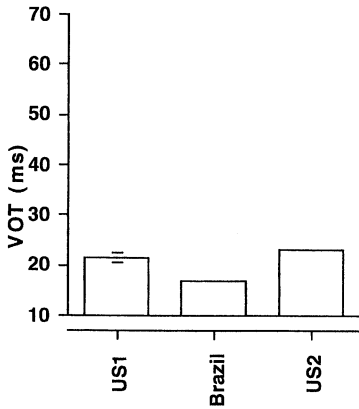
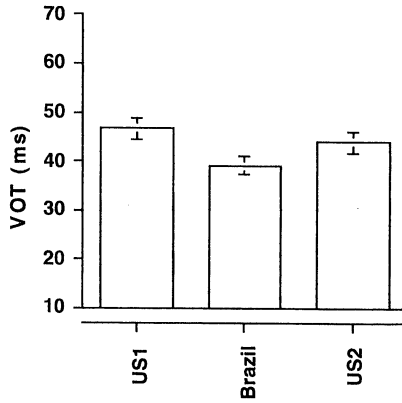
4.1 An experiment

Recently Michele Sancier and I (1997) examined a case of phonetic learning after the critical period that occurred over a much shorter time span than the 12 years of Flege's subjects. We studied the speech of a native speaker of Brazilian Portuguese who was fluent in English but did not learn English until she was in her teens. At the time of the study, she was 27 years old. She had told us anecdotally that on arriving home in Brazil for a visit, she was told by her father that her speech was "explosive." We inferred that her voiceless unaspirated stops of Portuguese, like those of Flege's French speakers living in Chicago, had become more aspirated, and that is what our subject's father heard as explosiveness.

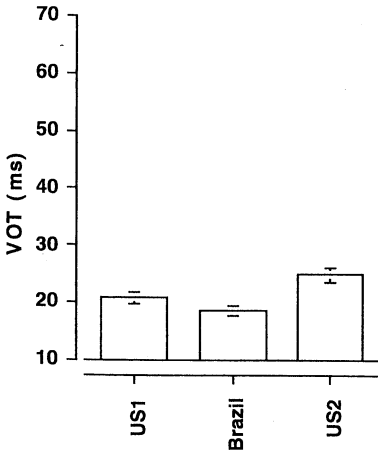
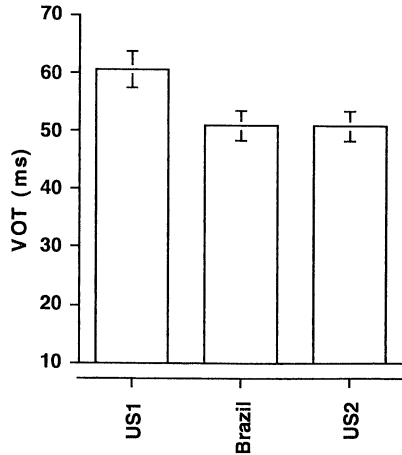
To test this idea, we recorded our speaker producing sentences of both English and Portuguese that included a number of /p/ and /t/ consonants. We recorded her on three occasions. On two occasions, she had been in the United States, at University of Connecticut, where she was a graduate student, for at least four months. On another occasion (between the two recording sessions just mentioned), she had just returned to the United States from Brazil where she had spent 2.5 months. We measured the VOTs of her voiceless /p/s and /t/s in both her English and her Portuguese speech. The results are shown in (1). Our speakers' VOTs of Portuguese stops were shorter than those of her English stops. Accordingly, the two sets of stops were categorically distinct for this speaker. However, the Portuguese and English VOTs changed in parallel as a function of recent language experience. In both languages, VOTs were longer when the speaker had spent four months in the United States before being recorded than when she had just returned from Brazil after a 10 week stay. Although these effects are small in absolute terms, averaging about 6 ms, they are statistically significant in both languages.

- (1) VOTs (and standard error bars) for a native speaker of Brazilian Portuguese producing /p/s and /t/s in both English and Portuguese on three occasions: after a 2.5 month stay in Brazil (Brazil) or after four month stays in the US (US1, US2). (Standard errors are very small for Portuguese /p/, and two are invisible in the graph.)

Portuguese [p]

English [p_h]

Portuguese [t]

English [t_h]

Recent Experience

Recent Experience

Why do our speaker's VOTs change at all; why do they change in both languages when the speaker is exposed to (and speaks) just one of the languages; why are the changes so small?

We conclude that our speaker's VOTs change due to the disposition to imitate speech that Goldinger's research has found for adults. That disposition is fostered by the nature of speech perception, in which information about phonetic gestures is extracted from acoustic speech signals. Our speaker hears a different phasing of the oral constriction gesture for /p/ and /t/ with the devoicing gesture when she is in Brazil than when she is in the US. Hearing a different phasing fosters imitation.

As to why English VOTs changed in parallel with Portuguese VOTs when our speaker was in a Portuguese speaking environment and why Portuguese VOTs changed in the English speaking environment, we turn to Flege's (1987) notion of equivalence classifications. As infants are exposed to a language, quite early on, they learn to ignore such irrelevant acoustic differences among tokens of a phonological category as differences in speaker identity (Kuhl, 1980). More generally, they attune themselves to the acoustic distinctions that are contrastive in their language. This attunement may lead second-language (L2) learning individuals to have difficulty establishing, as an independent category, an L2 category that is sufficiently similar to one in the native language (L1). Flege notes that equivalence classification need not imply that the L2 and L1 categories are wholly equated in production, and, indeed, our subject did distinguish her L1 and L2 voiceless stops in VOT.

As to why the changes in VOT are so small, we suppose that our speaker's VOTs reflect a lifetime of exposure to and production of voiceless stops. In some memory research, very recent experience has been found to have a disproportionate effect on memory relative to the effects of more remote experiences (Bjork and Bjork, 1992), and that is why 2.5 to 4 months of exposure to a language can have a measurable effect at all. However, the effect is small because the cumulative effects of our speaker's production and perception experience prior to those 2.5 to 4 months must be much larger than the effects of recent experience. We note that the VOT changes in Flege's research alluded to earlier (1987) were larger than ours.

4.2 A replication

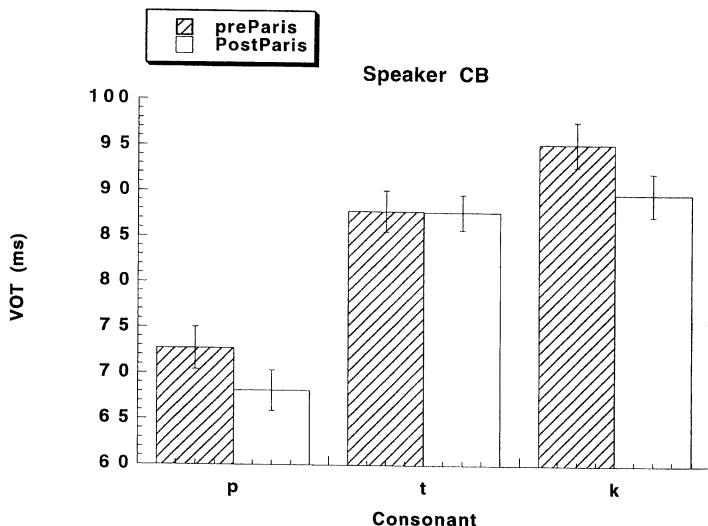
Sancier and I have recently had an opportunity to replicate our earlier experiment. An adult native speaker of English and her children (ages 11 and 14 years) spent several months in Paris. The adult speaker had some fluency in French and largely spoke French while in Paris. Her children had less fluency in French and spent less time speaking French. We recorded all three speakers producing isolated words in both French and English. Words began with /p/, /t/, or /k/. Half were cognates in the two languages; half were phonologically similar, but were not cognates. We recorded the speakers (in fact, they recorded themselves) just after arriving in Paris and shortly before returning.

To date, we have measured the English productions by the adult. (For present purposes, measuring the French productions is of interest mainly to the speaker herself who hoped to improve her French while there. For our purposes, it is less interesting to show that her French VOTs reduced than to show that her English VOTs did so.) We measured this speaker first because she spoke considerably more French and less English than did her children. We are, however, measuring the children's English speech as well. Presumably the children heard considerable

French even if they did not speak much. This may tell us something about effects of passive exposure to new gestural phasings.

The figures in (2) show the overall durations of our speaker's English VOTs for words beginning with /p/, /t/ and /k/. The speaker shows statistically significant reduction of her English VOTs overall (on average by 3 ms); the effects, for unknown reasons, were absent for the consonant /t/.

(2) VOTs (ms) of a native speaker of American English before exposure to a largely French-only language environment and after exposure.



5. Conclusion.

Throughout the lifespan, humans are disposed to imitate one another. Imitation may be a primitive or fundamental kind of entrainment that humans exhibit because of their fundamentally social and cooperative nature. For purposes of understanding speech perception, it is more interesting to focus on the bases for imitation. Imitation requires identification of one's own body parts and their potential actions with corresponding ones of the model to be imitated. Characteristically, the correspondences have to be made cross modally. I have suggested that cross modal identifications that underlie imitation are possible even in infants, because of the universal character of perceptual function. Perceptual systems universally, and including those responsible for speech perception, use information in stimulation at the sense organs as information for their distal source in the world. Perceivers detect the distal source. This makes cross modal "organ identification" easy, because correspondences can be established using a common metric.

Language users exhibit phonetic learning throughout the lifespan, and they exhibit it even when learning is undesirable (as when our native Portuguese speaker developed American accented Portuguese). I suggest that components of the explanation for continuous phonetic learning include the tendency of humans to imitate, coupled with the ease of imitation due to a speech perception that achieves perception of phonetic gestures.

Notes

¹ Preparation of the manuscript was supported by NICHD grant HD-01994 to Haskins Laboratories.

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A New Model of Indo-European Subgrouping and Dispersal

For Prof. Murray Emeneau on his 95th birthday, 28 February 1999

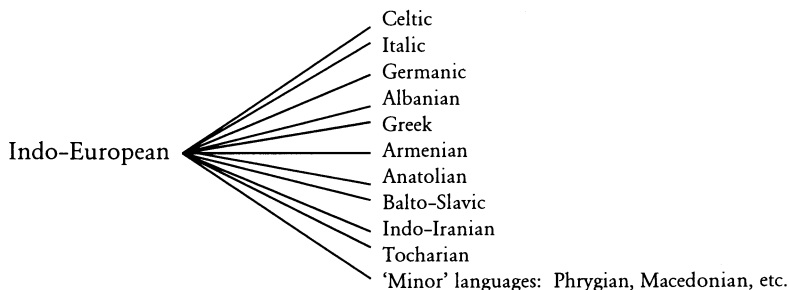
Andrew Garrett
University of California, Berkeley

1. Introduction

In this century two great discoveries have shaken our view of the Indo-European family tree and protolanguage. The first was the discovery of Hittite, which in turn revealed the existence of an Anatolian branch of Indo-European; the second was the discovery in Central Asia of languages belonging to the previously unknown Tocharian branch of the family. Yet as important as these are, they are not the only twentieth century archaeological finds with Indo-European ramifications. In this paper I will explore the implications of a less dramatic set of discoveries for Indo-European subgrouping.

I begin with a question posed in recent work by Johanna Nichols. Like many profound questions, this one is both shockingly obvious and disturbingly obscure: Why does Indo-European have so many branches? Ten are fully documented, and the count rises if you add the so-called 'minor' languages – Phrygian, Macedonian, Thracian, Venetic, and others known only through inscriptional remains. This is shown graphically in (1):

1



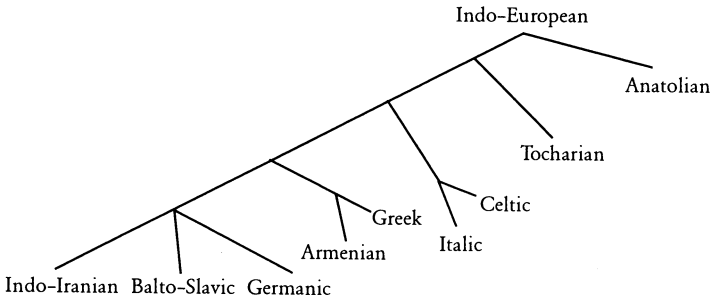
Typical subgrouping situations are of two distinct types. One is the family tree with binary or ternary branching. This corresponds to situations where a speech community is separated for some reason, such as population movement into or out of the area it occupies, and the newly separated communities evolve in relative linguistic isolation.

A second type of subgrouping situation is the dialect continuum, in which local dialects share features with their neighbors but are hard to arrange into a Stammbaum: any original subgrouping is obscured by the areal spread of innovations from dialect to dialect. The social reality behind a dialect continuum is presumably that speakers of adjacent dialects remain in contact and influence

each other linguistically. This local mutual influence eventually has the effect of erasing earlier patterns.

With ten or more branches, the Indo-European family tree is of neither type, yet it is hard to see what single event would split one speech community into ten. To be sure, the Indo-European tree can be turned into one with binary or ternary branching, and a recent proposal along these lines by Ringe et al. (1998) is adapted in (2)¹:

2



Yet attempts to construct a highly articulated Indo-European family tree beg one crucial question: Why are well-established subgroups like Greek and Indo-Iranian defined by many distinctive innovations, while higher-order groups are defined by only a few? Even if we can add structure to the Indo-European tree, the subgroups in (1) are still in some sense the 'real' ones, and the intermediate nodes in (2) are nameless precisely because we do not need to refer to them. This requires an explanation.

According to Nichols, the explanation has to do with the dispersal of Indo-European. She argues that '[m]ultiple branching at or near the root of a [family] tree points to abrupt dispersal of the protolanguage in a large spread' (Nichols 1997b: 371). A 'spread zone' is defined as 'an area of low [linguistic] density where a single language ... occupies a large range, and where diversity ... is reduced by language shift and language spreading. A conspicuous spread zone is the grasslands of central Eurasia, in which ... four different spreads have carried different language families across the entire steppe and desert as well as into central Europe and Anatolia' (Nichols 1997b: 369). In reverse chronological order, these four spreading families are Mongolian, Turkic, Iranian, and Indo-European.

Nichols' dynamic approach to linguistic geography is original and creative, and I have no quarrel with the general model she proposes, nor with the specific claim that central Eurasia has represented a linguistic spread zone in several cases. For the Indo-European case, this does conflict with the standard archaeological view of the so-called 'homeland' and the dispersal of the family. The standard view is that the language corresponding to Proto-Indo-European was spoken somewhere in the Pontic-Caspian steppe – in other words, just north of the Black Sea and Caspian Sea.² What Nichols calls the 'locus' of Proto-Indo-European was, on the standard

view, not far from the area where Proto-Indo-Iranian later emerged.

For Nichols it is important that Indo-European 'has the greatest number of primary branches of any known genetic grouping of comparable age', since this is 'the hallmark of a language family that enters a spread zone as an undifferentiated single language and diversifies while spreading' (Nichols 1997a: 138). What I will suggest here is that discoveries of the second half of this century call into question precisely this aspect of Indo-European subgrouping.

2. Greek

The most famous postwar discovery in Indo-European is the decipherment of Linear B and the subsequent identification of the Mycenaean dialect of Greek, attested between roughly 1400 and 1200 BCE, half a millennium earlier than any other Greek dialect.³ The facts of Mycenaean confuse the reconstruction of Proto-Greek. On the one hand, because Mycenaean Greek shows innovations that are found only in some Greek dialects, it cannot be viewed as Proto-Greek; it is just an early dialect. On the other hand, many innovations are found in every Greek dialect *except* Mycenaean. These used to be viewed as Proto-Greek changes, but because they are absent from Mycenaean they must now be seen as dialectal changes that have spread through all the post-Mycenaean dialects. As Morpurgo Davies (1988: 76) writes, 'some of the features shared by all dialects are due to post-Mycenaean and a fortiori to post-Common Greek innovations which occurred independently in the various dialects'.

Some of these post-Mycenaean but pan-Greek innovations are sound changes: for instance, the change of labiovelar stops to labials, the loss of intervocalic *b* and *y*, and the loss of postconsonantal *y* with the development of distinctive consonant palatalization. In morphology, I will mention two changes Morpurgo Davies cites. The first involves noun inflection. All post-Mycenaean Greek dialects have a system of five cases in which the Indo-European locative, ablative, and instrumental cases have merged with the dative. Yet Mycenaean retains at least seven of the eight Indo-European nominal cases; the relevant syncretisms postdate Mycenaean.⁴

A second example involves nominal derivation. Proto-Indo-European had many nouns with stems ending in **n* and a few with stems ending in **m*. In forms with suffixes these stem-final nasals surfaced word-medially, and otherwise they were word-final. Greek word-final nasals merged as *n*, with the result that original **m*-stems showed *m* word medially but *n* word finally. Original **n*-stems, of course, showed no such alternation. For the **m*-stems, the alternation was then eliminated by generalizing the *n* from word-final to word-medial position. As an analogical response to alternations created by sound change, all *m*-stems became *n*-stems in Greek.⁵ This is shown in (3). What is interesting here is that this distinctive morphological change appears in all post-Mycenaean dialects but not Mycenaean itself, as shown by the dative *emei* 'one' (vs. e.g. later *en-i*).

3	<i>N-STEMS</i>	<i>M-STEMS</i>	
nom. sg.	tékto:n	*k ^h t ^h ó:m	> k ^h t ^h ó:n
gen. sg.	tékton-os 'carpenter'	*k ^h t ^h om-ós 'earth'	> *k ^h t ^h om-ós → *k ^h t ^h on-ós

The problem is not simply that our list of uniquely Proto-Greek innovations is smaller than it used to be; the list is in fact dangerously small. The facts I have just rehearsed complement an issue discussed long before the discovery of Mycenaean, in Meillet's 1913 history of the Greek language. In a number of areas of grammar, the Greek dialects agree in a structural innovation vis-à-vis Indo-European, but they disagree in its formal manifestation in such a way that the innovation cannot be reconstructed for the Greek protolanguage. The infinitive is one example: all Greek dialects have a present, an aorist, and a perfect infinitive; but from dialect to dialect these are formed so differently that the only reconstructible ancestor system is one like Vedic Sanskrit, in which various types of deverbal nouns could be used as 'infinitives'. If there was any Proto-Greek system, it was not the kind of system found in the documented Greek dialects.

The first person plural verbal ending poses a similar problem. Greek dialects attest two variants of this suffix: *-mes* in West Greek dialects, and *-men* elsewhere. A standard view (e.g. Rix 1992: 251-52) is that *-mes* represents the original present (or 'primary') ending and *-men* contains the original past ('secondary') ending **-me*. As schematized in (4), *-men* is thus hypercharacterized, consisting of first-person plural **-me* plus a redundant marker *-n* taken over from the first-person singular:

4 CREATION OF 1 PL. *-MEN*

- a secondary 1 pl. **-me* + 1 sg. *-n* → hypercharacterized 1 pl. *-men*
- b secondary 1 pl. *-men* also generalized to primary function
- c West Greek: primary 1 pl. *-mes* generalized to secondary function

This analysis has two obvious problems if the Greek dialects are assumed to reflect a reconstructible 'Proto-Greek'. First, it presupposes that the ending **-me* survived long enough to be the basis for the creation of *-men* in some dialects, but there is no other Greek evidence for this ending. Second, it fails to account for the Indo-European dialectology of first-person plural endings in **-s* and **-n*. A generalized present and past **-s* ending is also found in Italic (e.g. Latin *-mus* < **-mos*), across the Adriatic Sea from West Greek, while an **-n* ending is also found in Anatolian (e.g. Hittite *-wen*), across the Aegean Sea from the non-West-Greek dialects. It would be attractive to analyze the relevant events in context as innovations spreading between adjacent dialects in a continuum.

3. Celtic and Italic

At the western end of the Indo-European world we have no precise counterpart to Mycenaean Greek, but our knowledge of several peripheral and archaic Celtic and Italic languages has steadily improved as a result of archaeological work in Spain,

France, and Italy. For Celtic, three archaic languages are now documented outside Britain and Ireland: Gaulish in France and elsewhere, Celtiberian in Spain, and Lepontic in Italy. Analysis of the Continental Celtic languages, especially Lepontic and Celtiberian, has cast doubt on a number of putative Celtic innovations. Thus Eska (1998) argues that the diagnostic Celtic loss of Indo-European **p* may have been 'in progress' in the earliest documented Lepontic. This would mean that the change was not a 'Proto-Celtic' innovation after all, despite eventually affecting all Celtic languages. Current work on Celtiberian suggests a comparable view of some other distinctive innovations of the Celtic branch of Indo-European.⁶

For Italic, the question of linguistic unity is an old one. Certainly the standard view is that Latin on the one hand, with its close relative Faliscan, and on the other hand Oscan, Umbrian, and the other Sabellic languages are members of an Italic branch of Indo-European, and that this has a reconstructible protolanguage with a set of unique innovations vis-à-vis other branches. In this case there is also a respectable minority position, defended locally by Beeler, to the effect that Latin and the Sabellic languages 'owe their similarities to relatively late linguistic convergence' and 'never constituted a subgroup intermediate between Proto-Indo-European and the attested languages' (Beeler 1966: 51).

This is not the place, and I am not the person, to resolve the Italic controversy, but its contours can be described. Defenders of Italic unity are impressed by the overall structural similarity of the Latin and the Oscan and Umbrian verb systems. For example, Watkins (1966: 43) writes that Latin shows 'a fundamental opposition of infectum and perfectum, a present, past, and future of each in the indicative, and a present-future and past in the subjunctive – ten functional structure points in all', adding that '[t]his organization of the verbal system is Common Italic'.⁷ These ten categories are shown with plus (+) marks in (5).

5 ITALIC VERB STRUCTURE (Watkins 1966: 43)

	— Indicative —		— Subjunctive —	
	infectum	perfectum	infectum	perfectum
Future	+	+	—	—
Present	+	+	+	+
Past	+ (*-bʰā-)	+	+ (*-sē-)	+

As evidence for Proto-Italic, Meiser (1986: 15 n. 1) likewise cites 'the structural and material similarities' of the verb systems of the Italic languages.

Opponents of Italic unity are struck by a lack of concord in the specific formal implementation of functionally equivalent categories like those in (5). A single Proto-Italic future formation cannot be reconstructed, and the Italic languages also disagree in the formation of the present subjunctive. Morphological disagreements in the perfectum are interpreted by several authorities, including recently Meiser himself, as evidence that the verb system ancestral to the attested Italic systems was unlike the one in (5), and was 'similar to that of ... Greek' (Meiser 1993: 171). Boldface plus marks in (5) show the only two categories for which it is clear that a

single innovation underlies the forms of both branches of Italic. In short, the question of Italic unity seems largely to have depended on the weight attached to formal correspondences, as opposed to functional or structural ones, in assessing the likelihood of historical identity as opposed to areal convergence.

4. Outliers

I have reviewed some aspects of Celtic, Italic, and Greek dialectology. For each language family there is evidence that its diagnostic innovations are not in fact shared by all its members. Thus, in the clearest case, the discovery of Mycenaean Greek has cast doubt on some important previously accepted Proto-Greek innovations. Similarly, reconstruction from the slowly expanding Italic dialect corpus suggests that the distinctive profile of the Italic verb system may reflect areal innovation, and new Continental Celtic discoveries are casting doubt on the Proto-Celtic status of previously accepted common features of the family.

Another similarity is that in each of these three cases there is at least one poorly documented outlier language whose generally accepted classification seems to depend on trivial diagnostics. In the Celtic case this outlier is Lusitanian, and a test of Celticity has been the loss of Proto-Indo-European **p*. Calling this change 'circumstantial and systematically unmotivated', McCone (1996: 8) concludes that it 'is unlikely to have happened independently at two or more sub-Celtic nodes ... From this it follows that ... Lusitanian, which ... preserves PIE *p* unchanged in PORCOM "pig" ... cannot properly be considered a Celtic language.' Here the assumption is that sound changes have systematic motivations, and that a change with no such cause is unmotivated; but this view of sound change is out of date.⁸ An alternative view may be better supported: sound change is caused by perceptual ambiguities, and [p] is less salient acoustically than its voiced counterpart [b] and than its voiceless counterparts at other places of articulation.

In the Italic case the outlier is Venetic, a somewhat better documented language, but one that has given rise to a similar debate. A recent comprehensive study notes that '[t]he classification of Venetic as "Italic" ... rests to a large extent on the treatment of the IE voiced aspirates' (Stuart-Smith 1995: 313). Exactly the same issue looms large in the final case of Greek, where the outlier is Macedonian. In trying to resolve the exact status of this problematic 'minor' ancient language, the most recent analysis concludes that 'some linguistic stratum ... had words inherited from PIE with deaspiration of the voiced aspirates' (Weiss 1998). The common element in both cases is that the sound changes affecting the Indo-European murmured stops are viewed as crucial in deciding the subgrouping of a poorly documented outlier. Yet Armenian, the sole member of one branch of Indo-European, nonetheless shows among its diverse dialects a range of treatments of the Indo-European murmured stops. This is clearly shown in (6): Armenian dialects that retain murmur coexist with those where the murmured stops are devoiced or have undergone other changes.

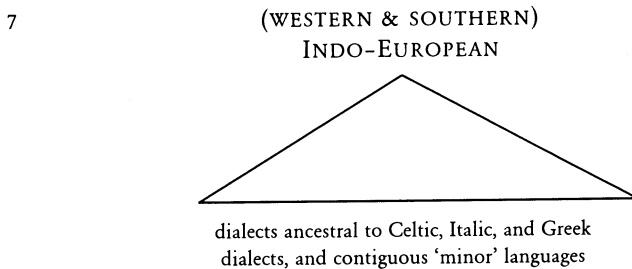
6

	SEVEN ARMENIAN DIALECT TYPES (Garrett 1998)						
PIE	1	2	3	4	5	6	7
*t	th	th	th	th	th	th	th
*d	d	t	d	d	d	t	t
*dʰ	dʰ	dʰ	d	t	th	d	t

The point is that changes in this one area are very weak evidence indeed for deciding whether to call a language ‘Italic’. The difficulty disappears – the question becomes uninteresting – if we adopt a model that does not require us to impose a historical classification in which every language in the family either does or does not originally belong to a single ‘Italic’ daughter of Indo-European.

5. Conclusion

The picture that emerges differs from the usual model, according to which Celtic, Italic, and Greek correspond to three neighboring daughter nodes on the Indo-European family tree. For western and southern Indo-European, an alternative model is sketched in (7):



What is crucial in this model is that at some early date – say, at the beginning of the second millennium BCE – the dialects that were to become Celtic, or Italic, or Greek, shared no properties that distinguished them uniquely from the other dialects. The point is not simply that innovations could spread from one Indo-European branch to another: this is well known. The point is that while there was linguistic differentiation, the differentiation *among* dialects that were to become Celtic, for example, was no more or less than between *any* pair of dialects. At this time, there was no such thing as Celtic or Italic or Greek.

I am not rejecting the Stammbaum model in favor of the wave model, and I am not saying that Proto-Indo-European was a dialect continuum, or that Indo-European is the result of convergence, or anything along those lines. What I am saying is this: there is no clear evidence for a historical – that is to say, in the technical linguistic sense of the term, a genetic – Celtic or Italic or Greek subgroup of Indo-European. These do not correspond to nodes on an Indo-European Stammbaum. On the contrary, sometime in the third or second millennium BCE, the Indo-European dialects of western and southern Europe formed a continuum.

This contained the ancestors of Celtic, Italic, and Greek, as well as Venetic and the other 'minor' languages of the area, and no doubt other dialects that are now lost. But there is no reason to assume that the ancestors of the later Celtic or Italic languages, or of the Greek dialects, shared any exclusive set of innovations defining them as distinct subgroups of Indo-European.

In short, according to the view I am advocating, the formation of a Celtic subgroup of Indo-European, the formation of an Italic subgroup, and even the formation of 'Greek' itself may have been secondary Sprachbund phenomena: local responses to areal and cultural connections that could very well have arisen in Greece, on the Italian peninsula, and in western and central Europe. These would represent linguistic areas, not merely the final landing sites of three discrete Indo-European subgroups after some millennial peregrination from the steppes. If this view is right, it makes no sense to ask what route the speakers of 'Proto-Greek', 'Proto-Italic', or 'Proto-Celtic' followed from the Indo-European homeland: no such languages existed, and no such populations. It is an accident of history that these three families and apparent branches of Indo-European have arisen (or four, if we restore Albanian to its place among the living). This accident reveals nothing about Indo-European, its speakers, or the dispersal of Indo-European languages and their speakers.

At least two additional questions now arise. First, can the model I advocate be applied elsewhere in Indo-European? I have only discussed the southwest quadrant of the Indo-European area, not the area occupied by Germanic, Baltic, Slavic, Armenian, Indo-Iranian, and Tocharian. In the Indo-Iranian case, for example, it is easy to reconstruct a protolanguage with numerous distinctive innovations, and there is no evidence that these changes spread secondarily through an early dialect continuum. But if it is only Greek, Italic, and Celtic whose dialectology should be reconceived, then Indo-European still has an impressively large number of initial branches.

The southern and western branches I have discussed here differ in an important way, however, from those that remain. The line that separates them is precisely the line demarcating areas with relatively early writing. The inscriptional record alone gives evidence for the kind of secondary areal convergence I have suggested for the histories of Celtic, Italic, and Greek, because the early, peripheral, and nonstandard dialects whose testimony is crucial are precisely not transmitted through a literary tradition: they are dug out of the ground.

Written evidence is relatively late in the Indo-Iranian world, in Balto-Slavic, in Tocharian, etc., and so in principle the crucial kind of evidence is absent. There is no Indo-Iranian counterpart of Mycenaean Greek because we do not have a variety of Indo-Iranian dialects documented, say, in a corpus of Bactrian inscriptions of 2000 BCE. We will probably never have such evidence, but the fact that Indo-Iranian did not leave the same testimony as Greek does not mean that it was not formed by similar processes. The Indo-European branches whose protolanguages

can be least easily undermined are, in short, those where the diffusion and use of writing is such that we necessarily lack the relevant data. If we apply what we learn from cases where there is evidence to those where there is none, it follows that the Indo-European family tree with a dozen independent, highly distinctive branches is nothing more than a historical mirage.

If so, a second question immediately arises: Why does Indo-European give the impression of multiple initial branching? The answer is clear in each case. In the Greek case, for example, the answer is that a set of dialects were spoken in what can now be seen as a Greek linguistic area, where innovations spread from dialect to dialect, and that dialects that did not fully participate are now either lost or poorly known; Macedonian may be an example. But why is this pattern repeated in case after case?

It is a truism that the discovery of Indo-European and the foundation of the academic field of linguistics were substantially fuelled by nationalism. I suggest that the nationalist ideologies lurking behind our field refract the same sociological forces that shaped its object of study. Our conception of Indo-European emerged from the analysis of national literatures and cultural traditions, and the canonical branches of the family emerged through the creation of national identities. On the view of Indo-European dialectology I have sketched, the existence of Greek is a by-product of the formation of what we may call Greek national identity. Through a series of mutual linguistic influences, this facilitated the dialectological coalescence of the set of Indo-European dialects we now call Greek. The ironic point, if I am right, is that the supraregionalizing force underlying the study of Indo-European is at the same time responsible for obscuring the true nature of its family tree.

This approach to Indo-European dialectology should not change the practice of historical reconstruction and analysis, but it does have several virtues apart from any purely evidentiary justification. First, it makes it possible to interpret cases like the Greek first-person plural ending, where western dialects agree with the Indo-European branch to the west and eastern dialects agree with the branch to the east. Such cases can in principle reflect the earlier state of the dialect continuum, in this case before the diffusion of a set of unique innovations throughout the dialects we now call Greek.

Second, classificatory debates about peripheral or 'minor' languages become somewhat pointless on this approach. Whether Venetic is 'Italic', for instance, is a matter of its development and its historical sociolinguistic connections in Italy and not its essential status. It will be interesting to know how Venetic participated in the Italic linguistic area, and its treatment of the Indo-European murmured stops may cast light on this issue, but we need not expect to find any unitary answer.

Finally, inasmuch as sociolinguistic processes are social and should therefore be encompassed by social theories, it is worth noting that the view I have advocated is congruent with present-day archaeological models, which stress the dynamic aspect of ancient societies. The development of areal cultural homogeneity is sometimes

attributed to 'peer polity interaction' (Renfrew & Cherry 1986), or contacts within a group of smaller-scale communities, and these accounts seem to predict precisely the kind of linguistic evolution I have proposed. Here is a point of overlap with the views of Colin Renfrew, who 'would prefer to see the development of the Celtic languages, in the sense that they are Celtic as distinct from generalized Indo-European, as taking place essentially in those areas where their speech is later attested' (1987: 245). Renfrew's view of Indo-European dispersal is rightly rejected by specialists as linguistically unsound, but his influential perspective on ancient social interactions is entirely at home here.

Let me add a historiographic coda. Nichols' integration of historical and areal linguistics is brilliantly original, as I have said, but like everything it has a context. In this case it is reasonable to think of a Berkeley school of language change whose most striking feature is its emphasis on the dynamic interaction of languages and speakers in contact. The founding document of this school is Emeneau's paper on 'India as a linguistic area' (1956), though it is also a school arising from the specific linguistic profile of California; and it is relevant that Emeneau's paper appeared in the issue of *Language* honoring Alfred Kroeber on his 80th birthday. I agree with Nichols that a dynamic view of language change enriches historical study, but for Indo-European I prefer to situate the dynamic at the end of linguistic dispersal, in the historical formation of the branches that now comprise the family as a whole.

Notes

¹ I do not mean to imply (nor do Ringe and his colleagues) that the tree in (2) is original in every respect; it echoes subgroupings proposed by a number of scholars (e.g. the late Jochem Schindler) in recent years.

² For illustrations of this view see e.g. Mallory (1989, 1997).

³ Strictly speaking this is not true, but the corpus of Greek dialect inscriptions earlier than 800 BCE is insignificant for present purposes.

⁴ For the data see e.g. Meier-Brügger (1992, vol. 2, pp. 63–66) and Hajnal (1995: 16–32).

⁵ This change is discussed from a typological point of view by Schindler (1974).

⁶ For instance, the Celtic raising of long mid vowels (**ō* > *ū* in final syllables, **ē* > *ī*) may not be regular in Celtiberian; cf. the discussion of McCone (1996: 15–17) with references.

⁷ 'Infected' and 'perfectum' are technical terms for the 'present' and 'perfect' verb systems.

⁸ McCone's argument also ignores the possibility of areal diffusion: an innovation that originates in one dialect and spreads to others cannot be said to 'happen independently at two or more nodes'. In fairness it should be noted that McCone also cites a sporadic metathesis (attested in Irish, British Celtic, and Gaulish, but not in Lusitanian) as a Celtic diagnostic.

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A comparison of three metrics of perceptual similarity in cross-language speech perception

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1. Introduction

Cross-language speech perception models, such as the Perceptual Assimilation Model (PAM) and the Native Language Magnet (NLM) model, are highly dependent on assumptions concerning the mapping of non-native sounds onto native categories, as well as the internal structure of native categories, in predicting the discriminability of non-native contrasts (Best 1995, Kuhl 1991, Kuhl and Iverson 1995). These models differ from one another in cases in which both stimuli of a non-native stimulus pair are identified as exemplars of a single category (hereafter *Within-Category* assimilations). PAM predicts that the discriminability of two non-native stimuli is a function of their difference in category goodness, or difference in distance from the center of the category. In contrast, NLM predicts that the discriminability of two non-native stimuli is a function of their psychoacoustic difference, weighted by the proximity of the pair to the center of the category, or the category's *prototype*. This proximity effect is termed the *perceptual magnet effect*. Due to the perceptual magnet effect, the discriminability of a stimulus pair is predicted to decrease as the stimuli approach the prototype. In studies of within-category (WC) assimilations, internal category structure has been commonly quantified with goodness ratings, though some studies have used the frequency of a stimulus' identification as an exemplar of a particular category (Sussman and Lauckner-Morano 1995, Sussman and Gekas 1997). The evidence supporting NLM's model of category structure has been mixed (Kuhl 1991; Lively and Pisoni 1997; Lotto, Kluender, and Holt 1998; Kewley-Port and Neel 1998), while this aspect of PAM has not been directly tested.

While both models make predictions concerning the discriminability of WC assimilations, only PAM makes explicit predictions concerning the discriminability of non-native contrasts that correspond to a native contrast in the listener's experience (hereafter *Two-Category*, or TC, assimilations), namely that they would be highly discriminable. And neither model adequately accounts for non-native stimulus pairs which are not mapped consistently onto one or two categories (hereafter *uncategorizable* assimilations). NLM is silent on such pairs as it is a model solely of internal category structure. PAM makes a distinction between a pair of uncategorizable sounds (a *Both Uncategorizable*, or UU, assimilation) and a pair consisting of one uncategorizable sound and one sound that is consistently mapped onto a native sound (an *Uncategorizable-Categorizable*, or UC, assimilation). PAM does predict that UC assimilations should be as discriminable as the most discriminable within-category assimilations, though it is silent concerning the range of variability one might expect to find in the discriminability of such assimilations. However, for UU assimilations, discriminability is said to be a function of two factors, interstimulus difference (gesturally-based, given PAM's basis in direct realism), and the position of each stimulus in the overall perceptual space. Given that no further detail is provided in terms of integrating these two kinds of information, PAM is unable to predict the discriminability of a UU contrast.

The purpose of this study was to test the portions of PAM and NLM that are most amenable to cross-language validation, namely the relationship between a non-native contrast's identification pattern and its discriminability, as formalized in similarity metrics, specifically for TC and WC assimilations. In addition, the problem of predicting the discriminability of uncategorizable assimilations was addressed in this study by proposing and testing a relatively simple hypothesis concerning the identification-discrimination relationship, which will be referred to as the overlap hypothesis. It simply states that the discriminability of a stimulus pair is a function in the degree of overlap in the identification patterns of each stimulus; stimulus pairs whose identification patterns show less overlap are predicted to be more discriminable. A formalization of PAM, NLM, and the overlap hypothesis for two-category, within-category, and uncategorizable discriminations (when applicable) appear in section 3.

To test these formalizations cross-linguistically, nasal contrasts combining bilabial, dental, alveolar, and retroflex nasals from three languages (Malayalam, Marathi, and Oriya), varying in talker, syllabic position, and vowel context, were presented in an AXB discrimination test and an identification test with category-goodness ratings to seven listener groups varying in their coronal nasal consonant inventory: Malayalam (bilabial-dental-alveolar-retroflex), Marathi and Punjabi (bilabial-dental-retroflex), Tamil and Oriya (bilabial-alveolar-retroflex) and Bengali and American English (bilabial-alveolar). Multiple listener groups and non-native contrasts were used to increase the likelihood that the results would generalize to other groups and contrasts. Nasals varying in place of articulation constituted a stimulus set that had not been examined in previous cross-language speech perception studies. Moreover, this set was chosen to maximize the potential for varying degrees of perceptual performance by non-native listeners, given the potential difficulty that non-native place contrasts are often shown to present to listeners (Werker, Gilbert, Humphrey, and Tees 1981). The goal was to generate a sufficient number of each assimilation type, particularly within-category and uncategorizable assimilations, for the purposes of testing the formalizations of PAM, NLM, and the overlap hypothesis. Section 2 describes these experiments in detail; section 3 gives the formalizations, and thus predictions, of each model; section 4 reports the results of the experiments in terms of the formalizations of PAM, NLM, and the overlap hypothesis; and section 5 concludes with a discussion of the results and suggestions for future research.

2. Methods

2.1. Stimuli

Six talkers, two each of Malayalam, Marathi, and Oriya, were recorded reading from a list of real and nonsense words from their native language, in both isolation and a sentence frame, in five repetitions each for a total of ten repetitions. Nonsense words were read in cases where the lexicon of the language did not provide a word composed of a necessary sequence of vowel(s) and nasal(s). The nasals of interest appeared in all syllable positions allowable by the individual languages, in an [a], [i], or [u] vocalic context. Some relevant characteristics of the speakers who produced the stimuli are listed in (1).

(1) Demographics of talkers. NL = native language, either Malayalam (ML), Marathi (MR), or Oriya (OR). "Home" = home city or district within India. "Years" = years outside of an environment in which the native language is widely spoken.

Name	NL	Sex	Age	Home	Years	Other Languages Spoken
YM	ML	m	58	Malabar	29	English, Hindi
YS	ML	f	47	Malabar	26	English, Hindi, Tamil
MS	MR	m	26	Mumbai	1	English, Hindi
MV	MR	f	35	Mumbai	6.5	English, Hindi, Gujarati
OC	OR	f	35	Cuttack	5	English, Hindi, Marathi, Bengali
OS	OR	f	30	Bhubaneswar	9	English, Telegu, Hindi

The recording took place in a sound-attenuated chamber in the University of Michigan Phonetics Laboratory using a Panasonic SV3500 DAT recorder. The stimuli were digitized at 44.1 kHz (filtered at 22 kHz), randomized, and played with a 3.5s intertrial interval (ITI) to native speakers of the respective languages in an identification test in order to exclude any stimuli from use in the experiment which might be poor exemplars. Of the stimuli which were recorded and evaluated, four exemplars, two from each talker, of 18 types of stimuli were used in the discrimination and identification tests. The stimulus types are listed in (2).

(2) Stimuli and their source languages. The vocalic context was [a] for all but underlined stimuli. Underlining indicates that the stimulus appeared in [i] as well as [a] contexts. The dental nasal of Malayalam talker YM was produced as interdental.

		Nasal			
Language	Syllable	[m]	[n]	[ɳ]	[ɳ̪]
Malayalam	VCV			✓	✓
Marathi			✓		✓
Oriya				✓	✓
Malayalam	VC:V	✓	✓	✓	✓
Marathi			✓		✓
Oriya					
Malayalam	VC				
Marathi			✓		✓
Oriya					

All of the nasal stimuli appeared in an [a] context, with the exception of the Malayalam medial geminate series, which appeared in both the [a] and [i] contexts. Pilot tests had shown that the perception by non-native listeners of talker YM's dental stimuli, which were actually produced as interdentals ([ɳ̪]), differed due to vocalic context. In an [a] context, YM's [ɳ̪] stimuli were identified as bilabial exemplars by the non-native listeners, with a subsequent effect on their discrimination of YM's dental contrasts. In an [i] context, YM's [ɳ̪] received the more expected label of dental or alveolar, depending on the non-native listener group in question. Both vocalic contexts were preserved in this case, since four contrasts produced by talker YM could be expected to elicit within-category assimilations from a subset of the listener groups: [am:a]-[aɳ̪:a], [iɳ̪:i]-[iɳ̪:i], [iɳ̪:i]-[iɳ̪:i], and [iɳ̪:i]-[iɳ̪:i]. The 18 stimulus types were combined to make 34 contrasts, with

contrast defined in terms of: the place of articulation of each member of a contrast, the talker who produced the contrast, the vocalic context the nasal stimuli appeared in, and the syllable type the nasal stimuli were embedded in.

2.2. Participants

Twelve to eighteen speakers each of Malayalam (N=18), Oriya (N=16), Marathi (N=14), Punjabi (N=13), Tamil (N=12), Bengali (N=15), and American English (N=18) were recruited and tested. All but the American English listeners were tested in India, in order to recruit subjects who varied little in terms of age, dialect spoken, and overall linguistic experience. All subjects from India were recruited by posting flyers on the campuses of local universities. American English listeners were recruited through introductory linguistics classes at the University of Michigan. Malayalam, Oriya, Tamil, and Marathi listeners were students attending national universities in India's capital, New Delhi. Bengali listeners were university students who were recruited and tested in Calcutta, the capital of West Bengal, where Bengali is primarily spoken. Punjabi listeners were recruited and tested in Amritsar, the cultural center of the Punjab state in northwestern India. None of the listeners who participated in the study had any experience with another language that would afford them additional nasal contrasts not found in their native language.

The Malayalam, Marathi, and Oriya listener groups were recruited to serve as controls. In addition, six listener groups represented three types of listener groups with particular coronal nasal consonant inventories: dental-retroflex (Marathi, Punjabi), alveolar-retroflex (Oriya, Tamil), and alveolar (Bengali, American English), all of whom could be expected to perceive a subset of the non-native contrasts as within-category or uncategorizable assimilations. The relevant nasal consonant inventory for each listener group is listed in (3), assuming that the category centers, or "prototypes", of these native categories are best represented by position-dependent allophonic variants of the phonemes associated with each category (Strange 1995). The predictions for a particular non-native contrast's assimilation to the native category or categories of a given listener group were difficult to make precisely, given the absence of a model of the similarity between one type of stimulus to another, or between one type of stimulus and one type of category. The absence of such a model has been cited as an important gap in cross-language speech perception models (Best 1995; Flege, Bohn, and Jang 1997). Thus, for this study, the predictions for the assimilation patterns were based on three assumptions or sources of information. First, it was assumed that a non-native stimulus would map onto a native category if both shared a common descriptive label, a position-dependent allophonic label. For example, the Malayalam dental nasal stimuli were predicted to map onto the Marathi and Punjabi listeners' native dental nasal category. Second, in the case of mismatches between a stimulus' label and any available native categories, past cross-language research shaped the prediction. For instance, in the case of the Malayalam and Marathi dental and retroflex nasals and native American English listeners, it was assumed that these non-native stimuli would map onto the English alveolar nasal, given prior work on English listeners with oral dental-retroflex stop contrasts (Werker et al. 1981, Polka 1991). Finally, all remaining predictions were guided by piloting work done with 3-6 speakers of Punjabi, Tamil, Bengali, and American English. These predictions appear in (4). These predictions could only be treated as tentative, and represented an attempt to elicit the range of assimilation types necessary for testing PAM, NLM, and the overlap hypothesis. The actual mapping of specific non-native sounds to specific

native categories was not crucial to the validation of these models, so long as a sufficient number of each assimilation type was elicited.

(3) Relevant (to the stimuli) perceptual category inventories for the six non-native listener groups. Syll = the type of syllable the nasal appears in. * = Oriya allows/disallows final consonants, depending on the dialect spoken (see Harnsberger 1998 for a summary).

Dental-Retroflex Group

Syll	Marathi				Punjabi			
	[m]	[ŋ]	[n]	[ɳ]	[m]	[ŋ]	[n]	[ɳ]
CV	[m]	[ŋ]			[m]	[ŋ]		
VCV	[m]	[ŋ]		[ɳ]	[m]	[ŋ]		[ɳ]
VC:V	[m]	[ŋ]		[ɳ]	[m]	[ŋ]		[ɳ]
VC	[m]	[ŋ]		[ɳ]	[m]	[ŋ]		[ɳ]

Alveolar-Retroflex Group

Syll	Oriya				Tamil			
	[m]	[ŋ]	[n]	[ɳ]	[m]	[ŋ]	[n]	[ɳ]
CV	[m]		[n]		[m]	[ŋ]		
VCV	[m]		[n]	[ɳ]	[m]		[n]	[ɳ]
VC:V					[m]		[n]	[ɳ]
VC	[m] *		[n] *	[ɳ] *				

Alveolar Group

Syll	Bengali				American English			
	[m]	[ŋ]	[n]	[ɳ]	[m]	[ŋ]	[n]	[ɳ]
CV	[m]	[ŋ]			[m]		[n]	
VCV	[m]		[n]		[m]		[n]	
VC:V	[m]		[n]					
VC	[m]		[n]		[m]		[n]	

2.3. Procedure

Two perceptual tests were administered to the subjects, a discrimination and an identification test. For both tests, stimuli were presented binaurally over Sony MDR-7506 headphones connected to a Sony TCD-D8 portable DAT recorder. Responses were made on photocopied answer sheets. The categorical AXB discrimination test consisted of 544 trials, 16 trials each of the 34 different types of contrasts. In order to ensure that the results were not dependent on the intelligibility of a single exemplar, two exemplars of each member of the 34 contrasts were used.

The contrasts appeared in four possible orders, AAB, ABB, BAA, BBA. A and B were always from the same talker, and all stimuli that were paired together were selected to minimize acoustic differences that were assumed not relevant to the identity of the stimulus, such as the duration or the fundamental frequency pattern of a stimulus. The ISI for the discrimination test was 1s, the ITI was 3s, and the IBI was 6s, with 20 trials per block. The total time for the discrimination test was 58.5

minutes. Subjects were told to indicate whether the nasal consonant in the first or last word was the same as the nasal consonant in the middle word by circling a number on the answer sheet. The term "nasal consonant" was defined through the use of simple examples in which nasals appeared in different syllable positions and vocalic contexts. A, X, or B were not physically identical, so listeners made categorial matches. Listeners were instructed to ignore "irrelevant differences" of duration, tone, or voice quality. A familiarization set of 20 trials was presented before the AXB test, with particular trials selected to reinforce the instructions. The identification test consisted of a labeling task in which listeners used response sets based on native phonemic categories. Listeners were also instructed to provide category-goodness judgments on a five-point scale. The ratings were necessary in evaluating PAM and NLM given these models' reference to category-goodness and prototypicality. Listeners identified and rated two exemplars each of the eighteen types of stimuli, produced by two talkers each, for a total of 72 stimuli. The identification test included two repetitions of this set, presented in random order, for a total of 144 trials. The test employed a 6s ITI and a 6s IBI, with 10 trials per block (total test time: 16.25 minutes). Listeners were again instructed to ignore "irrelevant differences" of duration, tone, or voice quality. Before the test began, ten trials were presented to familiarize listeners with the time allotted for labeling and rating a stimulus, with no feedback from the investigator.

(4) Predictions of possible assimilations. TC = two-category assimilation, U = uncategorizable assimilation, WC = within-category assimilation. * = predictions involving dental contrasts differed when Malayalam talker YM's contrasts were involved, given this talker's realization of dental nasals as interdental. YM's [m]-[ɳ] in an [a] context were predicted to be WC for all non-native groups, while his [ɳ]-[n] and [ɳ]-[ŋ] in an [a] context were predicted to be TC for all non-native groups. These exceptional predictions were made based on earlier pilot studies.

Contrast	Assimilation Type	Listener Group(s)
[m]-[ɳ]	TC/WC*	all
[ɳ]-[n]	WC/TC*	all
[ɳ]-[ŋ]	TC	Marathi, Punjabi
	U/TC*	Tamil, Oriya
	WC/TC*	Bengali, AE
	TC	Tamil, Oriya
[n]-[ŋ]	U	Marathi, Punjabi
	WC	Bengali, AE

3. Predictions

A set of specific predictions for the discriminability of non-native contrasts was generated from PAM, NLM, and the overlap hypothesis. They are listed below by three general assimilation types: two-category (TC), within-category (WC), and uncategorizable (U). A stimulus pair was classified as a TC assimilation if the two stimuli were identified as exemplars of different native categories and if each stimulus was identified with its corresponding category in 90% or more of responses. If one or both stimuli were identified by a listener group with a single native category in fewer than 90% of responses, then such a contrast was classified

as a U assimilation. A contrast was classified as a WC assimilation for a given listener group if both stimuli were identified as exemplars of a single-category in 90% of responses.

3.1. Two-Category (TC) assimilations

PAM predicts that these assimilations should elicit the highest scores of any assimilation type. In addition, for this experimental paradigm, PAM predicts that TC discrimination scores should fall between 90-100%. NLM makes no direct predictions concerning TC assimilations.

3.2. Uncategorizable (U) assimilations

NLM makes no predictions concerning stimulus pairs that are not within-category. PAM predicts only that, for two stimuli that fall outside of a native category, "discrimination is expected to range from poor to very good, depending on their proximity to each other and to native categories" (Best 1995:195). Two metrics are included here – one referring to interstimulus proximity, which also can be thought of as psychophysical salience, and a second referring to the proximity of each stimulus to one or more native categories (category proximity). Two problems emerge here in trying to predict the discrimination scores for an uncategorizable contrast. First, it is unclear how many category proximity distances must be computed for a given listener group. Should one include the proximity of a stimulus to the nearest native category, to the two nearest, or perhaps to all native categories in the same natural class? The second problem concerns the final formula combining all of the interstimulus and category distances: how are they weighted or combined in the final computation of the predicted discrimination score or range of scores?

To address this shortcoming of PAM, a very simple similarity metric was devised based on the overlap hypothesis described earlier, a *categorization* metric, which took into account the degree to which a non-native contrast mapped onto a native contrast. The assumption, based on the classic definition of Categorical Perception, was that listeners would be able to discriminate non-native contrasts that map onto a native contrast, with a corresponding decrement in discrimination ability with non-native contrasts that were less consistently categorized into two distinct categories. The metric was calculated solely on the basis of the frequency with which the non-native stimuli composing a contrast were mapped onto the various native categories possessed by a listener group. Specifically, the score was the sum of the differences in percent-identification of a stimulus to each native category of the listener group, as shown in (5).

$$(5) C = \sum_{i=1}^n |A_i - B_i|$$

where C = categorization score, n = the number of native categories, A_i = percent identification of stimulus A as an exemplar of category i , and B_i = percent identification of stimulus B as an exemplar of category i . In essence, the categorization metric is a measure of the degree to which two stimuli differ with one another in their degree of identification with multiple categories.

3.3. Within-Category (WC) assimilations

Within PAM, within-category stimulus pairs can either be classified as single-category (SC) or category-goodness (CG) assimilations (Best 1995). The

distinction between these two assimilation types lies in the degree to which the two stimuli forming a contrast differ in their similarity to center of the category: a stimulus pair in which both stimuli are equally good, or equally poor, exemplars of a single category is classified as an SC assimilation, while a stimulus pair in which both stimuli differ in their similarity to the category center is classified as a CG assimilation. A common similarity metric underlies this distinction, that the degree of difference in category-goodness between two stimuli determines their discriminability. Such a metric can be formalized as:

$$(6) D = |R_A - R_B|$$

where D = discriminability of a hypothetical /A-B/ non-native contrast, and R_A and R_B = the mean category-goodness rating of stimulus A and stimulus B, respectively.

Within the framework of NLM, within-category assimilations can conceivably be classified in terms of three assimilation types for the purposes of comparison with PAM: prototypical (both stimuli are prototypical), nonprototypical-prototypical, and nonprototypical (both stimuli are nonprototypical). NLM predicts that prototypical assimilations should elicit lower discrimination scores than nonprototypical ones, holding constant the psychoacoustic, or interstimulus, differences involved (Kuhl and Iverson 1995). No predictions can be made directly by NLM for nonprototypical-prototypical assimilations, though one would expect them to elicit higher scores than prototypical ones, since they involve a stimulus that is perceptually distinct from a prototypical stimulus. The perceptual similarity metric underlying all three assimilation types is more complex than (6). It involves two measures: of the similarity of each stimulus to the category center, or prototype, and the interstimulus similarity, or its acoustic robustness. The first measure is one typically taken by, for instance, category-goodness ratings; the latter is simple to quantify for synthetic stimuli. However, for natural stimuli, quantifying acoustic robustness involves assumptions concerning what aspects of the acoustic signal are relevant for speech, and how to combine disparate types of information in the signal (frequency, duration, amplitude). For the purposes of this study, the following formalization of the NLM was used:

$$(7) D = AR / R_x$$

where D = discriminability of contrast /A-B/, AR = acoustic robustness (defined below), R_x = the mean category-goodness rating of either stimulus A or B (lowest).

In essence, the formalization in (7) states that the discriminability of a stimulus pair is a function of its acoustic robustness, weighted by the proximity of the stimuli to the category center. Proximity here is defined in terms of just one of the two stimuli, namely the one furthest from the prototype, the one eliciting the lowest goodness rating in this study. This metric assumes that only one stimulus out of the pair needs to be at the periphery of the category for the perceptual magnet effect to be minimal. Thus, nonprototypical-prototypical stimulus pairs were assumed to be as discriminable as nonprototypical stimulus pairs, holding acoustic robustness (AR) constant, since the former involves a stimulus that is perceptually distinct from a prototypical stimulus. AR was calculated for this stimulus set by summing the F2 and F3 transition magnitude differences (calculated in Bark) between the two stimuli forming the contrast. Formant transition differences have been frequently cited as

important acoustic cues in differentiating nasal consonants differing by place (Larkey, Wald, and Strange 1978; Dart 1991). The transition magnitude difference for a given formant was calculated as follows: the difference was taken between the formant's center value (measured in Hz using narrowband FFTs and then converted to Bark) at vowel offset (12.5ms before the vowel/murmur boundary), and its value at vowel temporal midpoint. Thus, rising transitions into the murmur had positive transition magnitude values, while falling transitions had negative values. In cases of stimuli with medial nasals, and thus two vowel/murmur transitions, the transition magnitudes for a given formant were averaged (i.e. the F2 transition magnitudes of the preceding and following vowel were averaged for a given stimulus). The transition magnitude difference between two stimuli could then be calculated for a given formant (F2, F3). The difference scores for each formant could then be summed for the AR measure in (7). Unfortunately, AR could only capture some important *spectral* differences in contrasts. In some contrasts, significant *temporal* differences between the murmurs were observed, as well as differences in the *spectral* structure of the murmurs. Contrasts which exhibited such differences were excluded from the test of metric (7).

4. Results

The control groups performed as expected for all native contrasts, with one exception: Malayalam listeners' mean percent correct discrimination score for Malayalam talker YS' [aŋ:a]-[aŋ:a] contrast was 82%. Of the 238 assimilations (34 types of contrasts * 7 listener groups) collected in this study, the majority (157) were uncategorizable; 47 were two-category, while only 34 involved within-category stimulus pairs.

4.1. Two-category assimilations

All of the two-category assimilation scores fell within a high range, 87-100%, averaging 97% ($s = 3\%$), which matches closely with PAM's predictions. Only two assimilations failed to reach the 90% criterion, the identification of Malayalam talker YS' [am:a]-[aŋ:a] and [ana]-[aŋa] by speakers of Oriya.

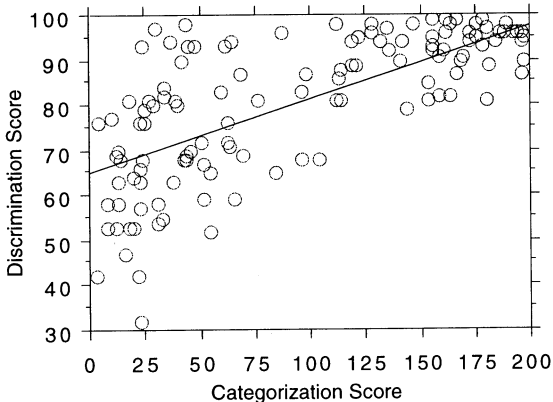
4.2. Uncategorizable assimilations

The scores for the uncategorizable contrasts varied greatly, from 32-99%, with the majority of scores falling within an upper range (80-100%). For each uncategorizable assimilation, a categorization score was generated. The categorization scores for all the identification results for non-native contrasts were paired with the discrimination scores in a simple regression analysis. If discrimination performance could be explained simply by the identification patterns, as quantified by the categorization scores, then we would expect to see a very high correlation across the entire distribution of the discrimination scores. The results of the regression analysis are presented in (8).

The discrimination and categorization scores were significantly correlated ($F[1] = 209, p < 0.0001, r = 0.76$). However, at lower categorization scores, there were more outliers from the regression line. The lower range of categorization scores corresponded, in most instances in this study, to identification patterns that were more like within-category assimilations, in which both stimuli composing a contrast were consistently judged as exemplars of the same category. One explanation for the variance at lower categorization scores would be that individual categories possess some degree of phonetic detail, allowing for a certain degree of listener

sensitivity to fine-grained, nonphonemic information. Intracategory detail cannot be modeled with this score, since it is based on the degree to which stimuli overlap in different perceptual categories.

(8) Categorization scores plotted against discrimination scores for uncategorizable assimilations.



4.3. Within-category assimilations

The capacity to test PAM and NLM predictions concerning intracategory pairs (single-category vs. category-goodness, prototypical vs. nonprototypical and nonprototypical-prototypical) was limited by the small number of within-category assimilations elicited in this experiment. However, many of the uncategorizable contrasts were within-category assimilations if only the top labeling choice of a particular listener group was considered. To generate more test cases for NLM and PAM predictions, the discrimination scores for within-category (WC) and uncategorizable near-WC assimilations were recalculated to represent only those subjects who consistently (in 90% of more of responses) labeled both stimuli of a contrast with the same label. When inconsistent labelers were excluded from the analysis, in some cases, so few consistent labelers remained that the corresponding mean discrimination score was an average over a much smaller group of listeners. In cases where the remaining pool of labelers dropped below 8, the assimilation was excluded from the analysis.

Using only the "consistent" subjects, a total of 64 within-category assimilations were generated. Of those, all 64 were used to test PAM's similarity metric (see (6)), while 50 were used to test the formalization of NLM appearing in (7); 14 assimilations were excluded in testing (7) due to the limitations of the acoustic robustness portion of the metric, outlined in section 3.3. The scores generated by both metrics, based on the identification test results, were included with the corresponding discrimination scores in a Spearman rank correlation analysis. Both the PAM and the NLM metrics showed significant, though low correlations ($z = 2.2$, $p = 0.03$, $r = 0.32$; $z = 4.7$, $p = 0.0001$, $r = 0.68$; respectively). While the NLM metric may have appeared to have fared better than the PAM metric, in fact, it was no improvement over a correlation between the acoustic robustness and discrimination test scores ($z = 4.7$, $p = 0.0001$, $r = 0.69$). Given that the NLM metric incorporates

acoustic robustness, the weighting due to the particular formalization of the perceptual magnet effect in (7) was expected to have produced scores that showed a greater correlation with the discrimination scores than the measures of acoustic robustness alone.

5. Discussion and Conclusion

The results obtained in this experiment revealed an unexpected range of discrimination scores for different types of within-category assimilations, and a large proportion of uncategorizable contrasts, raising a number of problems for both PAM and NLM. First, it was clear that neither model could account for the majority of assimilations elicited in this study, uncategorizable ones, involving one or more stimuli that fell between native categories. The proposed categorization score was a somewhat successful attempt at accounting for variation in the discriminability of uncategorizable contrasts, though other factors are apparently at work in within-category assimilations. The categorization score's advantage was in its ability to capture less categorical, more graded identification responses that were so prevalent in this study, due no doubt to the use of several listener groups with more than one relevant perceptual category for the stimuli in question.

Second, the formalizations of PAM and NLM predictions for the identification-discrimination function were not strongly upheld by the results. This poses the greatest problem for PAM, given that the formalization in (6) represents a very straightforward translation of the principles articulated by Best (1995) for within-category assimilations (single-category plus category-goodness). These results, and the modest correlation reported between the acoustic robustness (AR) and the discrimination scores, suggest that interstimulus distance is an important factor in within-category assimilations, contrary to the predictions of PAM. The failure to validate NLM could have been due to this study's particular formalization of the perceptual magnet effect, conceived of as a weighting of AR, or it could reflect the limitations of the AR portion of the metric. AR was limited to the magnitude of transitions of the second and third formants, two cues that appeared to show the greatest cross-stimuli differences in an acoustic analysis of the stimuli¹ (Harnsberger 1998). However, only a subset of the within-category assimilations (50/64) were used in testing the NLM formalization, constituting contrasts that only appeared to be cued by F2 and F3 transition differences. If the NLM formalization was appropriate, then the results of the study are consistent with those that have failed to find a perceptual magnet effect (Lively and Pisoni 1997; Lotto, Kluender, and Holt 1998).

The results reported in this study provide a number of suggestions for future cross-language studies. First, the frequency with which uncategorizable contrasts were elicited in this study points to the importance of this assimilation type in cross-language speech perception models and the need for formal models to account for their relative discriminability. The categorization metric of the overlap hypothesis represents the beginnings of one such model, but it clearly must be augmented by some sort of model of the internal structure of categories. The model of internal category structure in PAM was clearly not supported by this experiment, and it is unclear whether or not NLM can provide an adequate model. Such a model doubtless requires more cross-language study, using both natural and synthetic stimuli, and examining both vowels and consonants, with a variety of listener groups. Such future experiments should allow us to successfully evaluate current perceptual category models and develop more predictive models of perceptual performance than have been hitherto possible.

Notes

¹ The acoustic analysis included measures of F1-F5 at the onset, midpoint, and offset of the vowel and murmur portions of each stimulus, as well as measures of overall stimulus duration and murmur duration.

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***Some* and the pragmatics of indefinite construal**

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0. Introduction

Some is a complicated little word: it participates in a variety of distinct constructions; it expresses a variety of subtly different meanings; and its use is subject to constraints which do not apply to other words with similar meanings. In this paper, I hope to sort out some of this complexity: to present some basic facts about *some*'s uses, and to offer some explanation for the ways *some* can and cannot be used.

But while this paper purports to be about *some*, it is also, in some sense, about *any*. In fact, it could hardly be otherwise. The close relation between these forms—in particular, their puzzling, polarity sensitive pattern of suppletion—requires that any account of *some* should include at least some explanation of its relation to *any*. More than that, a proper understanding of the ways *some* can and cannot be used may shed light on some of the enduring controversies which surround *any*. The basic questions with *any* are in fact precisely those which confront us with *some*: how, if at all, are the different uses of this form related to each other; and why are these uses constrained in the peculiar ways they are.

Ultimately I will argue that the evidence from *some* offers important, if somewhat indirect, support for a unified analysis of *any* as an indefinite determiner. The argument is essentially analogical in form. Starting from the assumption that *some* and *any* share a close semantic relation, my goal is to see how much of the analysis of *some* might apply to *any*. I will argue that the parallelism between the two is stronger than is commonly supposed, and that consequently, the way we analyze one of them should significantly constrain the way we analyze the other.

1. Some facts about *any* and *some*.

The basic facts for *any* have been well-established at least since Horn (1972). Polarity sensitive, or PS *any*, as in (1a), occurs only in "negative" polarity contexts (which of course need not be strictly negative) and seems to have the force of an existential quantifier. Free choice, or FC *any*, as in (1b), occurs in modal and other non-episodic contexts, and seems to have a meaning closer, if not quite identical to that of a universal quantifier (cf. Vendler 1967).

- (1) a. There aren't any lemurs in Leipzig.
 b. Any lemur enjoys a good swim.
 c. No lemur drinks any whiskey.

(1c) shows that in some contexts both uses may happily coexist. On the PS reading, lemurs are claimed to be abstemious: they drink no whiskey. On the FC

reading, they are merely fastidious: they drink whiskey, but not *just any* whiskey.

A variety of analyses are possible here. The simplest might be that *any*'s two uses simply reflect two distinct senses associated with *any* (Ladusaw 1979; Carlson 1981). Another possibility is that *any* has only one meaning, that of a universal quantifier, and that the distinct PS and FC readings simply reflect different scope assignments *any* may take with respect to other operators (Quine 1960; Gil 1991). Others agree that there is only one *any*, but argue that it is not a universal but an indefinite. On this account, the distinction between PS and FC *any* reflects the difference between existential and generic construals available with indefinite determiners generally (Davison 1980; Kadmon and Landman 1993; Lee and Horn 1994; Horn 1998).

The facts about *some* are no less interesting, though they tend to receive less attention. We may note first a traditional distinction between the reduced form *sm*, as in (2a), and the full form, as in (2b).

- (2) a. There were *sm* lemurs sitting in the library.
b. Some linguists enjoy drinking whiskey.

While the reduced *sm* simply introduces an indefinite instance of a nominal type, the full form seems to presuppose a contrast with other instances of the type. Thus the lemurs in (2a) need not contrast with some topical larger set of lemurs; but the whiskey drinking linguists in (2b) can only be construed as a subset of linguists in general. Partly because these two construals are usually associated with distinct pronunciations, they are often treated as distinct lexical items.

Other uses of *some* may be distinguished on syntactic and semantic grounds.

- (3) a. There's *some* linguist here to see you.
b. Boy, that was *some* party last night!
c. We danced *some*, we talked *some*, and then we went home.

(3a) and (3b) show *some* combining with a singular count noun rather than a mass or plural noun as in (2). In both cases *some* seems to carry an added implicature about the speaker's attitude toward its referent. In (3c) *some* actually functions as an adverb rather than a determiner.

However we explain the ways *some* is used in (2-3), we must also contend with the ways it cannot be used. First, while *any* is a negative polarity item (NPI), *some* is a positive polarity item (PPI), and as such cannot happily occur in the scope of negation. Where *some* does occur with negation, the result is either ill-formed, as in (4a-b), or else it forces a reading in which *some* takes wide scope over negation. Thus (4c) can only assert that there are some books which were not read, and not that there are no books which were read.

- (4) a. *You don't have *some* peanut butter on your chin.
b. *There isn't *some* linguist here to see you.
c. I didn't read *some* books.

As noted by Langacker (1991: 103), *some* is subject to a further constraint in that, unlike other indefinites, it cannot support a generic reading. Thus while NPs formed with *a/an* or with zero can refer either existentially, to an indefinite instance of a type, as in (5), or generically, to the type itself, as in (6), NPs with *some* only allow non-generic readings.

- (5) a. Sally saw{a/some} wombat hiding under the bed.
- b. We have {some/Ø} wombats living in our attic.
- (6) a. {A/#Some} cat likes to chase mice.
- b. {#Some/Ø} cats are mammals.

In the following sections I sketch out an analysis of these facts concerning *some* which I hope will extend in a natural and explanatory way to the facts concerning *any*. First, I argue that not all of *some*'s distinct uses should be treated equivalently. Some may be explained by general pragmatic principles of indefinite construal and hence should not (or at least need not) be stipulated as distinct lexical senses. Other uses, however, seem to have semantic and syntactic properties which do not follow in any obvious way from *some*'s other conventional uses or from more general linguistic principles. I propose to treat these as distinct lexical senses which are extended from *some*'s basic use as a determiner. Finally, I will argue that the constraints on *some*'s distribution—its status as a PPI and its resistance to genericity in all its variants—reflect a type of weak scalar construal which *some* imposes on its referent.

In the last section I will apply these results for *some* to a consideration of *any*. I will argue that these two forms are closely related, and that the constraints on *any*, like the constraints on *some*, reflect its basic status as an indefinite scalar operator. As for the different uses of *any*, I will suggest that these appear to be strictly parallel to the pragmatically determined uses of *some*, and therefore do not require any lexical stipulation of distinct senses.

2. Basic *some*: the indefinite construction

Following Langacker (1991: 96), I treat determiners in general, and *some* in particular, as grounding predications—that is, as forms whose basic meaning involves the way in which a conceptualizer makes mental contact with an instance of a nominal type. I thus take *some*, in its most basic sense, as serving to establish mental contact with a limited, indefinite instance of the nominal type designated by its head. I will refer to this instance as *some*'s profile, or equivalently, as its referent.

By an **indefinite instance** I mean one which cannot be uniquely identified simply on the basis of the nominal alone. The noun which *some* determines is, on its own, insufficient to put the hearer in mental contact with a unique instance of the type it designates. An indefinite instance can be specific or non-specific depending on whether or not the speaker has a particular instance in mind. In general then, I take definiteness to reflect a referent's status in the mind of the hearer, and specificity to reflect its status in the mind of the speaker.

By a **limited instance** I mean one which, although indeterminate in its extent, may contrast with other instances. The use of *some* systematically suggests such contrasts. While it may be that if *all the linguists danced* then *some of the linguists danced*, the use of *some* still suggests that only a limited subset participated. *Some's* limited reference distinguishes it from more general indefinites, like *a/an*, which can refer either to a single instance or generically to a whole class of instances, and also from *any*, which effectively refers to every instance of a kind.

The indefinite semantics of *some* allow it to be associated with a variety of different construals, but while these construals are semantically distinct, they need not be taken as distinct senses of *some*. On the contrary, these construals are all available with a variety of indefinite NPs, including at least those marked by *a/an*, *a few*, *many*, *several*, and the cardinals *one*, *two*, *three*, etc. These construals are not idiosyncratic features of *some* in particular, but rather apply to indefinite NPs generally. They do not in themselves support a polysemous analysis of *some*. In the rest of this section I distinguish three important dimensions of construal which may play a role in the interpretation of indefinites, and demonstrate their significance for the use of *some*.

2.1. Existential vs. partitive. The first dimension of construal depends on whether an indefinite NP simply introduces an indefinite referent into the current mental space—the existential construal, or whether the referent is understood as construed as part of a larger group familiar in the discourse—the partitive construal. Out of context, indefinites are often ambiguous between the two readings. Thus in (7), *some linguists* can refer either to a group of people who happen to be linguists, or to some subset from a familiar set of linguists.

(7) Some linguists were seen smoking in a corner of the bar.

Note that the availability of these readings is not a peculiarity of the word *some*. Similar ambiguities arise when we replace *some* here with other indefinite determiners like *a*, *three* or *many* (cf. Milsark 1977; Diesing 1992).

As it turns out, the distinction between existential and partitive construals is precisely what distinguishes the reduced, unstressed *sm* from its full counterpart *sóme*. *Sm* requires an existential construal, while the full form allows either an existential or a partitive construal. While one could treat *sm* as a separate lexical item from the full *some*, it is also possible that *sm's* reduced phonology reflects a general pattern of vowel reduction in unstressed function words. I am inclined to the latter interpretation, though nothing crucial hinges on the decision here.

The distinction between these two construals is grammatically significant. In particular, the existential reading is only available with *stage-level* predicates describing transitory states or events, as in (8a,b), and not with *individual-level* predicates denoting a stable characteristic or property of their subjects, as in (8c). This explains why (8c) is bad: the weak unstressed *sm* can only receive a non-specific, existential interpretation, but the individual-level predicate *often belligerent* can only apply to a specific individual or group of individuals.

- (8) a. There were some lawyers arguing in the garden.
 b. Sm lawyers beat up one of the linguists.
 c. *Sm lawyers are often belligerent.

Similarly, although the partitive construal works with either individual-level predicates, as in (9a), or with stage-level predicates, as in (9b), its presuppositional nature does not allow it to introduce a new discourse entity. This explains the oddness of (9c), which forces a partitive reading in an existential *there* construction.

- (9) a. Some lawyers are very pleasant people.
 b. Some of the lawyers apologized profusely.
 c. ??There were some of the lawyers arguing in the garden.

The existential-partitive split and its relation to other grammatical phenomena have been issues at the center of much recent research on indefinites (Enç 1991; Ladusaw 1994; Byrne 1998). The important point here is that however this distinction is ultimately handled, it is not a peculiarity of *some* but a general feature of indefinite construal.

2.2. Neutral vs. contrastive. The next dimension of construal depends on the determiner's status in the information structure of an utterance. Normally, a determiner is less pragmatically salient than the nominal which it determines. But sometimes one wants to emphasize the choice of one determiner over another. The examples in (10) illustrate contrastive construals with both existential, (10a), and partitive uses of *some* (10b).

- (10) a. We did see **some** linguists at the party, but not **many**.
 b. **Some** linguists danced in the garden, but most just sat and talked.

Again, the choice of construal carries grammatical consequences. In particular, the restrictions on *some* as a positive polarity item appear to be much stricter when it is used contrastively. On the neutral construal *some* can appear in negative sentences where it takes wide scope over negation, as in (4c) above; but, when *some* is used contrastively, the wide scope interpretation seems to disappear. Thus negation in (11) must be construed as metalinguistic—the (a) reading. The (b) reading, parallel to that of (4c), is not available.

- (11) We didn't smoke **some** cigarettes.
 a. We didn't smoke "some" cigarettes, we smoked them all.
 b. *There are some cigarettes that we didn't smoke, but not many.

Apparently, then, the contrastive construal makes *some* stronger as a PPI. The examples in (12) further support this conclusion.

- (12) a. If he'd read some books about it, I imagine he'd have told us.
 b. ??If he'd read **some** books about it, I imagine he'd have told us.

In (12a), on a neutral construal, *some* is not blocked by a conditional. In (12b), however, the contrastive construal leads to anomaly in the conditional context.

2.3. Quantities and Kinds. The final dimension of construal depends on the ontological status of an indefinite's profile. In general, an indefinite NP can designate either a **quantity** of a given nominal type, or a **kind** of the type. The examples in (13) illustrate these two possibilities.

- (13) a. Some drugs might make you feel better. Quantity or Kind
 b. Some drugs can be very dangerous. Kind only
 c. There are some drugs in the refrigerator. Quantity only

(13a) allows at least two readings with different truth conditions. On the quantity construal, there must be some quantity of at least one kind of drug which might achieve the desired effect. On a kind construal, there have to be multiple kinds of drugs which might help, though there might be others that would not.

Since the idea of a kind itself presupposes that there could be other kinds which contrast with it, the kind reading is inherently presuppositional. As such it inherits all the privileges and restrictions associated with the partitive construal; however, the kind reading also imposes certain restrictions of its own. Much like FC *any*, the kind reading for *some*, is limited to just those contexts which allow indefinites to be interpreted generically. Thus in (14), where *some* is used episodically for specific past events, the kind reading is systematically blocked.

- (14) a. I saw some syntacticians sneaking around the garden. Quantity only
 b. Some linguists smoked all the opium. Quantity only
 c. I introduced Sally to some phonologists at the party. Quantity only

While the quantity-kind distinction does affect truth conditions, few, I think, would posit two distinct meanings of *some* to account for them. Rather the difference seems to reflect something more fundamental about the ways we can construe a nominal type (cf. Langacker 1997). This at least would explain why a variety of determiners (*many*, *a few*, *three*, etc.) allow both quantity and kind construals. And as I will suggest in section 5, echoing the proposal of Lee and Horn (1994), the quantity-kind distinction may be exactly the distinction needed to distinguish the free choice and polarity sensitive uses of *any*.

3. Polysemy: the extended constructional family

While some of *some*'s variants may reflect general facts about the pragmatics of indefinite reference, others cannot so easily be explained away.

3.1. Spesumptive *some*. The use of *some* with a singular count noun adds a significant nuance to *some*'s basic sense. The examples in (15) are typical.

- (15) a. There's some guy here to see you. Says he's the Emperor of Japan.
 b. Sally met some linguist at a bar. Seems like he reset all her parameters.
 c. Apparently some idiot thought this would be a good place for a mall.

As discussed in Warfel (1972) and Mazodier (1998), the use of *some* in these examples has a quasi-specific force. While the NPs here must each have a

unique referent, the use of *some* here suggests that for whatever reason the speaker either cannot or will not specify the identity of the referent. Because the usage involves a sort of presumption of specificity, Warfel dubbed this the **spesumptive *some***.

The presumption of specificity appears to be a non-defeasible feature of *some*'s meaning in this usage, and attempts to defeat it result in anomaly.

- (16) a. #Cecily is dating some English duke. He's an old friend of mine.
 b. #Noah rented some film for us to watch. It's an old favorite of mine:
 The Unbelievable Truth.
 c. Noah rented some films for us to watch. They're old favorites of mine: *Trust*, *Suspicion* and *The Maltese Falcon*.

The anomaly of (16b) compared with the naturalness (16c) clearly shows that spesumptivity is conventionally associated with *some* only in its use with singular count noun and not with its more basic use with mass and plural nouns.

3.2. Adverbial *Some*. Like many indefinite quantifiers, *some* has an adverbial use in which it modifies a relational predication, usually an activity verb or VP.

- (17) a. We danced some, and then we said goodnight.
 b. She wrote poetry some when she was younger, but not so much anymore.
 c. I explained my feelings some, but maybe not enough.

While other indefinites also have adverbial usages, the adverbial uses an indefinite allows may not be obviously predictable from its meaning.

- (18) a. Mort isn't { *some / any / *a lot / much / very } good at ice-fishing.
 b. Harry is { *some / *any / *a lot / *much / very } good at ice-fishing.
 c. Sally's { *some / *any / a lot / much / *very } better than Harry.

There may be some principled explanation for these differences between adverbial *some*, *any*, *much* and *a lot*, but it seems likely that speakers have to learn these patterns as idiosyncratic facts for each form. If this is correct, then the adverbial usage of *some* must be recognized as a distinct sense.

3.3. Exclamative *Some*. The examples below illustrate exclamative uses of *some* with singular count nouns (19a) and mass nouns (19b). The usage allows either an appreciative interpretation, the default in (19a-b), or an ironic reading, as in (19c).

- (19) a. Boy, was she (ever) **some dancer**!
 b. That was **some wine** she brought to the party!
 c. **Some friend** she turned out to be!

Exclamative *some* has two properties typical of exclamatives in general (cf. Michaelis & Lambrecht 1996). First, it can only be used to express a speaker's subjective evaluation of a referent. This explains why (20a) is odd (at least without free indirect discourse), because here the subjective evaluation is not

that of the speaker. Second, exclamative *some* involves the assertion of a scalar extent: the referent must be understood as an extreme exemplar of its type. This explains why it normally only occurs in predicative NPs, thus barring examples like (20b) where *some* is not part of the predicate, and allowing examples like (20c).

- (20) a. *Harry thought she was **some** dancer, but I disagreed.
 b. ***Some** friend stole my prized bottle cap collection!
 c. She must have been **some** friend to rip you off like that!

The semantics of exclamative *some* is radically different from that of all other *some*s. First, it forms a definite NP whose referent must be uniquely identifiable: an exclamation presupposes something to exclaim about. Furthermore, the very notion of exclamation seems somehow at odds with other uses, as in (21), where *some* seems more compatible with hedging and understatement than exclamation.

- (21) a. I have *some* idea of what you mean, but it's still a bit hazy.
 b. She's read *some* Lacan, but not much.

But understatement is often just a step away from exclamation, and *some*'s use as an exclamative may be seen as a natural extension from a more basic understating function. The examples in (22), with their air of pregnant understatement, offer a link between the hedges of (21) and the exclamatives of (19).

- (22) a. *Some* people actually enjoy the weather in San Diego.
 b. Of all the boys I've known, and I've known *some*,
 Until I first met you, I was lonesome. (from "Bei Mir Bist Du Schön")

Here, sentences which seem unassuming may be effectively very forceful. Thus one might use (22a) with someone unhappy about San Diego's excessive sunshine to suggest that not only do **some** people enjoy this weather, but in fact most people do. Similarly, the song lyrics in (22b) suggest that the speaker has in fact known quite a few boys: the use of *some* allows her to claim this worldly experience without sounding like she is bragging.

While these examples are not true exclamatives, they do point to a natural link between the exclamative use and other more understated uses. The important point is that while *some*'s exclamative use probably has to be stipulated, it is not an arbitrary fact but is motivated by *some*'s other uses, and in particular by its rhetorical use in understatements, (21), and pseudo-understatements, (22).

4. *Some* and the pragmatics of understatement

As noted above, what distinguishes basic *some* from other indefinites is the limited nature of its indefinite reference. But to say that *some*'s reference is limited does little more than restate the facts about its distribution. The question

is, why is it limited? My basic proposal here is that *some*'s limited reference reflects its basic function as an expression of understatement.

Intuitively, understatement involves the expression of a less informative proposition where a more informative proposition might have been expected. As such, understatement is essentially a scalar phenomenon: it depends on the construal of an expressed proposition against an ordered set (i.e. a *scale*) of alternative propositions. Typically, any scale is structured around a norm representing default contextual expectations. The assertion in (22a) thus counts as an understatement because the expressed proposition—that *some people enjoy the weather*—makes a weaker claim than what one would expect—that *most people enjoy the weather*.

As noted in Israel (1996, 1998b), lexical forms may be specialized for the expression of understatement, and such specialization often gives rise to polarity sensitivity of one sort or another. Thus English *much* tends to occur in negative contexts where it can form a relatively weak proposition; similarly, a PPI like *somewhat* is blocked in negative contexts where it might sound emphatic. Other forms, like *a bit*, are rhetorically underspecified, and so can be used either to form understating propositions, as in (23a), or emphatic ones, as in (23b).

- (23) a. Sally was {a bit / somewhat /*much} confused by his explanation.
 b. Sally wasn't {a bit /*somewhat /much} impressed by his nonchalance.

My claim here is that *some*, like *much* and *somewhat*, is essentially understating. *Some* profiles a limited instance of a nominal type construed against the set of all other instances of that type, and *some* requires that the proposition to which it contributes must be uninformative with respect to these other instances.

The understating nature of *some* is clearest in rhetorically loaded examples like those in (22). In other cases, and especially on the existential construal, the effect of understatement may be much more subtle. The examples in (24), for instance, lack the rhetorical pregnancy one normally associates with understatement.

- (24) a. Noah has sm really delicious mushrooms.
 b. Some mushrooms are poisonous. You should be careful.

While such uses may be rhetorically neutral, they are nonetheless consistent with an understating scalar construal in that they present an expressed proposition against a background of more informative alternatives. The background propositions are much less prominent here, but they are nonetheless implicit in the contrast of *some* with alternative forms like *a lot*, *most* and *all*.

The analysis of *some* as inherently understating provides a simple explanation for the constraints on its distribution and interpretation. Because *some* is an understater, it cannot be used to convey information about all the instances of a given type: a set of *some* instances always, at least implicitly, contrasts with other instances. *Some* is thus a PPI: it cannot be interpreted in the

scope of negation, because the negation of an indefinite precludes the possibility of any contrasting instances. And it cannot be interpreted generically for the same reason—because a generic interpretation implies the participation of every normal instance of a type.

5. The Rhetorical Symmetry of *Some* and *Any*

Some's status as an understater also explains its relationship with *any*, which is the emphatic counterpart of the understating *some*. While *some* requires a construal in which the expressed proposition is weaker than some potential alternative, *any* requires its expressed proposition to be stronger than any potential alternative. Figure 1 schematizes the relationship between these forms.

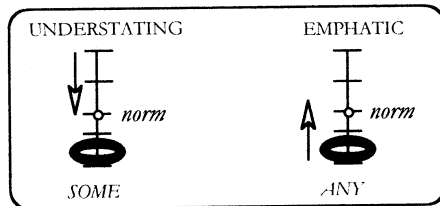


Figure 1: The Rhetorical Counterparts

The only difference here is in the inferencing the two forms demand. Both profile an indefinite instance construed against an ordered set of alternative instances, and in both cases, the ordering of alternatives supports scalar inferences. The upward arrow for *any* indicates that *any*'s profile licenses inferences about all other instances of a type. The downward arrow for *some* indicates inferencing from scalar alternatives to *some*'s expressed proposition. The understating semantics of *some* blocks it from licensing inferences about scalar alternatives. *Some* is understating because it suggests that one might have said something else which would have been more informative.

If *any* and *some* really are so closely related, then we should expect to find more or less the same set of construal types associated with both of them. This prediction appears to be fairly robustly confirmed.

5.1. Existential vs. Partitive *Any*. Like *some*, *any* allows both existential and partitive readings depending on whether a profiled instance is construed as some part of a larger whole. The *of* phrases in (25) force the partitive construal.

- (25) a. Noah didn't eat any of the brussel sprouts.
b. ??There weren't any of the linguists at the party.

(25b) suggests that as with *some*, the partitive construal of *any* is awkward, at best, in existential constructions. The parallelism here supports the analysis of *some* and *any* as twin scalar indefinites, and validates the view of the existential-partitive split as a matter of indefinite construal rather than lexical semantics.

5.2. Contrastive vs. Neutral *Any*. Like *some*, *any* allows both contrastive and neutral construals. In (26), for example, the use of heavy stress on *any* indicates a contrast with other potential quantities of brussel sprouts.

- (26) Gwendolyn: I really want a brussel sprout! Don't you have even one?
 Jack: No! I don't have **any**.

As noted above (section 2.2), the contrastive use of *some* is stricter in its sensitivities than is the neutral use. Similar things happen to *any* (cf. Israel 1998a). On the neutral use, *any* is a liberal NPI, and is licensed in such weakly negative contexts as the focus of *only*, in (27), and negated *because* clauses, in (28). But these possibilities are not available on the contrastive use.

- (27) a. Only people who've read any Heidegger will appreciate this argument.
 b. *Only people who've read **any** Heidegger will appreciate this argument.
- (28) a. Annette didn't get fired because she stole any money.
 b. *Annette didn't get fired because she stole **any** money.

It has sometimes been suggested that the difference between the stressed NPI *any* and its lax liberal counterpart might have separate lexical entries (Krifka 1995; Rullmann 1996). The analogy with *some* here suggests that the two may simply be pragmatic variants of a single basic form.

5.3. Quantity and Kind Scales. Like *some*, *any* can profile either a quantity or a kind of the nominal type represented by its head. Thus given the type *mushroom*, the determiner can refer either to an indefinite quantity contrasting with other possible quantities (one mushroom, two mushrooms, three mushrooms, etc.), or to an indefinite kind of mushroom contrasting with other possible kinds (poisonous, expensive, delicious, disgusting, etc.). As it turns out, the quantity-kind distinction neatly captures the difference between polarity sensitive and free-choice *any*.

PS *any* is always construed with respect to a quantity scale. Thus in each example in (29) *any mushrooms* effectively means 'any quantity of mushrooms.'

- (29) a. Brett doesn't have any mushrooms.
 b. Do you have any mushrooms?
 c. I'd be surprised if Laura had any mushrooms.
 d. *Craig probably has any mushrooms. Let's call him.

FC *any* involves the construal of an indefinite with respect to a kind scale. In (30) *any mushroom* thus effectively means 'any kind of mushroom.'

- (30) a. Mildred will eat just about any mushroom.
 b. Any mushroom has spores.
 c. You want a mushroom? Take any mushroom you want.
 d. *Noah found any mushrooms growing in the garden.

The analysis of PS and FC *any* in terms of quantity and kind scales is due to Lee and Horn (1994), who argue for a univocal analysis of *any* as an indefinite

incorporating the semantics of a scalar focus particle *even*. On their account the difference between PS and FC *any* simply reflects the fact that *any* nominal can be construed either with respect to a scale of alternative kinds or to a scale of alternative quantities.

The parallels with *some* suggest that this may indeed be the right way to think about *any*. On this account then the two *any*'s reflect different pragmatic variants of a single lexical entry. The split is thus not an idiosyncratic property of *any*, but simply the manifestation of a general fact about the pragmatics of indefinite construal.

6. Some Conclusions

In this paper I have offered a broad, if much too brief, overview of the semantics of *some* and its relation to *any*. The evidence seems to justify the following modest conclusions:

- *Some* is polysemous. It is associated with at least four distinct lexical senses: basic, presumptive, adverbial, and exclamative.
- *Some* is pragmatically ambiguous. General principles of indefinite construal provide a variety of readings for the basic sense of *some*.
- The distributional and interpretive constraints on *some* reflect its function as an expression of scalar understatement.
- *Some* is the understating indefinite counterpart of the emphatic indefinite *any*.

I have attempted here to present a case for what might be called *responsible polysemy*. While I assume that polysemy is both normal and widespread in the lexicon, I do not assume that every alternative construal of a given form ought to be enshrined as a distinct lexical sense.

In this respect the study of *some* and *any* seems particularly instructive. For *some* although not every interpretive variant need be recognized as a distinct sense, **some** variants must. *Some* is therefore polysemous. But with *any* it appears that the most important interpretive variants may well be explained by general principles of indefinite construal. If this turns out to be correct, then *any* might not be polysemous.

It is probably premature just yet to close the book on the topic of the two *any*'s (see Horn 1998 for a useful overview of how much has already been written). After all, just because a variant is predictable on general principles doesn't mean that it can't also be learned as an individual item. Inevitably the debate about *any* will continue. As it does, however, we may do well to remember the relations of *any* to *some* and other indefinite determiners. The close pragmatic parallels between *some* and *any* suggest that these relations may be richer and more interesting than one might have expected. Unfortunately, further study will be required before we can know just how rich and interesting they will be.

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On the rise of suppletion in verbal paradigms

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1. Introduction*

The Ibero-Romance languages Portuguese, Galician, and Spanish share a rare suppletion¹ pattern in which there is complete overlap in certain inflectional categories of two distinct verbs—*ir* 'to go' and *ser* 'to be'. This unusual situation contrasts with familiar suppletion examples such as English *go~went* and *be~am~is~are~was~were*; in these cases the irregular verbs do not 'share' parts of their paradigms with other verbs. In this paper I examine the history of both of these types of suppletion in verbs meaning GO in the Romance languages and propose that the principal distinction between them is the semantic distance of the lexemes to which the overlapping forms belong; specifically, I argue that cases of non-overlapping suppletion come about when the verbal sources of the forms are essentially synonymous and that instances of overlapping suppletion arise when the source verbs, while semantically linked, are more semantically different.

(1) The present indicative and preterit (indicative) of BE and GO in Spanish

ser 'to be'				ir 'to go'			
present		preterit		present		preterit	
soy	somos	fui	fuimos	voy	vamos	fui	fuimos
eres	sois	fuiste	fuisteis	vas	vais	fuiste	fuisteis
es	son	fue	fueron	va	van	fue	fueron

The languages in question display syncretism in the preterit (perfective past) between *ser* 'to be' and *ir* 'to go' (as shown with forms from Spanish in Table 1). In exploring the factors in the development of suppletion in verbs meaning GO in Romance, I will touch on the following questions:

- Why does an irregular verb get 'replaced' by a highly suppletive one?
- Which parts of the paradigm are replaced by the 'suppletive' forms?
- Why does a verb meaning GO take some forms from a verb meaning BE?
- What is the nature of this type of 'overlapping' suppletion?

2. Suppletion versus irregularity

In answering these questions, the first step is to address the issue of what suppletion is and how it relates to irregularity. While intuitively there is a certain appeal to putting pairs such as *bring~brought* and *go~went* in different categories, in part on the basis that in the first there is shared phonological material, one might argue that the distinction is outweighed by the need to 'list' both *brought* and *went* in the lexicon (i.e., memorize them) and that there is then no justification for distinguishing between 'irregular' and 'suppletive' morphology. In this paper I define **suppletion** as the phenomenon whereby semantically regular relations are encoded by unpredictable formal patterns. Cases in which the forms related paradigmatically share phonological material (i.e., 'irregular' forms) are examples of **weak suppletion**, while the others are instances of **strong suppletion**; these types reflect two ends of a continuum rather than an either-or opposition. In the next section I describe the relationship between these types and the diachronic processes

behind them. Then I address motivating factors involved in suppletion, which I illustrate in section 5 with a case study of some suppletive patterns in verbs meaning GO in the Romance languages. I present preliminary conclusions in section 6.

3. Diachronic sources of verbal suppletion

There are three main diachronic processes which lead to suppletion: sound change (both regular and 'irregular'—see below), analogy, and **incursion**, or borrowing from other lexemes. In this section I examine how these lead to suppletion, starting first with weak cases and moving on to strong ones.

3.1. Weak suppletion

Weak suppletion arises through sound change and analogy, but apparently does not result from incursion.

3.1.1. Sound change

In the case of sound change, there are two main subtypes. The first is regular or 'Neogrammarian' change in which all eligible instances of a given sound undergo a particular change, and the second is apparently irregular, that is, it does not display Neogrammarian consistency. A good example of suppletion induced by regular sound change concerns the Spanish verb *decir* 'to say'. Through a series of regular sound changes (the two most important of which can be represented as $k > \theta / V$ [+front], $k > g / V _ V$ [-front]), the Latin verb *dicere* developed from a regular verb into a suppletive one. These cases depend on the interaction of such changes with loss of the conditioning environment or leveling; the allophonic status of the [g] ~ [θ] alternation was lost with the subsequent change of $k^w > k > g / V _ V$ [+front], as in *aquila* /ak^wila/ > *águila* /'agila/ 'eagle'. In contrast, the regular development of the present indicative forms of *pacāre* > *pagar* 'to pay' did not result in suppletion (see Table 2; shaded cells indicate cases in which non-phonological factors played a role).

(2) The results of regular sound change: PAY and SAY in Latin and Spanish

	PAY		SAY	
	Latin	Spanish	Latin	Spanish
1s	'pa:ko:	'pago	'di:ko:	'digo
2s	'pa:ka:s	'pagas	'di:kis	'diθes
3s	'pa:kat	'paga	'di:kit	'diθe
1p	pa:'ka:mus	pa'gamos	'di:kimus	de'θimos
2p	pa:'kartis	pa'gajs	'di:kitis	de'θis
3p	'pa:kant	'pagan	'di:kunt	'diθen

Similarly, what might be called 'irregular' sound change can also lead to suppletion, as in the case of English *say~says*, which displays an irregular vocalic development in the third singular. Given the high frequency of this lexeme (as compared to *pay~pays*, for example), it is likely that this type of change reflects the same process found reduction commonly associated with grammaticalization (cf. Hopper & Traugott 1993, among others). In both cases, elements appropriate to frequent use in discourse appear in relatively weak prosodic positions, which leads to phonological reduction.

(3) The results of 'irregular' sound change: PAY and SAY in English

	PAY	SAY
base	pej	sej
3s	pejz	sez

3.1.2. Analogy

In addition to sound change, analogy can also lead to suppletion. This has happened in the case of the Galician imperfect indicative of the verb *ir* 'to go', which has variant forms resulting from analogy between this verb and the semantically related *vir* 'to come'. The following proportion can be set up using the infinitive and the first person singular imperfect indicative:

(4) Analogy in the Galician imperfect indicative of *ir* 'to go'

infinitive	impf.1s		infinitive	impf.1s	
vir	: vira	::	ir	: X	X= ira
'to come'	'I used to come'		'to go'		'I used to go'

In this case, a number of regular sound changes reduced the difference between the infinitives of these two verbs: /we'ni:re/ > /vir/ 'to come' and /i:re/ > /ir/ 'to go'. Regular sound change led to distinct imperfects, however: /weniam/ > /vira/ 'I used to come', /i:bam/ > /iba/ 'I used to go'. Thus, the nasal is etymologically appropriate in *vir* 'to come', where the regular sound changes of Galician (and Portuguese) resulted in the loss of intervocalic /-n-/ but not of /-ɲ-/ which comes from the loss of hiatus between a front vowel followed by a back vowel in the present and imperfect; a similar development occurred in *ser* 'to be' under influence of *ter* 'to have'.

This example of analogy differs from more canonical cases such as Eng. *dream~dreamt* → *dream~dreamed*, in which an irregularity is eliminated. In the Galician case, the analogy effectively increases the irregularity of *ir* 'to go'; another parallel can be in non-standard *bring~brang~brung* in English, where a verb which fell into none of the inflectional subpatterns of the language enters one (cf. *sing*, *ring*).

3.1.3. Contamination

Closely related to analogy is **contamination**, the phonological alteration of a form to more closely resemble another, usually semantically related, form; it can be thought of as a form of non-proportional analogy. Well-known examples include the Germanic words for 'four', all of which have /f/ under the influence of the word for 'five' but should have reflexes of /*k*/, which shows up in Latin *quattuor* (cf. Eng. *what*, Lat. *quod*); likewise Russian *devjat'* 'nine' has been affected by *desjat'* 'ten', with replacement of /n/ with /d/ (cf. Eng. *nine*; see Anttila 1972:76, 91).

Like analogy, contamination can lead to weak suppletion in verbal paradigms. For example, in the Campidanese variety of Sardinian, the verb *andai* 'to go' has *andu* 'I go' alongside the variant *bandu*, in which the initial /b/ reflects the influence of forms coming from Latin *vādere* 'to go'. For reasons explored below (§5.2), this contamination occurred only in the singular and the third person plural. Another example in Romance is Galician *estar* 'to be', which, under the influence of *ser* 'to be', shows contamination effects resulting in instances of non-etymological -ɲ- in

patterns similar to those induced by analogy between *ter* 'to have' and *ser* 'to be' (see 3.1.2 above).

Given that analogy and contamination deal with the interaction between morphological and phonological patterns, one would predict that this type of change would not lead to suppletion in which the forms share no phonological material. That is, suppletion induced by analogy or contamination is only of the weak type, not of the strong type, to which I now turn.

3.2. Strong suppletion

Unlike analogy and contamination, sound change can lead to either weak or strong suppletion. Meanwhile the other source of strong suppletion, incursion, does not appear to induce weak suppletion (though in principle it could). Synchronically, strong suppletion falls into two basic types, which I call overlapping and non-overlapping. **Overlapping suppletion** is a situation in which forms of one lexeme also belong to a suppletive relationship with forms of another lexeme. The Ibero-Romance preterit forms of *ser* 'to be' and *ir* 'to go' display this type of suppletion; in this case the forms in question are in a suppletive relationship with forms in both paradigms, though this is not always the case (in Catalan, e.g., the form *estat* is a regular participle of *estar* 'to be' and is also a suppletive participle of the other copula (*és*)*ser*). **Non-overlapping suppletion** does not involve such sharing of forms across lexemes and is by far the more widespread of the two types; among the numerous examples are the forms of the English verb *to be*.

3.2.1. Sound change

With suppletion induced by sound change the difference between weak and strong outcomes is essentially one of degree in that over long periods of time, series of sound changes (it does not appear to matter whether it is regular or 'irregular') can result in a chain of development from a regular paradigm to a weakly suppletive one and ultimately to a strongly suppletive one. An example of strong suppletion induced by sound change is found in the English verb *to be*, in which Proto-Indo-European **esmi*, **esti* yielded *am* /æm/, *is* /ɪz/.

3.2.2. Incursion

The main source of strong suppletion in inflectional verbal paradigms, however, is **incursion**, or the incorporation of forms from one lexeme into another, historically separate, lexeme. There are three types of paradigms to which this happens: defective, suppletive, and regular. **Defective** paradigms are paradigms missing an expected element. In these cases it is perhaps misleading to refer to the incorporation of forms from other lexemes as incursion, since no form is actually being replaced; nevertheless, it captures the similarity to other situations and the contrast with other possible processes, such as analogy. An example of a formerly defective paradigm which has undergone incursion is the non-overlapping case of *to be*, which actually includes forms from two previously separate defective paradigms centered on the PIE roots **es-* 'be' (*am*, *is*, *are*) and **bheu-/bhu-* 'become' (*be*, *been*) (*was*, *were* are from a third root **wes-* 'live, dwell'; see Buck 1949:635-636).

In the case of previously suppletive paradigms, incursion tends to change the phonological substance of the allomorphy but leaves the suppletive pattern intact. This happened when the Old English pattern *go~eode* gave way to *go~went*, as well as in verbs meaning GO in various Romance varieties, as I discuss below.

Finally, incursion can also affect regular paradigms, as in the case of Italian *andare* 'to go', which, like most Romance verbs meaning GO, also has reflexes of

Lat. *vādere* 'to wander'; the case of French *aller* 'to go' is similar, but here there is also incursion by forms from *īre* 'to go' (in the future and the conditional).

In most Romance languages, the verb meaning GO displays both weak and strong suppletion resulting from a combination of all of these factors (Table 5). Before looking at the details, let us consider some possible motivations for these developments.

(5) Selected forms of GO in Iberian Romance and Latin

	Ptg	Gl	Sp	Ct	Latin	additional etyma
pr inf	ir	ir	ir	ə'na	'i:re	*an'da:re
1s pr i	vow	vow	boj	batʃ	'eo:	'wa:do: / *'wa:deo:
3s pr i	vaj	vaj	ba	ba	it	'wa:dit
1p pr i	'vamos	'imos	'bamos	ə'nem	'i:mus	'wa:dimus / *an'da:mus
2p pr i	'ides	'i(de)s	bajs	ə'new	'i:tis	'wa:ditis / *an'da:tis
3s pr sb	va	va	baja	'baʒi	'eat	'wa:dat / *'wadeat
2p pr sb	'vades	'vajades	ba'jajs	'baʒiw	e'artis	wa'da:tis / *wa:de'artis
1s imp i	'ia	'iɲa / 'i(b)a	'iba	ə'nabə	'i:bam	*an'da:bam
1s fut i	irej	i'rej	i're	(ən)i're	'i:bo:	'i:re 'abeo: / *an'da:re 'abeo: ²
1s pret	fwi	fun	fwi	ə'ni	'ii: / 'i:wi:	'fui: / *an'da:wi:

4. Motivation

In the search for insight into these developments, I first separate cases induced by sound change from those brought about by analogy or incursion. Sound change operates blindly; whether the result is suppletion depends on phonological pattern. With analogy and incursion, however, the processes do not apply in all possible cases. In this section, I examine some possible motivations for the application of these phenomena.

4.1. Lack of phonetic substance

The replacement of reflexes of Latin *īre* 'to go' has been attributed to a lack of phonetic substance; for example, Lathrop suggests (1980:130):

The Classical Latin infinitive *īre* was continued (Sp. *ir*), but none of its present tense conjugation has survived to modern Spanish; most of its forms would have been too short or too confusing: CL *ego eō* ['I go'—MLJ] would have developed to to [sic] Sp. *yo yo*, for example. *Imos* (from CL *īmus*) and *ides* (from CL *ītis*) were the only forms of *īre* that were retained in Old Spanish.

This explanation suffers from a number of flaws, the first of which is that it depends on the elimination of forms on the basis of avoiding the results of subsequent regular sound changes. (He offers no evidence that such forms survived into Romance and then were eliminated.) Lathrop provides no concrete evidence that this is an operating factor in language change, and sound change frequently results in homophonous and otherwise potentially 'troublesome' forms. Second, he invokes a notion of minimal length without offering any criteria for determining whether a form would be 'long enough' or not.

A discussion avoiding some of these problems is that of Maiden (1995:135), in which he remarks on the replacement in Italian of the singular and third plural present indicative forms of Lt *īre* with forms of *vādere*:

The reason for this pattern of replacement is unclear; it is possible that the relative 'insubstantiality' of the phonetically regular outcomes of the relevant forms of IRE...might have favoured replacement by a phonetically more 'substantial' form. But monosyllabic roots are not inherently intolerable, as is shown by *ho* 'I have', *hai* ['you have'—MLJ], *ha* ['he/she/it has'—MLJ], *è* 'he is', *dà* 'he gives', etc.³

I argue below that considerations of phonological substance may play a supporting role in these developments, but they certainly cannot account for all the data.

4.2. Functional considerations

The conditions under which analogy and incursion occur depend in part on semantic and functional/contextual factors as well as on morphological relatedness. As an example, consider Latin *esse* 'to be', which was defective in that it did not have a past participle. The defective character of this verb arose as a result of the development of a change in the distribution and function of certain forms. The Indo-European deverbal adjective in **-to-* was originally a perfective form associated only with some verbs; for many verbs, especially stative verbs, no such form existed. In time, however, these were incorporated into the verbal system as past participles which were used in forming the periphrastic perfect. With the development of new contexts in which a past participle of *esse* was needed, speakers were presented with at least two options to 'fill the gap': create a form analogically or 'borrow' a form from another lexeme.

If the form of parts of the existing paradigm are conducive to setting up an analogy, this is a viable option, as occurred with Spanish/Portuguese *ser* 'to be', which has an analogically-created participle *sido*. Another possibility, however, is to incorporate into the paradigm a pre-existing form that is semantically appropriate. With a copula, for example, a verb meaning STAND might provide a past participle. Such a participle is used primarily in the perfect, and, given that having stood in a place entails having been there, it is not surprising to discover that French, Italian, and Catalan have all incorporated reflexes of *status*, the past participle of STAND, into their paradigms for BE (*été*, *stato*, *estat*). It is worth noting that these developments need not be teleological, though they are motivated.

An important consideration here is a form's degree of autonomy, which Bybee correlates with the likelihood that a form has a separate lexical representation (1985:57). A high degree of autonomy is required for lexical split, which can in turn allow an inflected form to become part of another paradigm. Bybee's principle criteria for autonomy are high frequency, phonological distance from the basic form, and semantic separation between the form in question and the basic form (Bybee 1985:88). What appears to happen in incursion, then, is that autonomous forms used in different but related contexts are brought together as a paradigm.

5. A case study: GO in Romance

To explore the interaction of these factors, let us now look in detail at GO verbs in Romance, especially Ibero-Romance, which displays the overlapping suppletion between BE and GO described earlier. I first examine a proposed explanation for this pattern (§5.1), then offer additional background (§5.2) before offering another solution (§5.3).

5.1. Previous research

As stated earlier, in the Ibero-Romance verbs *ir* 'to go' and *ser* 'to be' there is complete overlap in the preterit, imperfect and future subjunctive, and the synthetic pluperfect. Leaving aside for the moment why the relevant forms of *īre* were replaced, I will start with the issue of why the source verb was BE. Lathrop (1984:191) attributes the selection of BE to a change in a system of resultative/non-resultative verb pairs conditioned by the loss of the verb *fieri* 'to become'. He claims that there was an aspectual opposition between resultative and non-resultative verbs which had the same forms in the perfect; he cites the verbs *sīdō/sedeō* 'to sit down/to sit', *sistō/stō* 'to stand (tr)/to stand (intr)', *fīō/sum* 'to become/to be', and *calescō/caleō* 'to grow warm/to be warm'.

His argument is as follows:

When *fieri* is lost in the Romance languages, it appears that *eō* ('to go') and *sum* ('to be') become related as non-resultative/resultative. Thus, the perfect of both is *fuī*. We see that they functioned this way on the basis of the type of constructions: ['it came into my mind' / 'it is in my mind — it is into my mind'] (my translation).

This explanation has two problems. First, two of the four pairs of perfects mentioned—*sistō/stō* and *fīō/sum*—do not have identical perfects, while another does so only optionally (Table 6). Furthermore, the Latin example offered (with no source citation) does little to support the claim, as the forms of BE are in the present tense and the motion verb cited is COME, not GO.

(6) The presents and perfects of Latin 'resultative/non-resultative' pairs

	seat oneself	sit	stand (tr.)	stand (intr.)	become	be	grow warm	be warm
1s pr in	sīdō	sedeō	sistō	stō	fīō	sum	calescō	caleō
1s pf in	sīdī, sēdī	sēdī	stiī	stefī	factus sum	fūī	calūī	calūī

The original version of the same work offers a much more satisfying account in which Lathrop claims that the reason that *esse* 'to be' was the verb which provided the forms of the perfect (and related categories, which he does not mention) is that there was in popular Latin usage a pattern whereby

the perfect of *esse* could be used with in + accusative to mean 'went':

Pretores in provinciam...furerunt.

'The officers went into the province.'

in Mediam fui saepius...

'I went more often to Media...' (Lathrop 1980:147).

Lathrop remarks that there is a parallel in French with the '(frowned upon but common) *j'ai été au théâtre* for the more standard *je suis allé(e) au théâtre* "I went to the theatre"' (Lathrop 1980:148), as there is in English, as in *We've been to France twice*. Lathrop fails to explain why it is that this usage of BE to express motion is restricted to the categories where it is found. To understand the distribution of BE forms in GO paradigms, I will first examine motivations for the suppletive patterns elsewhere in Romance GO verbs.

5.2. Non-overlapping suppletion: WALK, GO AROUND, and GO

At least seven distinct Latin lexemes are the sources of the modern forms: *īre* 'to go', **allāre* 'to walk', **andāre* 'to go around', *vādere*/**vādēre* 'to go', *meāre* 'to go, to pass', *venīre* 'to come', and *esse* 'to be'. As many as four of these contribute to the paradigms in a given language (French). Verbs meaning COME and BE appear only in overlapping suppletion in GO paradigms. Intuitively it is clear that in some way these meanings are more different from GO than the others are; I argue in the next section that this semantic distance is a necessary factor in the development of overlapping suppletion (further research is required to determine exactly how to judge semantic distance). The others, on the other hand, participate only in non-overlapping suppletion. In this section I examine the reasons for the patterns of suppletion that they show.

A number of recurrent patterns call for explanation. First, in the present tense, a number of Romance languages have one stem for the first and second person plural forms and another for the singular and third person plural. This appears to reflect the development of a type of subparadigm which separates the first and second plural from the other forms. This is largely the result of the phonemicization of the stress in the development of the Romance languages. In Classical Latin, stress fell on the penult if it was heavy (i.e. had a long vowel, diphthong, or a coda consonant); otherwise stress was antepenultimate. A number of sound changes—most importantly the loss of phonemic vowel length—resulted in the phonemicization of stress; in Spanish, for example, *hablo* ['aβlo] is 'I speak', while *habló* [a'βlo] means 'he/she/it spoke'. In the present tense, these changes set the first and second person plural apart from the other forms in that the former had ending stress and the latter had stem stress (cf. Haiman & Benincà 1992:83).

This appears to correlate directly with the distribution of the so-called inchoative augment, which is found in most non-Ibero-Romance languages and typically appears only in the singular and third person plural; this results in stress on the first syllable after the stem (e.g., Ct *conduëixo~conduïm* 'I drive~we drive'). It does not appear to be a coincidence that this is the same as the common pattern of stem suppletion in the GO verb whereby forms from *vādere* are used in the singular and third person plural, with forms from various other stems used for the first and second person plural. (These two use the same stem as each other, however, except when secondary factors come into play, as described below; cf. 7).

(7) Stress in the Catalan present indicative

	SING	GO
1s	'kanto	'batʃ
2s	'kantas	'bas
3s	'kanta	'ba
1p	kan'tem	a'nem
2p	kan'tew	a'new
3p	'kantan	'ban

Strikingly, these two forms—first and second person plural—are also the ones which typically have forms coming from stems other than *vādere*; the forms are reflexes of **andāre* in Italian and Catalan; **allāre* in French and some Rhaeto-Romance varieties; *īre* in Old Spanish, Old Portuguese, Galician, and some Rhaeto-Romance varieties; and *meāre* in Surselvan (Swiss Rhaeto-Romance). It appears,

then, that the phonemicization of stress in Romance led to a perceived distinction between the first and second person plural on the one hand and the singular and third person plural on the other. This, in combination with the comparative lack of phonological material in the singular and third person plural forms of *īre*, led to a paradigm consisting of forms of *vādere* in the singular and the third person plural and forms of *īre* in the first and second person plural (Table 8).

(8) The present indicative of GO in early Romance

1s	* <i>wado:</i>
2s	* <i>was</i>
3s	* <i>wa</i>
1p	* <i>īmus</i>
2p	* <i>ītis</i>
3p	* <i>wan</i>

Subsequently, a number of languages (Italian, French, several Rhaeto-Romance varieties, Sardinian, Catalan) replaced the reflexes of *īre*, thus preserving the pattern of suppletion. Importantly, all of the stems involved have meanings very close to that of *īre* 'to go': *vādere* 'to go', *meāre* 'to go, to pass', **andāre* 'to go around, to walk', **allāre* 'to walk' (note that in Ibero-Romance *andar* 'to walk' is a completely separate lexical verb). Thus the phonemicization of stress can be said to lead to the 'accidental' development of a subparadigm (in fact, there is evidence that such a subparadigm may have played a role in the development of the Catalan periphrastic preterit; see Juge 1999 [forthcoming]).

5.3. Overlapping suppletion: BE, COME, and GO

Cases of overlapping suppletion in Romance verbs meaning GO are restricted to interactions between GO and COME and between GO and BE.

5.3.1. COME and GO

In Swiss varieties of Rhaeto-Romance other than Surselvan, the first person present indicative of GO is the same as that of COME (Surmeiran /*vɨj*/, Puter/Vallader /*vɛp*/ < Lt *veniō*). This state of affairs is easy to understand given the deictic value of COME. Prototypically, of course, the understood direction of motion is toward the speaker; when the form is first person, however, the meaning is typically not that the speaker is moving closer to his or her current location. Rather the deictic center is effectively projected to the speaker's intended destination. This happens in English, for example, when a person responds to being called by saying (*I'm coming*). Of course the formal elimination of the COME/GO deictic distinction, even if limited to the present indicative as in this case, also results in the loss of a simple way to express this difference in cases such as habitual or historic present uses and thus appears to run counter to functional considerations in the traditional sense.

5.3.2. BE and GO

To understand the distribution of the forms of GO coming from BE, a brief discussion of the history of the Latin perfect is in order. A conflation of the categories of aorist and perfect, the Latin perfect had both a preterit (perfective past) reading ('I went') and a present perfect reading ('I have gone'). In most of the modern Romance languages, these forms retain only the preterit meaning, though the Portuguese reflex still has perfect-type uses (as does the somewhat restricted

synthetic pluperfect; cf. Parkinson 1988:150, Nitti 1974:xiii). The tense/aspect considerations also support this, as this change is best motivated in a system in which the forms in question have perfect readings. This is so because of the connection which exists between going to a place and being in one. Having gone to a place entails having been there, but while the converse is not necessarily true (one may have spent one's entire life in the same place without having gone there), it typically holds. This slight asymmetry seems to correlate with the fact that the influence was from BE to GO rather than vice versa; it may be that the relative 'insubstantiality' of the perfect of *ir* provided additional motivation for this change.

It is likely that the synthetic preterit, derived from the Latin perfect, still displayed distributional characteristics of a present perfect (just as the simple pluperfect in Portuguese still functions as a past perfect) when the substitution took place, because the closeness of the connection between 'I have gone (to a place)' and 'I have been (to a place)' is far greater than that between 'I went (to a place)' and 'I was (to a place)'; in fact, this is evident in the fact that in English the use of *to be* plus a prepositional phrase with *to* is quite common in the perfect tenses (as in *He's been to France many times*) but almost unheard of in the simple past (**He was to France last year*, but see below). Subsequent changes in the tense/aspect characteristics of the preterit and related forms have obscured the earlier motivation for this pattern of syncretism between BE and GO.

The most obvious of these obscuring changes is the loss in most Romance languages of the perfect reading of the preterit. The synchronic separation of the forms was increased by the fact that the modern Ibero-Romance locative copula is *estar*, not *ser*; this fact provides evidence for a relatively early date for the incorporation of these forms into the GO paradigm. Another relevant change concerns the imperfect subjunctive, historically from either the pluperfect indicative or the pluperfect subjunctive and synchronically built on the same stem as that of the preterit. In counterfactual sentences, the imperfect subjunctive is used when referring to unreal present scenarios, as in *Si fuera al mercado ahora mismo*,... 'If I were going to the store right now,' In such a case, there is no plausible way to interpret the form *fuera* as a form of *ser* 'to be'. Similarly, the future subjunctive (almost never used in modern Spanish, but still in use in Portuguese) uses the same stem as the preterit.

The semantic connection between the perfect of BE TO and GO TO is paralleled not only by English but also by modern French, as below.

- 9 French Elles ont ét-ées au théâtre
 They.f have.3p be-ppcpl.fp to the.m theater.m
 'They went/have gone/have been to the theater.'

This connection, however, is by no means universal; in Norwegian, for example, *å være* 'to be' collocates with *i* 'in', while *til* 'to' is used with *å gå* 'to go' and other motion verbs:

- 10 Norwegian Vi har aldri vær-t i/*til Norge
 We have-p never be-ppcpl in/to Norway
 'We have never been in/*to Norway.'

Another area of potential overlap concerns the common connection between GO and BE in evaluation; the questions *how did it go?* and *how was it?* are equally

appropriate for inquiring about a past event, such as a presentation, for example. This is a widespread pattern cross-linguistically and may have contributed to the incursion of forms of BE into the paradigm of GO.

5.3.3. Cross-paradigmatic relationships

As mentioned above, the overlap between GO and BE is not limited to the preterit, where it is semantically motivated, but is also found in the imperfect subjunctive, synthetic pluperfect indicative, and future subjunctive; in these cases there is no clear semantic motivation. There is, however, an important morphological connection among these forms. These are all built on the stem of the third person plural of the preterit (cf. Table 11; these related forms are bolded). This is perhaps the most consistent generalization that can be made with respect to relationships across paradigms; even the most irregular of verbs in Ibero-Romance display this pattern.

(11) Selected third person plural forms in Spanish

	<i>ser</i> 'to be'	<i>ir</i> 'to go'	<i>de'θir</i> 'to say'
present indicative	son	ban	'diθen
imperfect indicative	'eran	'iban	de'θian
preterit (indicative)	'fweron	'fweron	di'xeron
future indicative	se'ran	i'ran	di'ran
present subjunctive	'sean	'bajan	'digan
imperfect subjunctive	'fweran	'fweran	di'xeran
future subjunctive	'fweren	'fweren	di'xeren

6. Conclusions

Using the development of verbs meaning GO in the Romance languages as a case study, I have examined the development of suppletion in verbal paradigms. I have argued that the traditional explanation for a syncretism in the preterit between *ir* 'to go' and *ser* 'to be' placed excessive emphasis on the notion of lack of adequate phonetic substance, though this consideration appears to play a role in some cases. Suppletion can arise out of the conventionalization of patterns of use of synonymous verbs but also can result from specific tense/aspect connections between less semantically close verbs; this can in turn lead to overlapping suppletion, which seems to typically exist between verbs with a relatively high degree of semantic distance. The patterns examined show that synchronic morphological relations also play a role in determining which parts of a paradigm undergo replacement by forms derived from a given root even though prediction of these patterns is not strictly possible. I have also illustrated that cross-paradigmatic analogy can result in weak suppletion and that this kind of analogical change seems at odds with most instances of analogy in that it increases idiosyncrasy without appreciably increasing the distribution of patterns in the language. Finally, I have pointed out that suppletion of the kind examined here raises a number of issues for further investigation in both diachronic and synchronic morphology.

Notes

* I would like to thank the members of the UC Berkeley Fall 1997 Analogy Seminar for providing input on an oral presentation of this work. Andrew Dolbey, Andrew Garrett, and Gunnar Ól. Hansson were especially helpful in our discussions of this material. They do not necessarily agree with the analysis presented herein and any shortcomings are strictly my responsibility. Please

direct comments on this paper to the author, Department of Linguistics, UC Berkeley, Berkeley, CA 94720.

¹ In this paper I focus on stem suppletion rather than affixal suppletion of the type found in the English forms *boxes* and *oxen*, where /əz/ and /ən/ are suppletive exponents of the plural. I am also not addressing suppletion across derivational paradigms.

² The synthetic Romance future comes from a periphrastic construction consisting of the present infinitive plus forms of the verb *habēre* 'to have'.

³ As in my own citations, forms are presented in standard orthography; <h> corresponds to phonetic zero.

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Emergent phonology

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0. Speech and phonology

As is well known the physical properties of speech are determined by a large number of factors. They vary depending on the language spoken, on the age, gender and identity of the speaker. They undergo stylistic modifications in innumerable ways owing to the interaction of physiological, cognitive, social and communicative factors.

Linguistics deals with this problem by assigning the study of the speech signal to phonetics. Phonology investigates postulated sound structure, that is, abstract entities and processes which are assumed to underlie speech behavior and which are by definition independent of performance and language use. In this way, the study of speech sounds is split into two: Phonology becomes digital, and phonetics analog.

“... the fundamental contribution which Saussure made to the development of linguistics ...” was “... to focus the attention of the linguist on the system of regularities and relations which support the differences among signs, rather than on the details of individual sound and meaning in and of themselves. ... For Saussure, the detailed information accumulated by phoneticians is only of limited utility for the linguist, since he is primarily interested in the ways in which sound images differ, and thus does not need to know everything the phonetician can tell him. ... By this move, then, linguists could be emancipated from their growing obsession with phonetic detail.” (Anderson 1985:41-42).

1. The child's problem

It is interesting to examine this traditional division of labor from the viewpoint of speech development. If children's phonetic input is indeed massively variable, how do they find phonology behind that variability? How do they discover the hidden structure of speech? We shall develop a tentative answer in the following steps.

Perceptual categories form as emergent consequences of accumulated phonetic experience (speech transforms complex but lawful). Motor development is guided by a physiological economy principle which helps the child spontaneously discover many patterns in the ambient language (motor bootstrapping). That heuristic presupposes that sound systems are (in part) adapted to be spoken. There is a great deal of evidence supporting this claim.

2. Avoiding circularity

To avoid circularity, it appears desirable to impose the following methodological conditions. We should not assume phonological structure to be pre-specified: Say no to nativism! Neither should it be postulated from the data to

be explained: Say no to curve-fitting! The long-term goal is to deduce sound structure from the child's experience and minimal assumptions about 'initial knowledge'—technically speaking, as a *behavioral emergent*.

3. Role of perceptual experience

3.1 Infant-directed speech

Is infant-directed speech less variable? It is true that Baby Talk shows less complex sentences and simpler words? It contains repetitions and is often produced more slowly with greater emphasis on the most informative elements (Ferguson 1977). Accordingly, it exhibits adaptations, but does that mean that BT moves the 'hidden structure' of speech to the surface so that the child can pick up the phonology in the signal in a more direct way?

There is converging evidence that BT does not solve the 'invariance problem' for the child in that way. A recent cross-linguistic study illustrates the point (Kuhl et al 1997). It compares the formant frequencies of vowels in adult-to-adult conversations and infant-directed speech. The data indicate a tendency for BT vowels to be somewhat more peripheral in the vowel space, but by and large the variability is extensive and comparable to that of adult-to-adult speech. Similar observations (Fónagy 1983, Davis & Lindblom 1994, Sundberg 1998) indicate that BT in no way undoes the context-dependence of acoustic phonetic patterns. Typically it is prosodically lively and emotionally positive (Fernald 1984). Rather than make phonological units more transparent, emotive coloring and prosodic liveliness have the effect of increasing the complexity of the acoustic encoding (Lindblom et al 1992).

3.2 Perceptual categories as emergents of phonetic experience

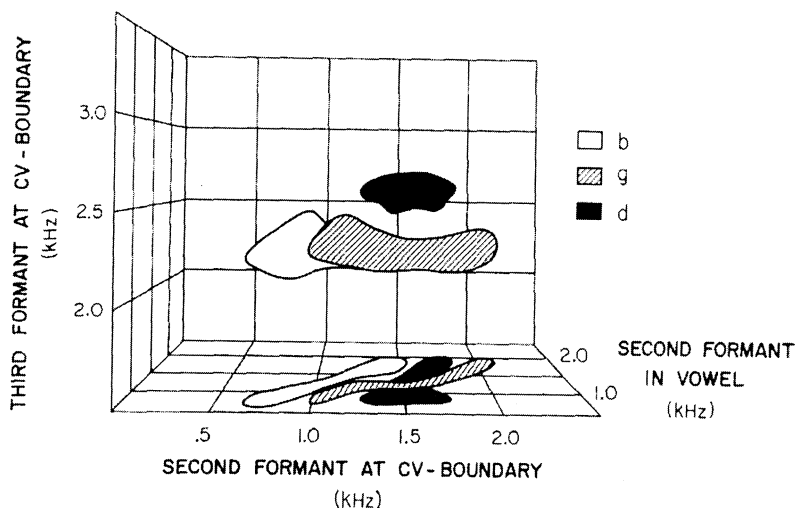
While it is certainly true that speech signals vary greatly, it is equally clear that this variation is non-random. Articulatory dynamics and vocal tract acoustics shape phonetic variations in complex, but basically highly systematic ways. What role do such regularities play in speech development? Some results on speech perception by animals provide some clues to answering that question.

Japanese quails were trained to peck in response to syllables beginning with /d/, but to avoid pecking when hearing syllables with initial /b/ or /g/ (Kluender, Diehl & Killeen 1987). The items were produced by an American English speaker. They contained /i/, /u/, /æ/ or /a/ and exhibited the normal patterns of consonant-vowel coarticulation. At the end of training it was found that the birds had successfully learned to discriminate /d/- from /b/- & /g/-syllables. The same quails were then presented with a set of new stimuli containing the same consonants but different vowels: /ɪ ɛ ʊ ʌ eɪ oʊ oɪ ə/. The task was to peck in response to stimuli with /d/, and to avoid pecking when hearing other syllables. Again the birds performed successfully. They were able to generalize their experience of the first experiment to the new stimuli of the second.

It appears possible to explain the quail's behavior by hypothesizing an exemplar-based learning process. This account assumes that each individual

stimulus (more precisely, each auditory pattern) gets stored in a holistic manner, say as a 'neuro-spectrogram'. As more patterns accumulate, the data sort themselves into clusters. The physical similarities and differences between the stimuli cause three distinct representations to form in auditory space.

(1) Acoustic separation of place in coarticulated stops.



A simplified version of the process is illustrated in (1) where $F2_{onset}$, $F3_{onset}$ and $F2_{vowel}$ are plotted for a set of CV sequences similar to those used in the quail study. As can be seen, the three categories emerge as three non-overlapping, three-dimensional 'clouds'. It does not seem unjustified to assume that, *at the very least*, the quail had access to the information portrayed in this diagram. If so, they would have had the possibility of associating the /d/ cloud with pecking and the other clouds with no pecking.

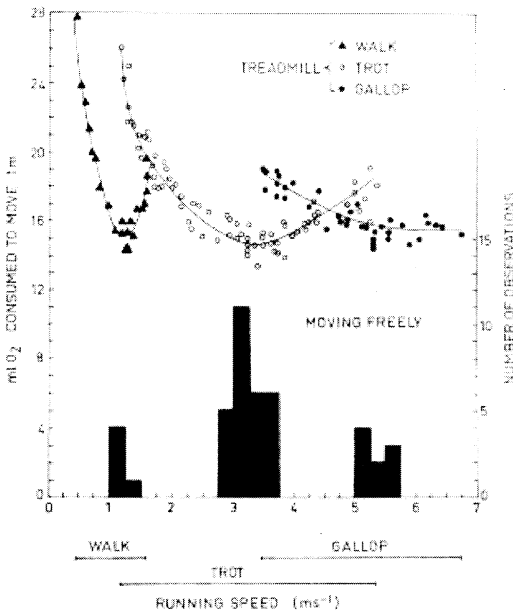
These facts and interpretations exemplify a paradigm that has been explored for some time by psychologists (Estes 1993). Why would a process of experience-driven category formation provide a realistic scenario also for speech? A comparison of exemplar-based accounts with more traditional approaches throws some light on this question. The differences stand out particularly clearly in the light of speech development.

Exemplar models make minimal assumptions about 'initial conditions' and are therefore not guilty of 'resolving' issues such as the variability problem by postulating unknown, innate mechanisms. They make the most of the signal and its complex, but lawfully structured, variability before positing hypothetical decoding mechanisms whose operation is also yet to be specified.

As pointed out by Johnson & Mullenix (1997), traditional accounts assume representations (e.g., phoneme-sized units) to be simple (context-free invariants). The task of deriving such units from the speech signal calls for complex processes capable of extracting invariants. Mechanisms of this type have been proposed—e.g., the ‘phonetic module’ of the motor theory (Liberman & Mattingly 1985), the ‘smart mechanisms’ of direct realism (Fowler 1986) and the ‘top-down’ processes (reconstructive rules, inference making and hypothesis testing) of cognitively oriented approaches. How do these processes operate on-line in adult listeners, and how do they develop? It is fair to say that our understanding of these issues is currently far from complete.

Exemplar-based models adopt the opposite perspective, assuming representation to be complex and mapping to be simple. Categories form as emergent products of cumulative phonetic experience. The hypothesis is that signal statistics will go a long way towards establishing units. Right or wrong, these models commendably do address the mapping and the ontogeny problems. They say no both to nativism and to mere descriptive curve-fitting.

(2) Movements shaped by a minimum-energy criterion.



4. Role of motor constraints

4.1 Movements are shaped by a minimum-energy criterion.

The claim that movements are shaped by a minimum-energy criterion rests solidly on a large body of physiological studies (McArdle, Katch & Katch 1996). A great deal of quantitative data is available on how much energy various species use during locomotor tasks.

This information is presented by plotting the amount of energy that the subject expends against traveling speed. An example is the data on horses walking, trotting and galloping, see upper part of (2) (adapted from Hoyt & Taylor 1981). When the energy used is expressed per unit distance traveled, the measurements tend to be U-shaped and have distinct minima. Significantly, these minima are found at speeds that subjects spontaneously adopt when moving freely and unconstrained by the speed of a laboratory treadmill (lower part). Experimental biologists interpret such findings to suggest that locomotion (human walking and running, bird flying, fish swimming, etc) is shaped by a criterion of 'minimum-energy expenditure'.

4.2 Is energetics relevant to speech?

The phonetician naturally asks: Are speech movements and whole body movements similarly organized?

The energy costs of speech movements are likely to be small in comparison with those of locomotion. Therefore our brains might say: 'Be my guest! Do anything you like'. On the other hand, being both a tinkerer and a miser, evolution tends to be parsimonious, which suggests that the same rules ought to apply for small and for big movements. Until measurements of speech energy costs are made, we should of course keep an open mind on these issues. However, several factors favor parsimony. First, energetics is needed to explain a number of general characteristics of spoken language (Lindblom 1983). Second, it appears highly plausible that energetics leads the child to those characteristics, in a manner analogous to how it shapes the locomotion of animals.

What aspects of the world's phonologies are shaped by energetics? Why would children need help in their articulatory search for those aspects?

4.3 Sound patterns as adaptations to motor constraints

Admittedly, 'articulatory ease' is a controversial topic in phonetics (Ladefoged 1981, Ohala 1981). However, by placing this issue in its broader biological context, we might be able to resolve it.

Whenever the issue of 'ease' arises, it is helpful to ask, '*Could it have been otherwise?*' As we ponder that question, it becomes easier to see that, in comparison with other activities, speech is a *pianissimo* phenomenon (Lindblom 1983). Languages make fastidious use of the gestural and acoustic possibilities in principle available for sound production (cf the DOF problem introduced below). This conclusion is reinforced by a number of observations. We should mention analyses of the development of speech production, the universality of the syllable

and the typology of phonotactic structure. Further support comes from the facts of segmental dynamics and the phonetic contents of vowel and consonant inventories. Why is the transition from babbling to early phonetic forms continuous? Why do these forms show such a strong assimilatory organization (e.g. the 'co-occurrence patterns' reported by MacNeilage & Davis 1993)? Why do all languages have syllables? Why do favored syllable structures tend to be arranged phonotactically according to the so-called 'sonority hierarchy'? What is the origin of coarticulation and lenition phenomena such as assimilations, reductions and deletions? Why do phonetic segment inventories tend to be organized in implicational hierarchies (cf. Size Principle, Lindblom & Maddieson 1988)? The present claim is that all of these widespread aspects are not there by accident but constitute phonological adaptations to production constraints.

4.4 The 'degrees of freedom' problem in motor control

The preceding remarks introduce an issue known as the *degrees-of-freedom* (DOF) problem. Motor systems offer their users an extremely rich set of possibilities for executing a given task. In principle, there is an infinite number of trajectories that a movement from one point to another could take. Solving the DOF problem means finding a unique movement in a very large search space.

Like other motor mechanisms, speech production offers talkers countless possibilities for any given task. Articulatory modeling (Lindblom & Sundberg 1971, Maeda 1991) has shown that there is a continuous trade-off between jaw opening and tongue raising in producing a given vowel, e.g., an /i/. The normal way of making this sound is to raise the jaw and adopt a moderately palatal tongue shape. However, experiments have demonstrated that, when speakers are asked to produce a normal-sounding /i/ with an atypically large jaw opening maintained by a 'bite-block' (Lindblom et al 1979), their output does not approach a predicted /ε/-like quality. In fact, subjects are able to match the normal quality and formant pattern of the vowel quite closely, a result that clearly indicates a compensatory mode of articulation. X-ray data (Gay et al 1981) have confirmed this interpretation showing that, for bite-block /i/:s, subjects compensate by raising the tongue higher than normal into a super-palatal position. Consequently the DOF problem definitely also applies to speech.

4.5 Solving the DOF problem.

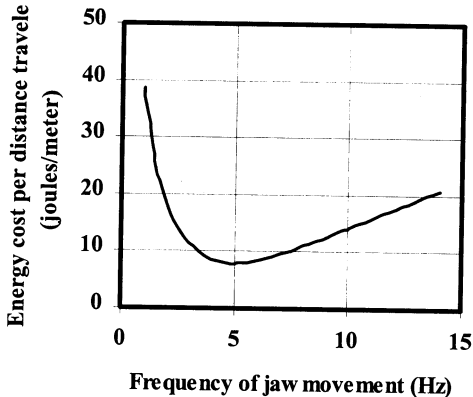
Some recent computational research on human walking (Anderson & Pandy 1999, Pandy in press) offers an elegant solution to the DOF problem. These investigators constructed a 3-D model of a musculo-skeletal system with 54-muscles and 23 degrees-of-freedom. The model and human subjects walked at a forward velocity of 81 m/min. Predicted displacements of anatomical structures were quantitatively similar to experimental observations. Muscle coordination patterns were consistent with EMG data from the subjects. Metabolic energy was expended at a rate comparable to that for human subjects. These predictions were made when a performance criterion of *least metabolic cost* was used.

Clearly, with so many muscles and mechanical dimensions, this type of model has a significant DOF problem. However, the success of the simulations implies that the optimization criterion drastically reduces the search space and makes it possible for the algorithm to identify unique and optimal movement trajectories for each subtask.

4.6 Estimating energy costs for jaw movement

A simplified model of the mandible was used to make some estimates of energy costs for speech (Lindblom et al 1999). The jaw was represented by a system defined by its mass (m), damping (b) and elasticity (k). The mass was equal to 250 g. A resonance frequency of 5 Hz was assumed.

(3) Energy costs of simulated jaw movement



The figure in (3) shows an estimate of energy consumption calculated for sinusoidal jaw movement of a 10 mm amplitude. We note that, despite the model's simplicity, the curve is similar to the results of (2) and those reported in the literature. It is U-shaped and has a distinct minimum.

4.7 Articulatory boot-strapping: 'Easy-way-sounds-OK'.

Given the information in (2) and (3), let us consider the following scenario: Suppose that young children vocalizing behave like subjects walking and running in preferring energetically low-cost movements. Further assume that, for vegetative reasons, the jaw and the area around the mouth opening are particularly salient regions of the vocal tract (Lindblom & Lubker 1985) and are therefore likely to be explored early on.

What would the articulatory and acoustic characteristics of opening and closing the jaw at minimum energy cost be like? An approximate answer is given

by the minimum value of the U-shaped curve in (3). It corresponds to an open-close alternation near the jaw's resonance frequency. Combining this movement with phonation would produce a quasi-syllabic acoustic output resembling [bababa]. In other words, least effort applied to the jaw would produce an utterance not unlike *canonical babbling*.

Let us take this thinking one step further. The low-energy articulatory search (start *pianissimo*!) unfolds only a fragment of the child's phonetic space. It narrows down the range of alternative movements thereby helping the child spontaneously discover many articulatory patterns used by the ambient phonology.

We note that for this strategy to work the following must be true: (1) The DOF problem for speech is solved in the same way as it is solved for non-speech movements. This implies a strong statistical bias in favor of low-cost motor patterns. (2) Many aspects of the world's phonologies are indeed low-cost motor patterns (absence of vegetative sounds and mouth sounds, feature composition of phonetic segments, e.g., /i/ a universally 'close' vowel, syllabic & phonotactic organization, coarticulation and lenition, system-dependence of phonetic dimensions in segment inventories). (3) Theoretically, the world's phonologies could have developed less optimal motor patterns for cultural reasons, but have done so only to a limited extent. The reason is, we suggest, that sound patterns are adapted for phonetic development. Low-cost motor patterns are retained so as to accommodate the child's energy-efficient search by providing ambient reinforcement of the child's efforts. The phrase '*easy-way-sounds-OK*' captures the nature of this boot-strapping. Ambient confirmation establishes perceptuo-motor links between the emergent perceptual categories and the fortuitously discovered articulations (Studdert-Kennedy 1987, in press).

5. Role of memory constraints for the origin of combinatorial structure

5.1 Phonological units: formal idiosyncracies or adaptive emergents?

The preceding remarks provide a sketch of how phonology might get shaped by developmental phonetics. The discussion has concentrated on *substantive* aspects. Do behavioral constraints also play a role in the child's acquisition of *formal* universals of sound structure, e.g. featural and phonemic coding? We believe that it does indeed.

To argue this point in an instructive way, a simple algorithm was devised to automatically break down holistic patterns into smaller elements and then re-use those elements. The re-use implies a combinatorial organization.

The point is that the derived units are emergent consequences of system growth and that they do not have to be pre-specified. We suggest that this mechanism is formally similar to what goes on in learning phonology. We interpret the holistic patterns as Gestalt motor scores. The segmentation into smaller elements defines 'articulatory gestures'. Gestural re-use is promoted by the fact that memory storage is associated with a biochemical cost. This cost is hypothesized to derive from the energy metabolism of memory formation

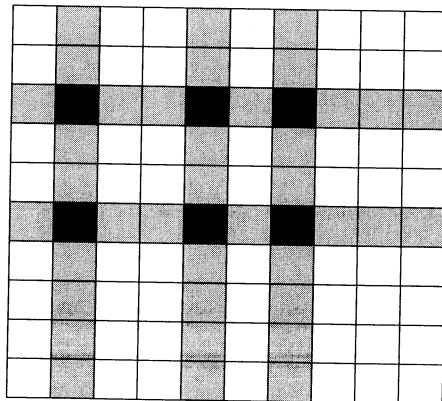
(Gonzales-Lima 1992) and is an increasing function of the novelty of the stored materials. Since novelty is expensive, holistic coding is disfavored whereas parts of these wholes can get identified and re-used.

This account of emerging structure is completely non-teleological, but once combinatorial coding comes into existence it exhibits several functional advantages. For instance, it uses memory in a manner that makes it possible to develop large vocabularies. We suggest that being able to code up to 100,000 words or more (Miller 1977) in a phonetically reliable way has an explanation at the micro-level of biochemistry. Whether that is a valid hypothesis or not remains to be seen. Nevertheless, some such explanation is clearly needed for several reasons. First, accounting for phonemic coding as due to a 'demand' for large vocabularies is teleological and therefore unacceptable. Second, explaining it in terms of the idiosyncratic nature of our genetic endowment for language (Halle & Stevens 1979) is a theoretical possibility but premature and therefore a low priority.

5.2 The nepotism game: 'close relatives get promoted'.

Here is a simple formal exercise to illustrate the above claims. Imagine a 10-by-10 matrix with 100 cells. Our task is to choose a sequence of n points located in the matrix so that a 'cost criterion' is minimized. We consider two alternative definitions of 'cost': (a) For every new cell we pay 1 unit! (b) For every new coordinate specification (row or column) we pay 0.5 units!

(4) Cost minimization induces combinatorial coding!



A single item is one unit on either measure. For (a), the cost is equal to n units regardless of the cells selected. With (b), costs can be cut by selecting a cell in a previously activated row and/or column. As n (system size) increases, numerous opportunities for re-use arise. (4) shows a situation with six points sequentially chosen according to the second measure. A selected cell has been marked in

black. When such a choice is made, the other cells of that row and column become available at half price (0.5 units). This is indicated by the shading. Zero cost is associated with cells at intersections of already committed rows and columns. The example in (4) costs 6 units when we pay per cell (first measure), but 2.5 units when selections are priced by coordinate specifications as in (b). Thus cost minimization forces the system to go combinatorial.

5.3 Self-segmentation and the emergence of articulatory 're-use'.

What does this exercise tell us about speech? Our answer begins by reinterpreting the matrix as a crude articulatory space. We replace rows and columns by continuous parameters, say the phase and amplitude of elementary oscillatory movement. Along a third dimension we specify the articulator performing the movement. A given point in this 3-D space represents a Gestalt motor score.

Suppose a child consistently uses forms sounding like [didi], [mymy] and [baba]. In the articulatory space these forms are represented by three points whose coordinates specify the movement parameters: e.g., three amplitude values for the open-close movement of the jaw, two positions (front and back) for the rest/target alternation of the tongue, etc. In standard notation (but without implying any segmental organization), the jaw-tongue parameters form the following matrix:

tongue positions	
jaw openings	_i_i
	_Y_Y
	_a_a

These specifications are each linked to its own type of closure movement: d_d_, m_m_, and b_b_.

The nepotism principle (NEP) literally states that a re-combination of all these hidden "component" movements is favored by the memory constraint. If NEP were consistently and mechanically implemented, it would yield the following additional potential re-use patterns for jaw-tongue movement:

tongue positions	
jaw openings	_u_u
	_ε_ε
	_æ_æ

Moreover, it would put a number of forms in a state of 'readiness', e.g., [dede], [dædæ], [duduw], [dydy], [dada], [mimi], [meme], [mæmæ], [mumuw], [mama], [bibi], [bebe], [bæbæ], [buuw], [byby]. Again no segmental organization is implied.

How does this re-use come about? How are the "component movements" identified? The quotation marks around "component" are important, since so far we have little reason to treat phonetic forms as anything but Gestalts.

As a first step towards an answer, we note that the vocal tract consists of several independently controllable structures. In other words, although early vocalizations do not arise from phoneme-like control signals, the system producing them is in fact anatomically 'segmented'.

Second, we observe that, in many cases, neural representations are *somatotopically* organized (Kandel & Schwartz 1991) which means that the brain stores individual motor and sensory activities in specific locations with anatomical identity preserved (cf notion of *homunculus*). Both of these circumstances play a crucial role in the proposed self-segmentation process.

Faced with the task of producing ambient forms not yet acquired, the child must solve the problem of assembling new motor programs. NEP predicts that the speed and accuracy of imitation, spontaneous use and recall will depend significantly on whether or not the new form shares "component" movements with old forms. Assembling a new motor score is assisted by overlap with previously encoded patterns even if those patterns are part of unanalyzed wholes and have not yet been 'defined' as separate motor entities. For the evidence supporting this scenario see review in Lindblom (1998).

What is the mechanism underlying gestural re-use? We propose that in part the NEP bias leads the child to engage in spontaneous articulatory re-use, in part the native language favors forms that match the output of NEP. Learners can thus use NEP to find 'hidden' structure.

The present account resembles the role sketched previously for motor constraints in the acquisition of phonology. The argument common to both sections is that behavioral conditions make certain patterns more functional than others. Languages are molded by those functional constraints. They adapt to them, incorporating fossils of naturalness in their architecture, and by so doing they become more learnable and easier to use.

6. Summary: There is no 'hidden' structure!

How do children find the 'hidden' structure of speech? This question presupposes that 'structure' is something disembodied. In other words, it is seen as embedded in an incomplete, degraded, noisy and infinitely variable signal. That is the traditional, but, in our view, not necessarily the correct assumption. Instead the following approach is advocated.

Phonetic variations are far from random. They are patterned in principled ways because of perceptual distinctiveness, articulatory dynamics and VT acoustics. A cumulatively growing, exemplar-based phonetic memory should go a long way towards revealing that patterning to the child. In such a model 'categories' do not resemble the neat, operationally (*sic!*) defined units of classical phonemic analysis, since their correlates are likely to be strongly contextually embedded, in a sense 'hidden'. However, over time variability would

get sorted and disambiguated by context and by the cues providing semantic and situational labeling. Mapping simple, representation complex.

One source of information for perceptual labeling is articulatory. Research on non-speech offers the phonetician valuable clues as to how motor processes operate. The role of metabolic cost in solving the DOF problem is a case in point. We have made the parsimonious assumption that speech movements are organized like other movements. Therefore energetics should be relevant. From that conclusion we were led to propose a two-part hypothesis: *Easy-way-sounds-OK!* It says (1) that children initially explore their vocal resources in an energetically low-cost mode and (2) that sound patterns have adapted to reward that behavior. This is a kind 'conspiracy' that makes children stumble on motorically motivated phenomena in the ambient language. Syllabic organization is one of them. It also establishes motor links to perceptual forms (cf imitation).

A related scenario was sketched for the development of the phonemically coded lexicon. We suggested that a linguistic system with featural and phonemic recombination humors learners whose memories charge a metabolic fee for storage. If that fee increases with the number of bits (amount of information) to be stored, it follows that patterns that do not share materials (Gestalts) are costly, whereas patterns with overlap are cheaper. Somatotopic organization and VT anatomy were found to impose a segmentation of this overlap into articulator-specific parameters. This is the process that implicitly defines the '*phonetic gesture*' for the child. Metabolically controlled *re-use* is thus launched and paves the way for cognitively driven and combinatorial vocabulary growth. These considerations favor the view that phonemic coding is an adaptive emergent rather than a formal idiosyncrasy of our genetic endowment for Language.

7. Conclusion: Say no to the 'inescapable dogma'.

Emergent phonology is proposed to promote a new vision of the relationship between phonetics and phonology. By substituting it for the traditional division of labor, we would get away from what Chomsky (1964) calls the 'inescapable dogma' of 20th century linguistics: the *logical priority of linguistic form over substance*.

The distinctions between form/substance and competence/performance, having served their historical purpose, should be abandoned. There is *no split* between analog phonetics and digital phonology because, from the developmental point of view, phonology remains behavior and continues to be analog. Phonology differs qualitatively from phonetics in that it represents a new, more complex and higher level of organization of that behavior. For the child, phonology is not abstract. It represents an *emergent* patterning of phonetic substance.

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H.P. Grice on location on Rossel Island

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I want to indulge in a thoroughly un-American activity: namely looking backwards. Perhaps on the Silver Jubilee of BLS, I may be forgiven. It is just over thirty years ago that Paul Grice delivered the William James Lectures, in which he outlined the theory of implicature, and then set up shop on this campus. It is almost 25 years since 'Logic and conversation' first appeared in print, and exactly 10 years ago that the book *Studies in the Way of Words* was published, where many of Grice's famous unpublications finally appeared.

On this anniversary, it seems appropriate to ask: How can the implicature ideas be applied in current language description and analysis? Gricean analyses are usually proposed for familiar languages for obvious reasons: subtle judgements of meaning are often involved. However, it may be possible to push beyond this if we concentrate on a certain genus of implicature, namely Generalized Conversational Implicature, and construe this in certain ways. In this paper I want first to sketch such a construal, and then to show that this may be a practical tool for understanding patterns in less familiar languages, which may also help us to capture patterns of preferred interpretation. For this purpose I will concentrate (for no special reason other than to justify the title) on spatial description in the language of Rossel Island, with comparisons to other languages we have been working on in a collaborative project at the Max Planck Institute for Psycholinguistics.

I suspect that there are some who think that Grice's theory of implicature is *passé*. Many cognitive linguists (e.g. Jackendoff 1983, Langacker 1987) deny that there is any place for a semantics/pragmatics distinction in their conception of the field (although in practice the distinction is recognized in other terms; see Wilkins & Hill 1995, Fauconnier & Sweetser 1996). Perhaps they have the following syllogism in mind: *Anything we mean, we think; Therefore, what we mean and what we think are the very same thing* - 'semantic structures' just are 'conceptual structures'. We don't need to be a psycholinguist to see that this is confused. There are a number of properties of language that ensure that what we *think* and what we *say* could never be exactly coincident (Levinson 1997):

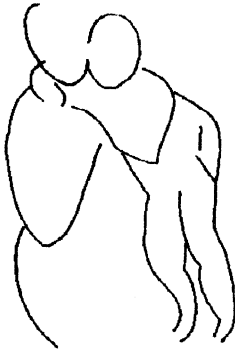
- *There is more than one 'language of thought'*, and language is tied to a more propositional mode of representation: that's why you can accurately describe in one word your kin-relation to your Auntie, but in any number of words fail to describe her face.
- *Language is a linear medium*. There is no reason to think that, say, visual cognition is linear in the same way (e.g. the cognitive power of diagrams lies in their non-linearity).
- *Language is indexical*. But thought better not be indexical in the same way, or a mental resolution to do something tomorrow would ensure I never did it.
- *Language is general, thought specific*. Natural lexica have to be learnable, and so are small in size: this guarantees the semantic generality of expressions – they must cover a lot of different extensions.

- *Language is a public, broadcast medium.* So it employs special shortcuts, like ellipses and anaphora, but also builds in redundancies against “noise” (like agreement systems).
- *There is often an obvious gap between the ‘said’ and the ‘unsaid’.* That is the domain of pragmatics.

For the purposes of making vivid the distinction between what is coded and what is inferred, a visual analogy may be helpful. Consider a sketch like that in (1) below. We can effortlessly interpret this as a mother and child. But there is almost nothing there! How do we do it? Although we know much more about the processes underlying vision (thanks partly to animal models) than those underlying language, how we get from an image as “degraded” as this Matisse sketch to a determinate interpretation is pretty mysterious. Something like the following must be involved:

1. We imaginatively fill in missing lines, complete the arcs, in order to obtain a “finished” 2D line drawing.
2. We extract 3D volumes from 2D representations.
3. We can do all this only because we can exploit the *presumption of semiosis* – that is, the presumption that the artist depicted *something* in such a way that he intended us to be able to recover it, following the cultural conventions of drawing in our society (and not e.g. those in Central Australia, where the view is always from above).

(1) Matisse Sketch



Now compare some minimal utterance like “*It will be ready soon*”. In a similar way we have to complete the sketch (and the resolution can go in quite different directions, according to whether we are talking about the dinner or Joe’s dissertation):

1. We fill in the ellipses (*ready* for what?), we resolve the pronouns (*it* = dinner, or thesis), we limit the temporal spans (*will soon* = 5 minutes, or next year)
2. We extract full-blown interpretations (*ready* of dinner means ‘cooked’, *ready* of dissertations means ‘written’), utilizing all the conventions of language use, our knowledge of stereotypical scenarios or frames, and so on.

3. We can do all this because we can exploit the *presumption of semiosis* – knowing that the speaker said just enough for us to be able to recover what he or she intended, using the conventions of the language and its use.

On this view, language codes only highly schematic and incomplete meanings. The illusion of determinate messages is due to a huge body of inference triggered by those feeble cues that constitute linguistic meaning. In short, language is sketchy. Why should that be? One crucial motivation is that human language is encumbered with a striking bottleneck in speech production: The fastest sustainable speech rate for English is about 7 syllables per second, or 17.5 segments per second (Laver 1994), which equates to a very lowly 100 BAUD. (Bill Poser, p.c.). Pre-articulation processes in speech production can run *three to four* times faster than articulation (Wheeldon & Levelt 1995), and the same goes for comprehension (Mehler et al. 1993). This encoding bottleneck implies that linguistic coding is 'expensive' and inference is 'cheap', and the design requirements for human communication are: minimize linguistic coding and maximize inference.

What is required is some system of *ampliative inference*, a reasoning process that *adds* premises (not deduction or logical inference which merely cranks out what is already contained in an utterance - which, as we have seen, may anyway be propositionally incomplete and fragmentary). The process should increase what Bar-Hillel & Carnap called the *semantic informativeness* of the utterance, i.e. it should serve to further delimit the worlds compatible with what the utterance means – an assertion is informative to the extent that it tells us what is not the case.

The problem is: how to constrain such ampliative inference so that what the recipient interprets corresponds well enough to what the speaker intends? The only way is for speaker and recipient to share simple but powerful heuristics, which will multiply the content of what is coded in a reliably recoverable way. Particularly desirable would be heuristics which would amplify the content of the message without requiring extensive background knowledge, because then an utterance could carry with itself, as it were, the keys to its own interpretation, its own unZip code.

Here are some candidates. First, consider a blocks world (à la Winograd 1972): a domain of discourse which consists of a few coloured blocks, say a red cube, a blue cylinder, a green cylinder, a small yellow cube, and a couple of other blocks. Now consider the utterance:

- (2) "The blue cylinder is on the red cube"

The statement is compatible with many different possibilities in the blocks world, e.g. the blue cylinder and the yellow cube and the green cylinder are all on the red cube. But that is not how we interpret the utterance: we read it as a claim that *only* the blue cylinder is on the red cube. That is the effect of our first heuristic, which I shall call the **Q-heuristic**; loosely put, it goes "*What is saliently not said is not the case*". In the blocks world we know that red cylinders contrast with green ones, and other blocks of other color—they weren't mentioned, so they were not in play.

Now consider the same utterance from a different perspective. When we envisaged the blue cylinder on the red cube, we imagined it sitting canonically on the red cube, not teetering on the edge, nor with another block between it and the red cube. Nor do we expect the red cube itself to be perched precariously on another block. There would be nothing *false* about describing any of these situations using utterance (2) (e.g. we don't hesitate to say "Supper is on the table" just because there is a table-cloth between the supper and the table). But (2) is just not how we would describe those non-stereotypical situations. That's because we observe what we can call the **I-heuristic**, which, loosely put, goes "What is simply described is stereotypically exemplified".

Now if we *did* want to describe those non-canonical situations we might say, e.g.,

- (3) "The blue cylinder is *supported by* the red cube"
 or "The blue cylinder is *sort of on* the red cube"
 "The blue cylinder is *on top of* the red cube"

In doing so we would be following the **M-heuristic**, roughly "Marked message indicates marked situation".

Now these heuristics are just some of Grice's Maxims in disguise. But recasting them this way is not entirely gratuitous. What we are trying to capture is that just some of those Maxims are suitable for the job of producing *default inferences*. Default inferences are ones that go through *unless* blocked in some way. Grice called them *Generalized conversational implicatures*, or GCIs for short, and he was particularly interested in them because GCIs are—he thought—frequently confused with the meanings or semantical content of words and constructions, for the simple reason that they normally, unless cancelled in some way, accompany those expressions. They thus do not depend on special properties of the context, like implicatures due to the maxim of relevance, or figures of speech like irony. Now the heuristics that I have just outlined have the requisite property of inducing *default inferences*, because they are based solely on properties of the form and content of the utterance, not on extra propositions about the context. The Q-heuristic requires a metalinguistic notion of salient alternates, an attention to what else might have been said but wasn't. The I-heuristic licenses maximal interpretations to the stereotype on the basis of unmarked message type. The M-heuristic plays off the I-heuristic: whatever might have been implicated by a simple unmarked utterance, is ruled out by the use of a marked message form.

Because these heuristics are just some of the old familiar Maxims in disguise, we do not need to spell out all the details of all the inferences that can be obtained under each one here (see the outline in Levinson 1995, and the monographic treatment in Levinson 1999). But here are some reminders, with some applications to spatial prepositions sketched:

The Q-Principle (from Grice's First Maxim of Quantity, "Make your contribution as informative as is required").

Heuristic: 'What is saliently not said, is not the case.'

For a set of alternates in the same semantic field which are logically compatible, use of the one implicates that another doesn't apply (e.g. asserting "The ball is

red" implicates 'not yellow, blue, etc. as well'). More specifically, given a Horn-scale $\langle S, W \rangle$ where S is informationally stronger than W (so $A(S)$ entails $A(W)$ in a suitable sentence-frame A), using W implicates that the stronger S does not apply. For example, $\langle All, some \rangle$ form such a scale, so that asserting "Some of Grice's pirots are still alive" \rightarrow (implicates) 'not all of them are', and similarly for all the quantifiers and modals (see Horn 1989, Levinson 1999). Closed-class alternates frequently exhibit this kind of privative opposition (cf. e.g. Hawkins 1991 on determiners), as do contrasts in the lexicon (cf. e.g. Wilkins & Hill on motion verbs). Consider for example the English spatial prepositions: arguably, for instance, $\langle at, near \rangle$ form a scale, so "the train is near the station" only implicates 'not at the station'.

The I-Principle (for 'Informativeness-Principle' (Atlas & Levinson 1981), from Grice's second Maxim of Quantity, "Do not make your contribution *more informative* than is required").

Heuristic: 'Unmarked, minimal expressions warrant maximal interpretations to the stereotypical extensions.'

Under this heuristic fall the many systematic patterns whereby simple expressions get maximal interpretations. Consider, for example, *conjunction-butchressing* in which conjoined events get read (under appropriate tense/aspect constraints) as causal statements ("She pushed the button and the engine started" \rightarrow 'she caused the engine to start'), or the rich interpretations of possessives or novel compounds (Levinson 1999), or the many kinds of *negative-strengthening* (Horn 1989). Again, we can find examples in the domain of spatial prepositions: for example *in* is interpreted in accord with the most salient stereotypes, thus asserting "The coffee is in the cup" \rightarrow 'the liquid, rather than the beans, is wholly within the cup', while "The pencil is in the cup" \rightarrow 'partially in, but projecting out of the cup', and so on.

The M-Principle (from Grice's first and fourth Maxims of Manner, "Avoid obscurity, avoid prolixity").

Heuristic: Marked message indicates marked situation; specifically, if unmarked utterance U I-implicates p , then marked utterance M M-implicates the complement of p (Horn's 1984 'division of pragmatic labor').

The effect of the M-heuristic is, then, to give us mirror-image inferences: whatever one would have inferred by the I-principle from a simple, direct expression, is ruled out by the use of a marked, prolix or unusual expression. Consider, for example, the periphrastic modals: whereas saying "John could solve the problem" I-implicates 'he did', saying the more marked "John had the ability to solve the problem" M-implicates 'he didn't'. Similarly, the use of double negatives to indicate a positive suggests that the implicatures of the simple positive are being avoided. Thus whereas "It's possible the Republicans will win the next election" I-implicates 'likely to probability n ' (where n is given by stereotypical expectations), "It's not impossible that the Republicans will win the next election", M-implicates that the probability is significantly less than n . There are many other applications to marked lexical alternates, marked derivational forms, etc. (see Horn 1984, Levinson 1999). Again, examples can be found in the English spatial prepositions, where, e.g. *on* contrasts with *on top of*, so that "The lamp is on top of the desk" M-implicates either an unusual viewing angle (we are under the desk) or a deviation from the direct-contact that would have been suggested by *on*.

We have now outlined three Gricean heuristics. They induce *presumptive meanings*, that is default inferences that are generated *without elaborate reasoning about the speaker's intentions*. GCIs gain this presumptive quality, this generality across contexts, because they are based on general heuristics operating only on the form and content of what has been said. Utterances carry with them the systematic cues to their own unpacking, thus overcoming the encoding bottleneck by letting metalinguistic considerations about choices in message construction amplify the message. More simply put, the three heuristics suggest an *iconic basis* for message amplification. This idea is entirely in line with Grice's central idea about communication, namely that "every artificial or non-iconic system is founded upon an antecedent iconic system" of representation and communication (Grice 1989:358).

Yéli Dnye, the language of Rossel Island

Let us now turn to consider how such an analysis of presumptive meanings might be of practical application in linguistic analysis. For that purpose I propose to transport Grice to a Pacific island, in line with his philosophical hedonism (as explained in the Grady & Warner (1986) *Festschrift*). Let us look at a few aspects of spatial description in Yéli Dnye, the language-isolate spoken on Rossel island, Papua New Guinea (see Henderson 1995, whose practical orthography is used here). In so doing I will try and draw out some generalizations that seem to be applicable to other languages under study at the Max Planck Institute for Psycholinguistics.

For comparative purposes, we employ a number of stimulus materials. One of them is a picture book (designed by Melissa Bowerman and Eric Pederson) with 71 pictures of objects in a 'topological' relation to one another, i.e. relations describable in English with prepositions like *in*, *on*, *at*, *near*. We ask, e.g. "where is the cup?", and get the answer "The cup is on the table", the latter exemplifying what we will call the **Basic Locative Construction** for English. When we do this for the 71 pictures, for English we get about fifteen prepositions (about a third of which are compound, like *on top of*) and one verb, for Dutch we get about 20 prepositions (about a third compound) and four verbs, and for Rossel language we get about 25 simplex postpositions and three verbs. For Tzeltal we get one preposition and up to forty verbs. Clearly, these are fine classifications of locative situations, but they may be done either in the adpositions, or in the locative verbs or in both (not to mention other spatial nominals).

The 'basic locative construction' for Rossel is exemplified in (4):

- | | | | |
|-------------------|---------------|---------------------|------------------------|
| (4) Figure | Ground | Postposition | Positional verb |
| ↓ | ↓ | ↓ | ↓ |
| kemi | kîgha | k:oo | tóó |
| mango | fruit | in | deictic+TAMP |
| cup | cup | sits | |
- 'The ripe mango is in the cup' (or 'There is a mango in the cup')

This construction has two important components: the postposition which builds the postpositional phrase specifying the Ground (where the object is located), and

the positional verb which is largely determined by the Figure (the thing to be located). We take these up in turn.

Rosselian postpositions

We have already seen how the oppositions between the English spatial prepositions may be susceptible to a Gricean analysis: thus *<at, near>* may form a Horn-scale, with the corresponding Q-implicatures, while *in* and *on* engender I-implicatures to the stereotype, which can in turn be avoided by the use of more prolix forms, so that e.g. "The cup is *on top of* the table" M-implicates some deviation from the stereotypical disposition, or from the canonical viewing situation (e.g. we are under the table).

Let's now look at the Rossel postpositions, which in our sample seem to make a record number of distinctions. Is it possible, without good intuitions about the language to formulate hypotheses about likely implicatural relations between the postpositions? Using our picture book, we got four consultants to describe each situation or its nearest Rosselian analogue, and as mentioned we obtained 25 distinct postpositions. Let us look at those which seem to indicate that the figure is attached to the ground, i.e. they were used to describe what we may call attachment scenes. These are scenes that in English would mostly involve the preposition *on*, as in painting on wall, ring on finger, handle on door, bandaid on leg, papers on spike, etc. Many kinds of attachment scene will in fact be described in other terms: e.g. leaves on a branch, or fruit on a tree invoke a postposition *nkwodo* which emphasizes 'distribution of multiple Figures all over Ground'. Factoring these sorts of cases out, we have the following central attachment postpositions:

Postposition	Gloss	Hypothesized Semantic Conditions
<i>paa</i>	'on a vertical surface'	Figure is attached to (near) vertical surface
' <i>nedê</i>	'stuck on hook/spike'	Figure is attached by projecting, piercing part of Ground (hook, spike, etc.)
<i>p:uu</i>	'stuck on'	Figure is attached strongly to ground, regardless of type of fixing

The glosses have been derived by inspection of the dozen or more scenes described with each postposition. Inspection also shows that '*nedê*' (used for 10 pictures) and *p:uu* (used for 29) have overlapping extensions: 7 pictures had alternate descriptions with one or the other postposition. This suggests that '*nedê*' and *p:uu* might be in privative opposition, forming a Horn-scale *<'nedê, p:uu>*, such that '*nedê*' basically means the same as *p:uu* but with the additional specification of attachment by piercing/hooksing, schematically:

<i><'nedê,</i>	<i>p:uu></i>
<i>Strong</i>	<i>Weak</i>
'attached by	'attached somehow'
hook or spike'	

If so, every '*nedê*'-situation is also in principle a *p:uu*-situation, although by our Q-heuristic speakers should use the more informative '*nedê*' if they can.

Consider now the behavioral predictions such an analysis might make. Suppose we have three scenes and three consultants, and two forms *S* and *W* which are

hypothesized to form a Horn-scale $\langle S, W \rangle$. Here is the behavioral distribution of responses predicted by the Gricean heuristic of using the strongest applicable form:

Scenes		Consultants			Non-occurring patterns
		1	2	3	
S-applicable Scene:	1 st choice	<i>S</i>	<i>S</i>	<i>S</i>	<i>W</i>
	2 nd choice	<i>W</i>	<i>W</i>	<i>W</i>	<i>S</i>
Marginal S-scene:	1 st choice	<i>S</i>	<i>W</i>	<i>W</i>	<i>W</i>
	2 nd choice	<i>W</i>	—	—	<i>S</i>
W-only Scene:	1 st choice	<i>W</i>	<i>W</i>	<i>W</i>	<i>S</i> or <i>W</i>
	2 nd choice	—	—	—	<i>W</i> <i>S</i>

In short, the predictions are that:

(i) For every *S*-applicable scene, consultants if pressed *may* agree that such scenes *could* be described with *W*, since there is only a pragmatic constraint behind the resistance to the use of *W*. And we don't expect them to offer us a *W*-description as first choice, then an *S*-description as a second best.

(ii) For every marginal *S*-applicable scene, we expect some consultants to choose *S* and some *W* as the best description, *but if they choose S, they should freely consider W an alternate*.

(iii) For every *W*-applicable scene for which *S* seems inappropriate, we do not expect a similar willingness to back off to an *S*-description, because this is a firm semantic constraint.

Now consider the distribution of responses for our 4 consultants over a representative sample of '*nedê* and *p:uu* scenes:

Picture No.	Scene	' <i>nedê</i>	<i>p:uu</i>
22	papers on spike	4	0
70	apple on skewer	4	0
9	coat on hook	3	1
37	clothes pegged on line	2	2
57	pendant on chain	1	3
12	mud on knife	0	4
35	bandaid on leg	0	4

It is evident that all four consultants use '*nedê* for clear spiking-scenes (pictures 22, 70), and all four use *p:uu* for scenes involving adhesion (12, 35). Most consultants treat hooking as a '*nedê* case (picture 9), most treat a chain-link attachment (picture 57) as a *p:uu* case. Right in the middle is an equivocal scene, in which clothes are held on a line by grip-action pegs: here the consultants divide. Let's look in detail at their responses for this marginal scene:

Clothes on Line Scene (Picture 57):

Consultants:	1	2	3	4
First choice:	' <i>nedê</i>	' <i>nede</i>	<i>p:uu</i>	<i>p:uu</i>
Second choice:	<i>p:uu</i>	<i>p:uu</i>	—	—

Clearly, the behavior is in line with the Horn-scale prediction: in the marginal case, anyone who volunteers *'nedê* as best description will readily accept *p:uu*, but not vice-versa. Thus we have some initial evidence in favour of the Horn-scale analysis.

Exactly similar analyses are possible for other pairs of Rossel adpositions, for example different IN postpositions, where one (*u mênê*) requires full inclusion under convex closure of the ground, and the other (*k:oo*) allows partial inclusion. Again the behavioral distribution of response-types fits a scalar analysis. So what? The general point is that many expressions that functionally contrast may in fact be in pragmatic rather than semantic opposition. Further, careful examination of preferred usages can reveal likely pragmatic factors even in a language under field investigation.

Now, for some of these attachment scenes, a different construction is also available. The construction is just the same, with a positional verb, except that the postposition is dropped altogether. This zero-postposition construction has a limited but systematic distribution in the description of our picture-book scenes: for example, instead of *p:uu* 'general attachment', the zero-postposition is used for part-whole relations (e.g. strap on bag), traditional adornments (e.g. armbands), objects in characteristic use (e.g. cork in bottle). The generalization is that the zero-postposition construction cannot be used for unexpected, non-stereotypical relations. Characteristic motion and dispositions (whether ships on the sea, or fruit on a branch) invite the dropping of the postposition. Non-traditional adornments (rings, hats) require post-positions, traditional adornments (arm-bands, belts) do not. All this is in line with cross-linguistic tendencies. Many languages with systematic case-marking may oppose a general Locative Case to a series of adpositions. Thus in Tamil one can use the Locative Case for nearly any stereotypical extension, without specifying IN/ON or other relations in the rich postpositional system; to use those postpositions then implicates some kind of special situation. Similarly, many languages (like Guugu Yimithirr) drop the locative verb in these kinds of situations, where Rossel drops the postposition. What these reduced constructions signal is: 'business as usual'. They are constructions inducing I-inferences to the stereotype, and they can contrast minimally with the postpositional construction, which can then suggest an unusual, non-stereotypical extension by M-implicature. This explains why our Rossel informants are happy to use the zero-postpositional construction with traditional bodily adornments, like armbands, but resistant to using it with Western adornments like watches, rings or metal necklaces.

There are a number of competing ON-postpositions about which similar remarks can be made. Take the following contrasting sentences describing a headband around a man's head:

(5) Picture 46: Head band

(a) *kpîdî pee pi kêpa mbêmê ka t:a*
 cloth piece person forehead on TAMP hanging

'The piece of cloth is hanging on the person's forehead'

(b) *kpîdî pee pi kêpa ka t:a*
 cloth piece person forehead (Postposition slot) TAMP hanging

'The piece of cloth is hanging (around) the person's forehead'

(c) *kpîdî pee mbêmê ka t:a*
 cloth piece (Ground slot) on TAMP hanging

'The piece of cloth is hanging on'

(d) *kpîdî pee pi kêpa mbêmê ka tóó*
 cloth piece person forehead on TAMP sitting

'The piece of cloth is sitting on the person's forehead'

The sentence (b) was the preferred form: it says just what needs to be said for an accurate description, and thus I-implicates stereotypical extensions. The first sentence (a) is prolix compared to (b): the postposition *mbêmê* therefore M-implicates that the head-band isn't around the hat-line, but is perched on top of the head. That implicature is avoided by an alternative reduction as in (c), where the Ground object (the head) is omitted but the ON postposition maintained, as in English *He's got a hat on*. Finally, one can switch the positional verb to another of the alternates as in (d): once again, the message now is "non-stereotypical extensions", specifically here what is suggested is that the head-band is not firmly tied on. This brings us to the next subject: locative verbs, but first let us sum up.

We have now illustrated how the three kinds of implicature, Q-, I- and M-, may serve to further structure this closed-class set of postpositions: many Saussurean contrasts are not there in the semantics at all (e.g. the extensions of one term include those of another), but rather emerge by the operations of Q-implicature or M-implicature. We have also shown how hypotheses about implicatural relations can be derived by inspection of elicitation materials in a field language, allowing them to be checked in further elicitation.

Positional Verbs

In answer to where-questions, a language with a single locative verb like English poses no problems of choice. But a language (like Dutch or Arrernte or Rossel) with three or more contrasting positional verbs forces a choice on complex semantic grounds. These verbs are often drawn from those used for human posture, like 'sit', 'stand', 'lie', but they often include a less anthropomorphic prototype, 'hang'. Dutch has all four, Arrernte 'sit', 'stand', 'lie', and Rossel has 'sit', 'stand', 'hang'. As far as I know, there is no full-scale study of the cross-linguistic patterns (although see Clark 1978, Hengeveld 1992:238-9): Stassen (1997:61) states that the "vast majority" of the 410 languages in his sample encode dispositional notions in their locatives, and suggests that this is the reason that locatives are more likely to involve a verb than, say, equational sentences. David Wilkins (in unpublished work) suggests that languages fall into three main classes: those with a single locative verb (e.g. English, Oluta, Turkish), those which utilize a large number of predicates (e.g. Tzeltal, Likpe), and those with a small contrastive set of positional verbs (e.g. Dutch, Guugu Yimithirr, Rossel).

The positional verb paradigm in Rossel is as follows (Henderson 1995:32, where 'proximal' indicates the three of the six tenses nearest to coding time):

		'sit'	'stand'	'lie'
<i>Indicative, Proximal</i>	Sing/Dual	<i>tóó</i>	<i>kwo</i>	<i>t:a</i>
	Plural	<i>pyede</i>	<i>wee</i>	<i>t:a</i>
<i>Non-Indicative, non-Proximal</i>	Sing/Dual/ Pl	<i>ya</i>	<i>kwo</i>	<i>t:a</i>

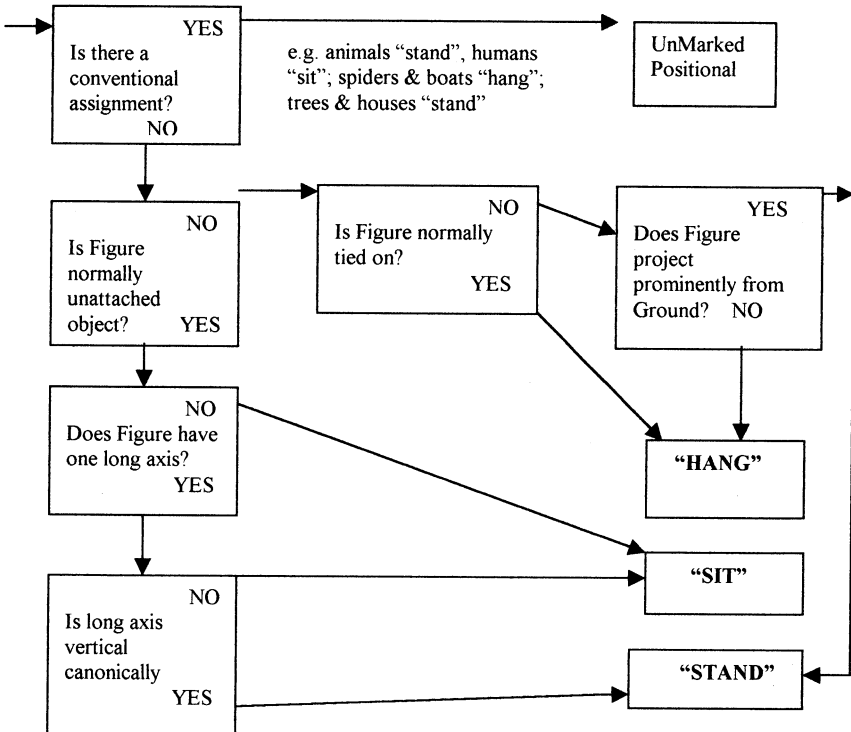
These verbs, with suppletion on these particular dimensions, seem to constitute a minor form class (there is one other candidate, *mii* 'move', which can be used for locatives statements about animates moving in their prototypical medium). We will call these **positional verbs** because canonical position and disposition of the Figure constitute, in the prototypical case, the basis of the semantic distinctions. Let us be clear that languages with a small set of locative verbs like this are fundamentally different from English in that: (a) Whereas in languages like English the general copula or BE verb is the unmarked option in answer to a Where-question, there is no such general option in a positional verb language; (b) in a language like Dutch or Rossel, when you say "The cup stands on the table" you are not asserting the standing, you are asserting the location, and presuming that cups are said to 'stand'—your statement will not necessarily be false if the cup is on its side. Positional-verbs have a sortal nature: they classify the nominal concepts according to canonical position.

In Rossel the 'basic locative construction' is essentially identical to the existential construction. The alleged differences between existential and locative constructions can easily be eroded (e.g. existentials can be definite as in *There is only the one God*, and localised as *There is no food in the house*), so it is not surprising that perhaps a quarter of all languages make no systematic distinction (E. Clark 1978:94-6). A language with positional locatives already has to have a default assignment of positional to nominal (otherwise one couldn't say "The bottles are on the table" without knowing if they were standing or lying), but this becomes especially clear in a language like Rossel that collapses locatives and existentials. In such a language we can use negative existential statements to test for these defaults (the negative makes clear we can have no particular exemplars in mind – only collocational constraints can be at work). Applying this negative existential test for default assignments, we find that in Rossel, we must say in effect "There is no shell money *sitting* here", "There are no islands *standing* there", "There are no canoes *hanging* there", etc., as detailed in Appendix 1. Abstract nouns follow similar conventions: knowledge sits, but memory stands, and hunger hangs. For physical objects there is some semantic motivation for the choices here, in line with shape and orientation principles described below. In addition, a bit of cultural knowledge will help to explain why people sit, but animals stand, why fornication sits but sorcery hangs, and yams sit in the ground but taros stand. But there is also almost certainly an element of arbitrary convention, as in gender and agreement systems, explaining why tides sit, but currents hang, and so on.

But what about novel objects? Consultants can agree about how they should be described. So there must be an underlying system of semantic specification, which accounts not only for confident assignment of novel objects, but also for

the (partial) semantic motivation behind the now conventional assignments to physical objects. Here is my guess at the underlying algorithm:

Partial algorithm for Positional Verb choice



This is the semantic background. A given nominal concept or Figure has a default collocation with a specific positional verb, given either by convention or the rules above applied to novel objects. We now turn to the pragmatics. Use of the *unmarked* semantic assignment **I-implicates** that all the stereotypical expectations obtain: e.g. 'The fish are standing in the pool' implicates they are swimming around as fish usually do, but 'the taro are standing in the garden' implicates that they are growing in the soil. A switch **M-implicates** a complementary interpretation: e.g. 'The taro are sitting in the garden' implicates that they are harvested. Although in principle the range of interpretations is wide, marked choices are typically interpreted in the following directions:

- the focus is on actual position (rather than canonical/conventional position), e.g. dogs "stand" by convention, so "sit" implicates lying down, e.g. sleeping.
- some specific condition for the unmarked assignment is not met: e.g. if 'hang' indicates 'tied-on', 'sit' M-Implicates 'not properly tied on'

- signal of ‘general state’ via a switch to ‘hang’ (through associations with attachment), or of ‘specific state (right here, now)’ by switch to ‘stand’.
- Here are some examples:

- (6) *koome table u mēknawo a kwo tóó*
 cat table POSS under TAMP stand ⇒ sit
 ‘The cat is under the table’ M+> “Actual position”
- (7) *te glass u mēnē a kwo tóó*
 fish bowl POSS inside TAMP stand ⇒ sit
 ‘The fish is in the bowl’ M+> “Dead”
- (8) *kpidi pee pi kêpa mbēmē ka t:a tóó*
 cloth piece person forehead on TAMP hang ⇒ sit
 ‘The piece of cloth is around the person’s forehead’ M+> “Falling off”

To summarize: the basic locative construction in Rossel illustrates a number of general patterns of cross-linguistic validity. First, adpositions are often not strictly in semantic contrast, the Saussurean oppositions often partly arising from pragmatic factors (Q- and M-implicatures). Secondly, languages with small sets of positional verbs typically have the following characteristics: positionals sortally classify nominal concepts according to conventional collocations and (for physical objects) shape/position information; these unmarked usages I-implicate stereotypical extensions; deviations from this unmarked usage can signal various things by M-implicature. Systematic application of the I-principle can lead to reduced structures (omissions of adposition or, in some languages, positional), whereupon fuller structures can M-implicate deviations from expected stereotypes. From this last fact, the paradox follows that the ‘basic locative construction’ can in some instances fail to be the most colloquial, least-marked form of answer to Where-questions. Gricean analyses can help us in practical linguistic description, and aid the formulation of typological generalizations.

Conclusion

We have just seen Grice on location on Rossel Island, indulging in some of the “linguistic botanizing” which he regarded as “essential” (Grice 1986:57). Grice had learnt that trick from Austin, but unlike Austin he was after a general theory about the relation of meaning to use:

“In my own case, a further impetus towards a demand for the provision of a visible theory underlying ordinary discourse came from my work on the idea of Conversational Implicature, which emphasized **the radical importance of distinguishing ... what our words say or imply from what we in uttering them imply**: a distinction seemingly denied by Wittgenstein, and all too frequently ignored by Austin” (ibid., 59, bold added).

It is a distinction, unfortunately, that we need to be constantly reminded of. And even if our ambitions are just linguistic description, good linguistic botany requires that one makes the distinction between what is coded vs. what is not coded but presumptively inferred, that is between the two great lifeforms in the theory of meaning: semantics and pragmatics.

Appendix 1: Some default assignments of different Figures to positional predicates under negative existentials

SIT	STAND	HANG
shell money darkness, light tides rain, calm-weather, mist	trees, palms, houses, mountains, islands, (calm?)	canoes, boats, roads, clouds, currents, winds, rivers persistent rain
moon, sun	stars	red-sky (dawn)
people, friends, relatives, descendants, wife, etc. snakes	chickens, dogs, birds (in tree), pigs, fish, weevils (inside fruit) crocs (in river)	 crocs (on bank)
water juice	fire, steam	smoke
yams (in ground) fat	taro & tapioca (in ground)	
coconuts, betelnuts, fruits on ground	pineapples, fruits on trees	mangoes, nuts in trees
meetings, feasts	beginning of meeting, feast	
knowledge sleep story, news discipline, work happiness fornication debt, peace medicine, mortuary payment	memory threat debt	taste, hunger, thirst signs, tracks flagrant fornication sorcery/power
clothes firewood	smells, light	smoke (also 'stand')
skin disease	cancer	disease/epidemic
books	cups, candles	holes (negative spaces)
	eyes, teeth, hair, grey-hair	

Some possible underlying cultural logic?

In addition to the canonical position of physical objects, there seem to be other factors:

- prestige animates 'sit' – people, yams, snakes (sacred), coconuts, betelnuts
- all non-prestige animals 'stand' – even fish
- strip-like entities 'hang' – hence rivers, paths, tracks of walkers, canoes
- 'hanging' has associations with general condition – hence sorcery and epidemics both 'hang', 'stand' has associations with temporary condition – hence debts, smells, etc. 'stand'.

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Metaphor, linguistic practice, and the temporal meanings of *gannaaw* 'back' and *kanam* 'front' in Wolof

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1. Introduction

That certain semantic extensions but not others occur in particular languages requires explanation (cf. Sweetser 1990; Heine et al. 1991; Hopper and Traugott 1993; Bybee et al. 1994). One area that has been studied in this regard is the extension of FRONT/BACK terms to time (Traugott 1975; Svorou 1994; Haspelmath 1997, Yu 1998). This paper focuses on the word for the body part 'back' in Wolof (Niger-Congo; Senegal and Gambia). *Gannaaw* 'back' has extended semantically to mean both 'earlier than' and 'later than', whereas the only temporal meaning of the Wolof word for 'front', *kanam*, is 'later than'. Based on a study of synchronic usage and polysemy patterns I offer a hypothesis on why, given certain physical/spatial uses, *gannaaw* should have the temporal meanings it does. Temporal uses of *gannaaw* and *kanam* are exemplified in 1 below. (In the examples I often give a word-for-word translation in double quotes preceding the idiomatic translation in single quotes.)¹

- 1) a. *ci gannaaw la ñów.*
 LOCPREP back/behind NONSUBJ.FOC.3 come
 "At back she came." i) 'She came a while ago.' or ii) 'She came afterwards.'
- b. *mun gi ñów ci kanam.*
 3.PRSENTTV come LOCPREP face/front/ahead
 "She's coming at front." 'She's coming later.' not 'She is coming beforehand.'

Current theories of metaphorical extensions of spatial to temporal terms would lead us to expect FRONT and BACK terms to have symmetrical meanings. This expectation is fulfilled where the 'earlier than' or 'past' meaning of *gannaaw* (example 1a, interpretation (i)) is opposed to the 'later than' or 'future' meaning of *kanam* (1b), but the 'later than' meaning of *gannaaw* (1a [ii]) appears anomalous in this regard.

The account that I will give is situated in the conceptual metaphor theory of Lakoff and Johnson (1980). But an understanding of the metaphor structure involved does not alone provide a satisfactory solution to the problem. What we need in addition is the idea of *linguistic practice* (Hanks 1990, 1996a, 1996b); i.e., an understanding of how meaning is produced through situated interactive language use. The ideas involved in the study of linguistic practice have a lot in common with those of the grammaticalization theorists mentioned above in that *context* is of central importance in grammaticalization. Important work on the relationship between context and metaphor in grammaticalization has been done by Heine, Claudi, and Hünemeyer 1991, and by Taub 1998. This paper differs from previous work by relating details of context to details of metaphor structure.

2. Background on *gannaaw*

Gannaaw has quite a range of uses, including 'back', 'space behind', 'absence,' 'except,' 'in addition,' 'since', (and various idiomatic uses) in addition to the temporal uses 'past' and 'later than'. I will discuss this range of uses briefly in order to show that, despite some similarities, *gannaaw* is unlike English *after* in important ways. Also, we have to keep it in mind that the account that I will offer in this paper identifies only one current of motivation in a complex web of influences on the 'later than' meaning of *gannaaw*.

Gannaaw is not a primarily temporal term. To give an idea of this, consider the following data. In a sample of two Wolof texts (Ab [a novelette] and Ep [transcribed oral performance]) totaling about 79,200 words, there were a total of 88 tokens of *gannaaw* and only about 16% of them (14 tokens) were temporal. (All 14 were instances of the 'later than' use.) Compare this with the English word *after*. Of 300 tokens of spoken *after* randomly selected from the COBUILD corpus, 225, or 75% were temporal (cf. the tables in 14 and 15 below). The most frequent use in the Wolof sample was the 'since' use, which accounted for about 24% of the tokens. The 'since' use is the subject of an insightful study by Stéphane Robert (1997).

One thing the above data suggests is that the ordinary way to say 'after' in Wolof does not involve *gannaaw*, and that is indeed the case. An unmarked way to say that one event happened after another uses the *anterior* construction, in which the first event is referred to by a subordinate clause, as in example 2 below.

- 2) *bi loolu am-ee, Mbaarik Bô daldi sol dállam.*
 when DISCREP happen-ANT Mbaarik Bô PRTCLE don shoes:GEN
 "When that had happened, Mbaarik Bô put his shoes on."
 'After that happened, Mbaarik Bô put his shoes on.'
 [Diop 1995:78. Spelling has been normalized. The translation in single quotes is from the original, p. 104.]

That the ordinary way to say 'after' in Wolof does not involve *gannaaw* is confirmed by the following observations. Consultants do not offer *gannaaw* constructions as translations of *after* constructions, nor are *gannaaw* constructions the typical way an 'after' meaning is expressed in spontaneous speech. Examinations of texts show that appearances of *gannaaw* with a 'later than' meaning tend to be restricted to certain contexts rather than appearing wherever a 'later than' meaning is expressed. Dictionaries (Fal et al. 1990; Munro and Gaye 1997; Gamble 1991a; Faye 1996) and grammars (Diouf and Yaguello 1991, Gamble 1991b, Njie 1982, Sauvageot 1965) do not list *gannaaw* constructions as a way of saying *after* or *après*.²

3. Metaphor theory

This investigation is situated in the theory of conceptual metaphor following Lakoff and Johnson 1980, 1999; Sweetser 1990, Turner 1991, Grady 1997, Yu 1998 and others. A metaphor in this theory is a one-way correspondence between concepts in different domains. Such correspondences, sometimes called metaphorical mappings, enable people to talk and think about one kind of experience in terms of another. For example, there is a conceptual metaphor called UNDERSTANDING AS SEEING in which seeing corresponds to, or maps onto, understanding. By means of this metaphor we can talk about experiences of understanding as if they were experiences of seeing and say things like *I see what*

you mean, *That's a clear argument*, or *That reasoning is opaque*. The correspondences involved in this metaphor are summarized in the table below. The domain from which vocabulary and conceptual structure are taken is called the Source domain, and the domain which is being construed in terms of the Source is called the Target. Elements of the Source are said to map onto ("→") the Target.

3) UNDERSTANDING AS SEEING

Source		Target
Person who sees	→	Person who understands
Thing seen	→	Thing understood
Aids to seeing	→	Aids to understanding
Impediments to seeing	→	Impediments to understanding

Previous works (e.g. Lakoff and Johnson 1980, 1999; Haspelmath 1997, Yu 1998) suggest that an account of expressions in which a FRONT word means 'earlier than' or a BACK word means 'later than' should be given in terms of the Moving Time metaphor. I assume that the following version of the Moving Time metaphor is relevant to Moving Time expressions using words for FRONT or BACK (cf. Moore forthcoming; Svorou 1994).

4) The FRONT/BACK Moving Time metaphor. E.g., "When they call, tell them to call back on the following day."

Person or thing farther in the direction of motion.	→	Earlier point or period of time.
Person or thing less far in the direction of motion.	→	Later point or period of time.

In addition to the fact that *kanam* 'front' does not have the 'earlier than' meaning that Moving Time would predict for Wolof, assuming the Moving Time metaphor as the sole motivation for 'later than' *gannaaw* would predict that *gannaaw* should mean 'after' in a fairly unrestricted fashion across contexts, but *gannaaw* does not behave that way. In the next example we see the Moving Time metaphor used in Wolof to talk about the sequential relation between two days. Here Wolof uses *topp* 'follow' in a fashion quite parallel to English. But *gannaaw* cannot be used to paraphrase the *topp* 'follow' expression — If *gannaaw* participated in the Moving Time metaphor like English *after*, we would expect to be able to paraphrase *bis bi ci topp* 'the following day' with *?bis bi ci gannaawam* 'the day after', but we cannot.³

Context (invented): The speaker has just said the Wolof equivalent of "That day, they gave us our diplomas." The example below is a possible continuation.

- 5) a. *bis bi ci topp ñu dem mbumbaayi*
 day REL LOCPREP follow we go party:ALL
 'The following day we went out and partied.'

The next example is not a possible continuation of "That day they gave us our diplomas" for the same consultant.

- b. *?bis bi (ci) gannaawam ñu dem mbumbaayi.*

day REL (LOCPREP) *back*.3GEN we go party:ALL
 Intended: The day after, we went out and partied.

4. The Ego Opposed strategy

There is a way to motivate the use of FRONT or BACK words in temporal expressions without appealing to Moving Time (Hill 1978, Traugott 1975). This involves the Ego Opposed locational strategy for spatial relations, exemplified below, which is typical in both Wolof (cf. Robert 1997) and English. According to this strategy, something which is in front of the observer (call it the *reference point*) is treated as if it were facing the observer (*Ego*). An entity (call it the *figure*) which is between the reference point and Ego is spoken of as being *in front of* the reference point, and an entity on the other side of the reference point is said to be *in back of* it.⁴ (In general, I will use the word *figure* to refer to something whose location or temporal status is in question, and the terms *reference point* or *reference object* to refer to the entity relative to which the status of the figure is determined. When I say "reference point" I do not intend any claims about the dimensionality of the entity referred to. *Figure* and *reference point* are equivalent to Talmy's (1978) *figure* and *ground*.)

- 6) *big bi mungi ci [kanamu/gannaaw] bwat bi.*
 pen the 3PRESENTATIVE LOCPREP front:PD/back box the
 'The pen is in front/back of the box.' [Q:62]

However, since *kanam* 'front' as well as *gannaaw* 'back' participates in spatial utterances that are structured by the Ego Opposed strategy, we still have not got an explanation for why *gannaaw* can mean 'later than' but *kanam* cannot mean 'earlier than'. But if we look at certain communicative practices involving *gannaaw*, a clear contrast with *kanam* emerges. Furthermore, these practices motivate some of the details of how 'later than' *gannaaw* is used.

5. Experiential grounding

In the *experiential grounding* (Lakoff and Johnson 1980, 1999; Grady 1997) of a metaphor, the Source and Target concepts occur together in a single experience; that is, they are *correlated*. This grounding in experience is what motivates people to talk and think about the Target in terms of the Source. If we look at the groundings for the various temporal senses of *gannaaw* 'back' and *kanam* 'front' together, we will see that the 'later than' meaning of *gannaaw* and the lack of an 'earlier than' meaning for *kanam* are actually quite well motivated. The following is a typical scenario in Senegalese daily life.

Someone, let us call her Binta, is walking down the road in an outdoor market. She does not know where the gourds are, so she asks a man who is seated by the side of the road the question in 7a below. He replies with the utterance in 7b. In using the word *kanam* the man by the side of the road *indexes* (Hanks 1990) the shared understanding that he and Binta have that she is walking through the market in a certain direction (cf. Clark 1996). That is, he appeals to their shared awareness of that aspect of the situation. *Ci kanam* in this context means 'ahead', and the utterance in 7b can only mean that the gourds are ahead of the woman, farther down the road in the direction in which she has been going. This spatial scenario is precisely analogous to the temporal metaphor in 1b (*Mungi ñów ci kanam* 'She's coming *later*'). In the spatial scenario, the place down the road is correlated in experience with the expected future time that Binta will arrive there. This motivates

the use in 1b where *kanam* refers to the future. Temporal uses of the word *ahead* in English in expressions like *There's trouble ahead* are motivated in the same way.

7) a. Q: *fan lañuy fi jaaye leket?*
 where NONSUBJ.FOC.3PL:IMPF here sell:VAL gourd
 'Where do they sell gourds around here?'

b. A: *ci kanam, sa càmmooñ* (cf. 1b)
 LOCPREP front your left
 'Ahead, on your left.'

Now let us imagine that the man by the side of the road had responded to Binta's question as in 7c below, also a typical phrase used in direction giving. This phrase is ambiguous, and the two interpretations correspond to the two temporal meanings of *gannaaw*. Interpretation (i) 'Over there behind you' is based on the same bodily schema as 7b involving Binta's motion through the marketplace: Her front is associated with where she is going and her back is associated with where she is coming from. This is precisely analogous to interpretation (i) of the metaphorical expression in 1a (*Ci gannaaw la ñów* 'She came a while ago.') In this case it is the experiential correlation between places Binta has passed on the road and the past moments when she was at those places that motivates the 'past' meaning of *gannaaw*. This mapping of BACK onto 'past' is also found in English, in expressions like *Back in 1967, San Francisco was a hippie Mecca*.

7) c. A': *fale ci gannaaw* (cf. 1a)
 over.there LOCPREP back

(c) is ambiguous:

- i) 'Over there behind you.' [090998]
- ii) 'Over there' [behind something]. 'Just around the corner.'

It is a scenario in which interpretation (ii) of 7c is appropriate that I am proposing as the Source of 'later than' *gannaaw*. (cf. example 1a, interpretation (ii) *Ci gannaaw la ñów* 'She came afterwards'). In this scenario, the speaker of 7c shares Binta's perspective and indexes a reference object in their shared visual field (a building, perhaps), saying that the item Binta is looking for is behind this reference object.

In this scenario, the reference object is correlated in experience with the time Binta makes mental contact with it (Langacker 1987). She expects to arrive at the place where the figure is at a *later* time. This is precisely analogous to temporal expressions like 1a(ii) (*Ci gannaaw la ñów* 'She came afterwards'), in which the figural time is said to be *later than* the (unstated) reference time. Let us call this the Ego Opposed temporal metaphor. The mapping is given in 8 below.

8) *The Ego Opposed temporal metaphor*. (RP = Reference Point; F = Figure)

A physical RP on a (conceived) path leading → A temporal reference point.
 to F.

A place (F) beyond the RP on the path. → A later point or period of time.

We have just seen two different strategies for locating things in space:

One strategy, exemplified by 7b and 7c(i), uses the human body as reference object in a scenario in which the owner of the body (e.g. Binta) is going somewhere on a path. (From now on I'll use the word *Ego* to refer to the person — Binta in this example — who is having the experience of space or time in question.) In this Source experience, the relations FRONT/AHEAD (*kanam*) and BACK/BEHIND (*gannaaw*) are both exploited for the purposes of telling people where things are located. The mapping of this scenario onto temporal experience is called the Moving Ego metaphor (cf. Clark 1973).⁵

The other strategy, exemplified by 7c(ii), uses as reference object something that is located in Ego's perceptual field and is endowed with a FRONT/BACK orientation based on Ego's viewpoint. This strategy of direction giving exploits the BEHIND (*gannaaw*) relation but not the IN FRONT OF (*kanam*) relation. The hypothesis that this type of strategy is the relevant experiential grounding explains why *gannaaw* but not *kanam* is used in temporal expressions that employ the Ego Opposed strategy. The viewpoint based semantic property of *gannaaw* discussed here is relevant also to the other senses of *gannaaw* mentioned near the beginning of the paper. It is discussed extensively in Robert's (1997) analysis of the 'since' sense of *gannaaw*.

The explanation I am offering is somewhat unusual within metaphor theory because it is stated in terms of particular communicative practices (Hanks 1996a). For example, in the case of *fale ci gannaaw* 'over there behind [something]' as in 7c(ii), the utterance depends for its meaning on the specific way the speaker appeals to the addressee's knowledge of the situational context of utterance. Particularly, the speaker assumes that she and the addressee will pick out the same contextually salient reference object at the moment of utterance and interpret it in the same way in terms of the addressee's desire to get to a particular location.

One may of course wonder why *gannaaw* has this particular direction-giving use and *kanam* does not. The explanation for this probably has to do with the fact that the direction-giving strategy in question is used in cases where the figure is occluded by the reference object. If the figure were in front of the reference object, it would also be in front of the interlocutors and could just as well be referred to by indexing the front of the interlocutors (rather than some other reference object) or by ostension with a gesture; e.g., *Munga fale* 'It's over there' (pointing).

The above account motivates the fact that *gannaaw* has a 'later than' use while *kanam* lacks an 'earlier than' use. The account also predicts that 'later than' *gannaaw* expressions should reflect the viewpoint-dependent nature of the Source experience. In fact, the experiential grounding as stated above predicts that 'later than' *gannaaw* expressions should involve an anchoring of the temporal relation in the "here and now," but this is not always what we find. After we survey the range of uses of 'later than' *gannaaw*, I will elaborate my account of the experiential grounding of the Ego Opposed temporal metaphor so that the type of viewpoint related restrictions we observe for 'later than' *gannaaw* will be better motivated.

6. Viewpoint-establishing contexts and the range of 'later than' uses of *gannaaw*

The use of 'later than' *gannaaw* expressions tends to be viewpoint dependent in the sense that when speakers use the expressions they have a tendency to appeal to the speaker-addressee shared awareness of the situational or discourse context of utterance. This tendency is attested to by native speaker judgments and my own impressionistic observations of how *gannaaw* is used in spontaneous speech. Further evidence comes from text counts in which I counted tokens of 'later

than' *gannaaw* in a corpus of about 180,000 words of written text (including transcribed oral performance and other spoken texts, novelettes, and the example sentences from the Fal et al. dictionary), and about two and a half hours of spoken interviews that I tape recorded during my fieldwork in rural Senegal 1997-98. The results of the text counts are summarized near the end of the paper. In the current section we review the various viewpoint-establishing contexts in which *gannaaw* appears. Finally, I will mention cases in which *gannaaw* appears in contexts that are not viewpoint-establishing.

The first type of appeal to the situation of utterance that we will see is in fact an appeal to the "now" of the speech act. That is, the reference point of *gannaaw* is denoted by a deictic word like *lii* 'this', *tey* 'today', or *suba/ëllëg* 'tomorrow', as in the next example. The phrase *gannaaw suba* (or *gannaaw ëllëg*) is a set phrase that means '(the) day after tomorrow'. Temporal deictic words such as *suba* 'tomorrow' amount to about twenty-one percent of the words whose referents play the role of reference point of *gannaaw* in the text count.

- 9) *taw na tey de, waaye bu tawoon suba, mbaa*
 rain PERF today EMPH but if/when rain:PAST tomorrow, or
gannaaw suba dana baax ci ñun lool.
back tomorrow FUT good LOCPREP us very
 'It rained today, but if it rained tomorrow, or the day after tomorrow, it would be very good for us.' [att.] [US 101597]

Another type of appeal to the situation of utterance is one in which the reference point of *gannaaw* is highly accessible (in the sense of Ariel 1990) from previous discourse as in the next examples. In 10a below, the discourse-referential demonstrative *loolu* 'that' explicitly indexes the addressee's knowledge of the immediately preceding discourse. In 10b the reference point of *gannaaw* is coded by zero, which is recognized as a marker of high accessibility crosslinguistically (Givón 1995).

- 10) a. *ginnaaw loolu, biram dellusi ca dëkk*
back DISCREP Biram return:VEN LOCPREP.DIST village
ba, taxaw ca digg pénc ma
 the stand LOCPREP.DIST middle gathering.place the...
 'After that, Biram came back to his village, stood in the middle of the public gathering place ...' (*Ginnaaw* is a variant of *gannaaw*.) [Kesteloot and Mbodj 1983:113]

- b. *gannaaw ñu dem ci dë ton*
back they go LOCPREP two ton
 'After that they went to two-ton trucks. (I.e., they started using two-ton trucks. Immediately before (b), the speaker had said that the first trucks that were used could carry the equivalent of ten donkey loads.) [att.] [FS 101597]

The discourse-referential demonstrative *loolu* did not turn up very frequently in the text-counts, accounting for only about six per-cent of the tokens. However, it is my impression that *gannaaw loolu* 'after that' is one of the more typical uses of 'later than' *gannaaw*. The phrase seems to occur often in spontaneous discourse and it turns up frequently in elicitation. The impression that there is something

special about the phrase *gannaaw loolu* is supported by the fact that Gamble's (1991a) dictionary includes *gannaaw loolu* as an entry glossed 'after that' but no other entry for *gannaaw* as a temporal term. Instances in which the reference point of *gannaaw* is coded by zero amount to the most frequently occurring type in the text counts, at almost thirty per-cent of occurrences of 'later than' *gannaaw*.

A rather different type of viewpoint-establishing context occurs in cases where the reference point of *gannaaw* is the first clause of the anterior construction as in the next example. Note that *gannaaw* is optional in this case.

- 11) (*gannaaw*) *bi Kondoron bi demee*
 (back) when Kondoron the go:ANT
la alal ju bare feeñu
 NONSUBJ.FOC.3 wealth REL be.abundant appear
 "(After) when Kondorong had left, the abundant wealth appeared."
 'After/when Kondorong had left, the man got rich.' [AS, 091798]

This is the same anterior construction that was exemplified in 2 near the beginning of the paper as an unmarked way to say 'after' in Wolof. Since the construction is a way of saying 'after', it requires the conceptualizer (speaker or addressee, cf. Langacker 1987) to view the referred-to events in a particular sequence. The function of *gannaaw* is to emphasize this already-established viewpoint rather than to independently assert a relation of sequence. Tokens of the *gannaaw*-plus-anterior construction account for about 19 per-cent of the tokens of *gannaaw* in the text count.

Finally, we come to uses of *gannaaw* that are not predicted by the generalizations offered in this paper. The reason 12 below is not predicted is that the temporal relations it refers to do not involve any particular viewpoint. In Moore (to appear) I have more to say about what accounts for examples like 12 below.

- 12) *gannaaw timis, gee. Gannaaw gee rekk*
 back dusk post.dusk.prayer back post.dusk.prayer only
guddi.
 night
 'After dusk, [is] the post-dusk prayer. After the post-dusk prayer then, [is] night.' [att.] [PG 101197]

Unpredicted tokens of 'later than' *gannaaw* like those in 12 account for about 19 per-cent of the tokens in the text count.⁶

7. More on the experiential grounding of 'later than' *gannaaw*

The experiential grounding involving the phrase *fale ci gannaaw* 'over there behind' in the marketplace scenario sketched in Section 5 is plausibly the essential type of motivation for uses of *gannaaw* that mean 'later than'. In the marketplace example (7c[ii]), the spatial relationship between the figure and the reference object is salient for Ego at the particular moment she conceptualizes it from her viewpoint. A scenario with the temporal and spatial immediacy of this marketplace scenario appropriately motivates metaphorical expressions like *gannaaw suba* 'day after tomorrow' that are based in Ego's "now." However, the marketplace-type scenario is less appropriate for the other *gannaaw* expressions we saw in Section 6, in which

Ego's "now" is not necessarily relevant to the temporal relation referred to by the expression.

Example 13 below involves essentially the same direction-giving strategy that we saw regarding the marketplace scenario and *fale ci gannaaw* 'over there behind' in 7c(ii) in Section 5 above. Like the marketplace scenario, the "location on route" direction-giving scenario exemplified in 13 below is involved in a typical communicative practice in Senegal. Example 13 occurred in the US in spontaneous conversation as a native speaker of Wolof was explaining to me where a certain lake is in Senegal.

- 13) *ci gannaaw Pikin bala ngay jot Tëngéej*
 LOCPREP back Pikin before you:IMPF reach Rufisque
 "behind Pikin before you reach Rufisque."
 'after Pikin, before you get to Rufisque.' [AS 082299]

In the marketplace scenario (7c[ii]), the reference object of *gannaaw* is salient and immediate in the perceptual field of the interlocutors. This is analogous to the way the understanding of 'the day after tomorrow' is based on the concept of 'today' which is immediate in experience. By contrast, in order to understand 13, the hearer must transport herself in imagination to Dakar — it is only from this perspective that the lake is "behind/after" a place called Pikin and before the town of Rufisque. On the account I am proposing, this sort of "transported viewpoint" or viewpoint shift (called *transposition* in Hanks 1990) is directly analogous to the viewpoint shift in 1a(ii) or 10a (*ginnaaw loolu...* 'after that...') in which the conceptualizer comprehends a temporal relation from an imaginary point that is earlier than both the temporal reference point and the figure.

Viewpoint shifts such as that exemplified in 13 are not unconstrained; for example, 13 would not be said to an addressee in Rufisque. Ego Opposed *gannaaw* expressions — spatial and temporal — depend on a shared viewpoint. This dependence accounts for the tendency observed in Section 6 for 'later than' *gannaaw* to occur in viewpoint-establishing contexts. The data alluded to in Section 6 is summarized in 14 below.

8. Text-count data

14) Environments in which 'later than' uses of *gannaaw* occur in texts.

env.	P	F	U	Jf	Ta	Ep	Dt	Ab	Fal	Tot	%	sub
temp.	0	0	1	1	2	1	0	4	1	10	21.3	VE
<i>loolu</i>	0	0	0	0	2	0	0	0	1	3	6.4	77%
zero	0	2	0	6	2	0	0	1	3	14	29.8	
Ant.	0	0	0	0	3	5	1	0	0	9	19.1	
-----	----	----	----	----	----	----	----	----	----	-----	-----	----
person	0	0	0	0	0	2	0	0	0	2	4.2	NV
other	6	0	0	0	1	1	0	0	1	9	19.1	23%
Total:	6	2	1	7	10	9	1	5	6	47	99.9	100%

The contexts are indicated in the left-hand column, identified by the element that denotes the reference point: Temp = temporal deictic, e.g., *suba* 'tomorrow'; *loolu* = the discourse referential demonstrative 'that'; Ant. = the anterior construction; *person* means that a person was the reference point of *gannaaw*; the

other category consists mostly of non-deictic timeword reference points, as in example 12 above.

The sources of the data are in the top row. Single letters represent the names of consultants in the tape-recorded data. The other sources are as follows: Jf = Ndam 1997; Ta = Kesteloot and Mbodj 1983 & Kesteloot and Dieng 1989; Ep = Dieng 1993; Dt = Démb ak Tey; Ab = Je_ 1992; Fal = Fal et al. 1990. Tot = total. Sub = subtotals; e.g., 77% for those tokens of *gannaaw* that occurred in a viewpoint establishing (VE) context, listed above the dashed line in the table. NV stands for 'contexts that are not viewpoint establishing'.

The data summarized in the table in 14 show that 'later than' *gannaaw* has a strong tendency to appear in viewpoint-establishing contexts, which account for 77% of the tokens. A comparison of this data with data from English (in the table in 15 below) shows that the tendency we have observed with *gannaaw* is not a property of all words that mean 'later than'. It is also interesting to note that the lack of dependency on viewpoint-establishing contexts that we observe in the case of English *after* is what would be predicted if the metaphorical motivation for the 'later than' meaning of *after* involves the FRONT/BACK Moving Time metaphor.

15) Spoken tokens of *after* in English.

Occurring in viewpoint-establishing contexts	22%
--	-----

Not occurring in viewpoint-establishing contexts	78%
--	-----

The total sample was 225 tokens of *after* meaning 'later than', taken from 300 spoken tokens selected randomly from the COBUILD corpus. The remaining 75 tokens did not have the meaning 'later than'.

9. Conclusions

The fact that *gannaaw* 'back' has an "extra" temporal sense compared to *kanam* 'front' at first seemed mysterious. However, when this extra temporal sense is considered alongside certain typical spatial uses of *gannaaw*, the mystery disappears. Furthermore, we have begun to understand some of the factors that govern the contexts in which *gannaaw* occurs with the meaning 'later than'. Conceptual metaphor theory provides a basis for understanding how *gannaaw* means 'later than', but only in conjunction with a theory of linguistic practice.

Notes

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¹ The following abbreviations have been used in the glosses:

AFF Affirmation; ALL Allative; ANT Anterior; att. = attested in use (as opposed to elicited); AUX An imperfective auxiliary, realized as *di* or *-y*; DISCREP Discourse referential demonstrative; DIST Distal; EMPH Emphasis; FOC Focus; FUT Future; GEN Genitive (Third person possessor); IMPF Imperfective; LOCPREP Locative preposition; NONSUBJ Nonsubject; PD Possessed; PERF Perfect; PL Plural; PRSNTTV Presentative; PRTCLE Particle; REL Relativizer; SUBJ Subject; VAL Valence-altering suffix; VEN Venative.

For the most part, examples are transcribed according to the official Senegalese transcription system (cf. Fal et al. 1990). Values of the Senegalese symbols are listed below. In all

cases not mentioned, the Senegalese symbol has the IPA value. é = [e]; e = [ɛ]; ë = a high "schwa"; a = (a low central vowel); à = a more open a; ó = [o]; o = "open o"; ñ = palatal nasal; j = voiced palatal stop; y = [j]. Capital and lower case symbols have the same value. Geminates are indicated by doubling the symbol in question except for *q* which represents [q:]. In the case of long vowels, a single diacritic modifies both symbols. For example, óo represents [o:]. Word-final stops are devoiced.

² Gamble 1991a lists *gannaaw loolu* as meaning 'after that'; this relates to a point that will be discussed below. *Dictionnaire wolof-français* (Fal et al. 1990) does list one entry of *gannaaw* as "part[icule] de liaison 'Après, comme, puisque'," but this suggests that the temporal semantics are not felt to be central, since *après* 'after' is grouped under the same entry as *comme* 'as' and *puisque* 'since'. In fact, in her investigation of the *comme/puisque* use of *gannaaw*, Robert (1997) claims that "'after' is expressed with another [i.e. other than *gannaaw*] morpheme (*bilba*)"

³ Strictly speaking, *after* participated in the Moving Time metaphor at an earlier stage of English but does not any more -- that does not affect the point of the illustration.

⁴ See H. Clark 1973, Fillmore 1997, Rubba 1994. Vandeloise (1991:39) and Hill (1978) call Ego Opposed *mirror image*. Cf. Allan 1995. Levinson 1996 calls it a *relative strategy*.

⁵ Lakoff and Johnson 1980 call this metaphor TIME IS STATIONARY AND WE MOVE THROUGH IT.

⁶ The table in 14 below notes that 23% of the tokens of 'later than' *gannaaw* appear in contexts that are not viewpoint-establishing. The discrepant 4% can be given a separate account based on the fact that their reference object is a person.

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Markedness and the evolution of binary spatial deictics: French *voilà* and *voici*

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0. Introduction

This paper investigates the evolution of the French deictic demonstratives *voilà* 'there is' and *voici* 'here is' with respect to asymmetries in the distribution of the two terms. Critical in this study is the observation that these demonstratives constitute radial categories of related senses. We begin by introducing the phenomenon of radial categories in general, and then move on to a description of the radial category structure of the French deictic demonstrative *voilà* 'there is.' In its central (spatial) case, *voilà* has usurped some of the semantic ground of *voici* 'here is.' In some of their extended senses, such as the discourse case, *voilà* and *voici* maintain distinct semantics, while in other extended senses, such as the paragon case, only *voilà* is used. Previous accounts of the encroachment of *voilà* over *voici* invoke markedness, but these accounts fail to explain how these lexical items pattern in extensions. We suggest that incorporation of the pragmatic functions of particular senses and the metaphorical extensions from which they derive can explain this phenomenon.

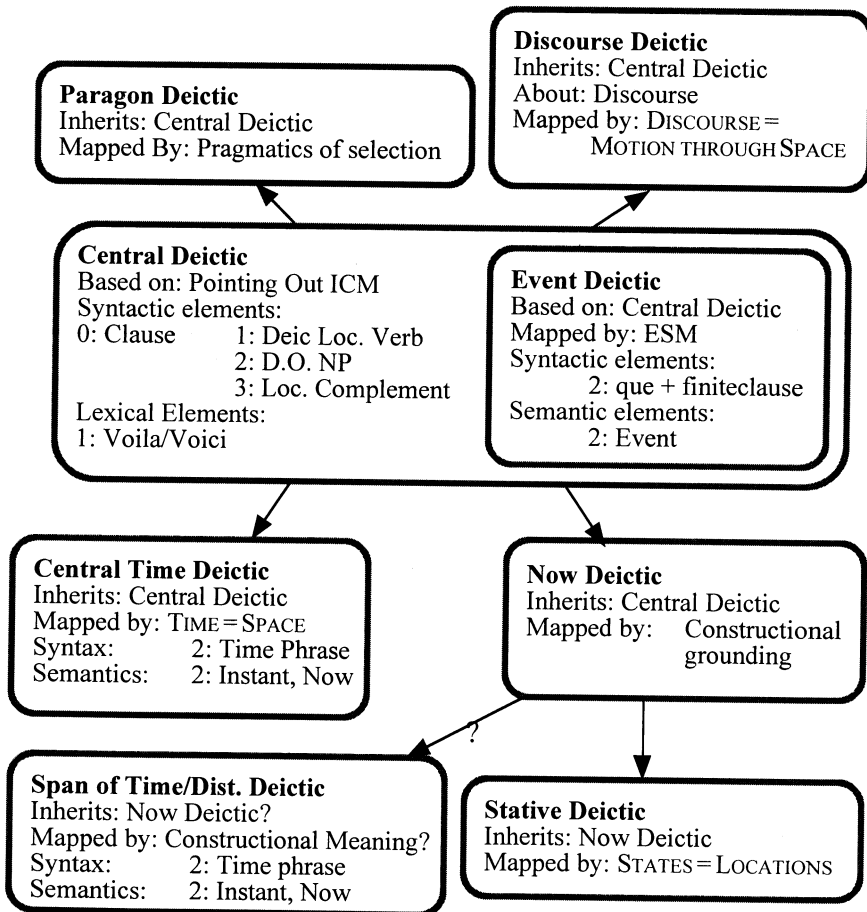
1. French deictic demonstratives

1.1. The radial category of *voilà*

Radial Categories (Lakoff 1987, Brugman 1981, Lindner 1981) are linguistic categories where the connections between the senses of a word or construction are established by general extension mechanisms such as metonymy, metaphor, constructional grounding, syntactic blends, and the pragmatics of communicative acts. A classic example of such a category is the English category *mother* (Lakoff 1987), which has a central sense, including such characteristics as nurturance, contribution of genetic material, marriage to the father, and so on. The category also includes extensions from the central sense, such as *adoptive mother*, *biological mother*, etc., which modify characteristics of the central case. Additionally, extensions from a central case can themselves act as sources of subsequent extensions, as shown for Dyirbal noun classes, such as *balan*, which has among its meanings 'women', 'fire', and 'dangerous things' (Dixon 1982). Studies of radial category structures in language have determined that many levels

of linguistic elements can be felicitously described as such: from the phoneme (Jaeger 1980) to grammatical categories such as subject (Van Oosten 1986), to lexical items (Cienki 1998), and to grammatical constructions (Goldberg 1995).

(1) Radial category of *voilà*. (Bergen and Plauché to appear)



The French deictic demonstrative *voilà* 'there is' constitutes a radial category (1), whose central meaning is a spatial one that points out (☞) an object in the perceptual field of the speaker (Bergen and Plauché to appear). The central sense of *voilà* (2) is extended to the domains of discourse (3), time, evaluation, and others through the mechanisms described above. For example, *voilà* and *voici* can

point out not only a physical object (2), but also an element of the ongoing discourse (3). This is motivated by a metaphorical mapping from the domain of space to the domain of discourse that is not specific to this lexical item, but can be found elsewhere in French (4) and in other languages.

- (2) (a) *Voilà les clés que tu cherchais.*
There are the keys you were looking for.
(b) *Voici son sac à nain.*
Here's his dwarf bag.
- (3) (a) *Voici deux exemples.*
Here are two examples (to come).
(b) *Voilà un bon point.*
There's a good point (that's just been made).
- (4) (a) *Quand est-ce qu'on va **arriver** à la partie intéressante de l'histoire?*
When are we going to **get to** the interesting part of the story?
(b) *Je n'ai pas pu **suivre** la discussion.*
I couldn't **follow** the discussion.

1.2. Historical development

Voilà and *voici* derived historically from a composition of the imperative of *voir* 'to see' and the locative adverbs *là* 'there' and *ci* 'here' (5). They first appear as fixed lexical forms in the 13th to 15th century (Rey 1995).

- (5) *Voilà* from *vois* 'see!' and *là* 'there'
Voici from *vois* 'see!' and *ci* 'here'

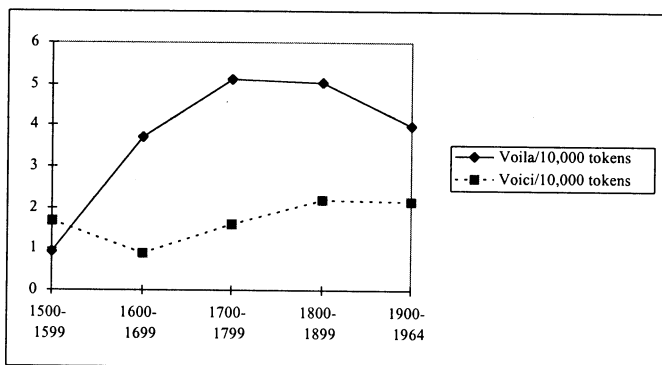
The historically original senses of *voilà* and *voici* are thus explicitly imperative ones. They call the attention of the interlocutor to some element in the present location of the conversants by telling the interlocutor to look at a thing in a location. This imperative function is preserved in Modern French in the central (spatial) case (2).

In Modern French, especially among younger speakers, *voilà* is generally preferred over *voici* in the central case. This is part of a larger trend in French of distal spatial deictics taking over the uses associated with their proximal counterparts (Smith 1995). For example, speakers use the deictic locative adverb *là* 'there' in the place of *ici* 'here' even when the reference place is explicitly encoded elsewhere in the utterance as referring to the location of the speaker (6).

- (6) *Viens là, Lulu, pour que je te mouche!!*
Come here, Lulu, so I can blow your nose! (lit. 'Come there')

This follows a cross-linguistic trend for binary deictic systems to develop usage asymmetries (e.g. English, German, French, and Russian). To illustrate this trend in French, let us consider corpus evidence taken from the ARTFL database (<http://humanities.uchicago.edu/ARTFL/>). The ARTFL (American and French Research on the Treasury of the French Language) is a corpus of literature from the 16th through the 20th centuries, ending in the 1960's. Thus, although it will not show the most recent trends of spoken French, it is an excellent source for the historical development of these forms over the last five centuries. In (7), the number of each of these forms out of 10,000 tokens is plotted by century.

(7) Absolute use of *voilà* and *voici* over time



This sample demonstrates that from the beginning of these fixed forms (in the 14th to 15th centuries), a usage asymmetry (at least in terms of simple frequency) developed between *voilà* and *voici*. Although this corpus is limited to literature, the usage asymmetry we observe in it correlates with asymmetries found in modern spoken French.

2. Markedness

2.1. Spatial deictics and markedness

The explanation for the primacy of the distal form, *voilà*, over the proximal form, *voici*, in previous literature is based essentially on the concept of markedness, where spatial distals are deemed “unmarked” and proximals “marked” for perceptual (Clark 1973) or semantic (Lyons 1975) reasons (8).

(8) *Voilà*, *voici*, and markedness

<i>Voilà</i> (distal)	unmarked	[]
<i>Voici</i> (proximal)	marked	[+proximal]

The theoretical construct of markedness is an asymmetric relationship between forms which is assessed by various measures, including frequency and semantic generality (Greenberg 1966), elegance and generality of description (Chomsky & Halle 1968), use in neutral contexts, and zero structural expression (Bierwisch 1967). In various frameworks, unmarked elements are more frequent, more semantically general, are used in neutral contexts, and have the shortest and or most morphologically simple expression. Marked counterparts are in opposition to unmarked forms on each of these parameters.

Furthermore, some theorists claim that there are certain concepts that are inherently marked or unmarked, which give rise to universal semantic asymmetries (Piaget 1967, Clark 1973). We will show that the idea of universality of markedness fails for the case of French deictic demonstratives.

2.2. Problems with the markedness approach

Not only are the measures described above for assessing markedness controversial and varied, but additionally they fail to account for language-specific differences in asymmetries. They also fail to explain why markedness patterns differ across radial category extensions.

First, there are languages like Russian with deictic systems in which the proximal and not the distal element becomes more common, or is unmarked (9). At the very least, a theory of markedness must be able to account for language-specific differences. Basing the markedness of lexical items in a given language on universal semantic asymmetries seems impossible for deictic demonstratives, since opposite markedness on elements expressing essentially the same semantics appears in different languages.

(9) Russian *vot*, *von*, and markedness

<i>Vot</i> (proximal)	unmarked
<i>Von</i> (distal)	marked

The previous accounts also fail to explain differences in markedness patterns in different extensions of the radial categories of deictic demonstratives. With some extensions, only the unmarked element of the central sense (or source domain) is mapped to a target domain. In others, both the marked and unmarked elements are mapped to the target domain. We will present an example of each of these phenomena and offer an explanation that can account for both patterns.

2.2.1. Extension of unmarked element only: the paragon case

One use of *voilà* has the specific meaning of picking out one or more elements from a group, usually because they are particularly exemplary of that category (10). This case can be described as an extension from the central case to the domain of category membership evaluation via the pragmatics of selection

(Bergen and Plauché to appear). (Explicitly identifying an entity as a member of a given category can entail an assertion of the “goodness of membership” of that entity in the category.) The paragon *voilà* construction is usually associated with a particular intonation pattern, putting sentential stress on *voilà*. This extension works very much the same way in English (translations in 10).

- (10) (a) *Voilà une bonne idée.*
 There's a good idea.
 (b) *Voilà de la bonne littérature.*
 Now **there's** good literature.
 (c) *En voilà des étudiants!*
 Now **there** are some students (for you)!

The crucial point to note is that *voici*, the marked, proximal deictic cannot be used in this sense. Only the unmarked form, *voilà*, is mapped to the paragon domain. Previous accounts of this kind of asymmetry argue that markedness determines lexical choice in metaphorical extensions (Lakoff 1987, Clark 1973). In an analysis of English, which has the same ranking of proximal and distal deictics as French, Lakoff (1987) suggests that *there* and not *here* is inherited from the deictic (source domain) and mapped to the existential (target domain) and other extended sense of *there* constructions because *there* is the unmarked member of the binary pair (11).

- (11) English 'There' (Lakoff 1987)
- (a) Central Deictic
 There's a dog wearing a little sweater.
 Here's your soggy cuttlefish.
- (b) Existential
 There's a dog on the porch.
 ***Here's** a cuttlefish on the porch.

The Paragon case in French and English is the norm in that the unmarked element is the only element to be mapped to a metaphorical target domain.

2.2.2. Extension of both marked and unmarked elements: the discourse deictic

Unlike the paragon case described above (2.2.1.), for some metaphorically extended senses of *voilà* and *voici*, such as the one in the domain of discourse deixis, both the proximal and distal elements of the source domain are mapped (12). The metaphors that motivate this mapping are: DISCOURSE SPACE IS PHYSICAL SPACE, DISCOURSE ELEMENTS ARE ENTITIES, DISCOURSE IS MOTION ALONG A PATH, IMMEDIATELY PAST DISCOURSE IS IN OUR PRESENCE AT A

DISTANCE FROM US, DISCOURSE IN THE IMMEDIATE FUTURE IS MOVING TOWARDS US (Lakoff 1987, Clark 1973).

- (12) (a) *Voici comment on rase un chat...*
 Here's how you shave a cat...
 (b) *Voilà pourquoi notre fille est muette.*
 That's why our daughter is mute.

As has been previously shown for other languages (Lakoff 1987, Fillmore 1997), the proximal form, *voici*, is used to indicate discourse elements that will occur in the near future, whereas the distal form, *voilà*, points to discourse elements that occurred in the recent past (13).

- (13) Metaphorical mapping from central to discourse senses
voici (proximal) → future discourse
voilà (distal) → prior discourse

Traditional accounts of usage asymmetries in extensions have no way of dealing with the differences between extensions like the paragon case, where only the unmarked element is mapped, and extensions like the discourse case, where both elements are mapped. We argue in the rest of this paper that the semantic content of the target domains of extensions dictates these different extension patterns.

2.3. Particularities of the discourse domain

Deictics in discourse serve to bracket speech. Many languages have lexical items for opening and closing speech elements. Even if only one lexical item is mapped from the central domain to the discourse domain, as in the case of Russian, the two senses of opening and closing maintain their distinction, in this case through distinct intonation. When referring to a future discourse element, *vot* 'here is', has high, level intonation without a pause (*vot-1*). When closing a topic, i.e. referring to a past discourse unit, *vot* is produced with falling intonation and is followed by a pause (*vot-2*) (Grenoble and Riley 1996).

In (14), we see the distribution of deictic demonstratives in the central and discourse domains for English, French and Russian. In all three languages, some distinction is encoded in the discourse domain between cataphoric and anaphoric reference. In English and in French the same forms that encode a proximal/distal distinction in the spatial sense are used to express cataphoric and anaphoric reference in the discourse domain. In Russian, despite the use of only the unmarked (bolded) central sense element, *vot*, in the discourse domain, the anaphoric/cataphoric distinction is retained by the use of distinct intonational patterns (*vot-1* and *vot-2*).

(14) Extension to discourse

		English	French	Russian
Central	Proximal	here	<i>voici/voilà</i>	<i>vot</i>
	Distal	there	<i>voilà</i>	<i>von/vot</i>
Discourse	Cataphoric	here	<i>voici/voilà</i>	<i>vot-1</i>
	Anaphoric	there	<i>voilà</i>	<i>vot-2</i>

The domain of discourse or the metaphorical mappings to the domain of discourse encode a salient distinction between past speech and future speech. One possible scenario is that the proximal/distal distinction is mapped in its entirety to all extensions. This distinction is subsequently historically retained in domains where it is useful but lost in domains in which the distinction serves no purpose. A second potential explanation is that certain metaphors pick out relevant semantic aspects of the source domain (such as relative distance from the speaker) in the metaphors that map to particular domains, leading to the extension of a distinction or not. Either way, the salient distinction needed in the discourse domain explains why in English and French (and many other languages) we find both the marked and unmarked elements in this domain. Crucially, the domain of paragon selection involves only a single referent and no possibility or requirement of distinguishing between paragons.

3. The Russian discourse case: extension of unmarked member only

Before going on, we should address the case of the Russian discourse domain. Specifically, if discourse encodes a salient binary distinction, why is only the unmarked deictic demonstrative mapped to the discourse domain in Russian? We claim that the answer lies in the degree of transparency of the morphemes involved and the retention of the proximal/distal distinction in deictics and in general in the language under consideration.

Consider the relationship between spatial deictic demonstratives, discourse deictics, and spatial locatives in English, French, and Russian (15). In Russian, there is little distinction between proximal and distal in the central spatial demonstratives or elsewhere: the proximal is used preferentially in almost all contexts (Grenoble and Riley 1996). For example, in the contrasting forms, *ëtot / tot* 'that'/'this', *ëtot* 'that' is used only when there is an explicit contrast. Additionally, the deictic demonstratives in Russian are not morphologically related to the spatial deictic locatives. In French, there is little proximal/distal distinction in the spatial demonstratives, but they are morphologically transparent to, and related to distinct forms *ici* 'here' and *là* 'there'. In English, the proximal/distal distinction is retained in deictic adverbials and these forms are identical to their demonstrative counterparts.

(15) Extensions to discourse and related forms

		English	French	Russian
Central	Proximal	here	<i>voici/voilà</i>	<i>vot</i>
	Distal	there	<i>voilà</i>	<i>von/vot</i>
Discourse	Cataphoric	here	<i>voici/voilà</i>	<i>vot-1</i>
	Anaphoric	there	<i>voilà</i>	<i>vot-2</i>
Spatial Locatives		here/there	<i>ici/là/là-bas</i>	<i>tam/tut/zdes'</i>

A schematic of the degree of proximal/distal distinctions in the central case, the discourse case, and in general is given below by language (16). In English, (a) the proximal/distal distinction is retained in the central deictic and elsewhere, and (b) there is a very high degree of semantic transparency between the deictic demonstratives and the deictic locatives. In French, the proximal/distal distinction is maintained only to a limited extent in the spatial domain, but morphological transparency of the deictic demonstratives to their deictic locative counterparts, which also retain a proximal/distal distinction to some degree, permits the usage of these contrastive forms in the metaphorical extension to the domain of discourse. Finally, Russian does not preserve the proximal/distal distinction with the deictic demonstratives, nor is there any overt morphological relation between these forms and deictic locatives. Even if there were, the deictic locatives themselves seem to encode very little distinction between proximal and distal senses.

(16) Semantic transparency

	English	French	Russian
Transparency of Demonstrative	identical	transparent	opaque or unrelated
±prox in general	yes	yes	attenuating
±prox in central	yes	attenuating	attenuating
±prox in discourse	yes	some	no

Our claim is that the difference in the retention of a lexical distinction in the discourse domain is due to (a) the retention of a proximal/distal distinction in the deictic demonstratives of the source domain and (b) the morphological transparency of the deictic demonstratives. French and Russian are distinguished from English in the degree to which the proximal/distal distinction is attenuating in the central deictic demonstrative. However, Russian and French differ from one another in the transparency of their deictics relative to other spatial locatives and in the extent to which the proximal/distal distinction is maintained elsewhere in the spatial domain.

Further investigation into the importance of transparency in radial category extensions is beyond the scope of this paper, but we believe it to be an interesting potential topic for further research.

4. Conclusion: Target Domain and/or mappings maintain semantic distinctions

The French deictic demonstratives *voilà* 'there is' and *voici* 'here is' have developed asymmetries in their distribution that differ in different extensions of their radial categories. We have shown that previous accounts of the encroachment of *voilà* on *voici* invoking markedness fail to explain why some extensions map only the unmarked form from the source domain, while others map both. We have argued that the pragmatic functions of particular senses and the metaphorical extensions from which they derive form the basis for the differences in the way these forms are mapped.

There are properties of the expressed mechanisms required for discourse that dictate the possible mappings to this domain. This can be explained from two perspectives. The first is that metaphors for discourse pick out a distinction which is present in the spatial domain (namely, location relative to the speaker) which is not picked out by metaphors for other domains (e.g. Paragon) that also have the spatial sense as the source domain. Thus, one could argue that because these same metaphors exist in different languages, discourse is construed similarly (things in the future are in front of the observer and past speech is behind the observer), which becomes an important distinction for that domain, whether or not it is encoded in these forms.

It is also possible that the domain of discourse itself has requirements which are fulfilled by certain mappings and not by others. Thus, the target domain structure of the discourse domain naturally selects metaphors that will encode a binary distinction. And it is precisely these requirements that surface in languages like Russian, which encode a binary distinction despite the lack of a correlated distinction in the spatial domain.

Either way, the special requirements of the target domain (of discourse) and/or its mappings dictate the retention of a semantic distinction whose source domain correlate (the spatial domain) may no longer exist.

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Constraints on motion verbs in the TIME IS MOTION metaphor

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1. Introduction

This study analyzes the structure of metaphorical mappings from the domain of spatial motion to that of passing of time, based on Lakoff and Johnson's framework (Lakoff and Johnson 1980, Lakoff 1993, Johnson 1987, etc.). This study shows which parts of the concept of spatial motion are mapped onto that of time and which parts are excluded from this mapping through analysis of English and Japanese.

Under the assumption that the source domain is "motion", the source structure is analyzed in terms of the Motion Event Frame as suggested by Talmy (1985), and it is examined whether all the inferential structures of the source domain are mapped onto target. It will be shown that there are a lot of mapping gaps in this metaphor. Though English and Japanese differ in their major conflation patterns (the former is a satellite-framed language, and the latter is a verb-framed language), these languages have quite similar constraints on the mappings (or mapping gaps).

2. Constraints on the Motion-Time Mapping

It has been previously argued that there are at least two different types of Motion-Time mapping. One is TIME IS A MOVING OBJECT (e.g. *The time will come* when), and the other is TIME IS A LINE ALONG WHICH OBSERVERS MOVE (e.g. *We are approaching* the end of the year.). To analyze the source domain structure, Talmy's Motion Event Frame is employed. This frame consists of two components, central and non-central. The following is the description of this frame.

- (1) The Motion Event Frame (Talmy 1985, with a slight revision of my own)

The Central Elements

Figure (the moving object),

Ground (the reference-object with respect to which the motion is conceptualized),

Path (the course followed or site occupied by the figure object with respect to the Ground object),

Motion

The Non-Central Elements

Manner (the way in which the Figure moves),

Cause, Circumstance, and Resultant State

2.1. Constraints on Manners of Motion

We will first see the constraints on manners of motion because English motion verbs has a dominant tendency to conflate manner information, and so this is the biggest part of this research. 168 English manner-of-motion verbs and 77 Japanese manner-of-motion verbs were researched. Though Japanese has in fact only 14 manner-of-motion verbs, this language has a very productive system of making compound verbs consisting of two motion verbs, the first of which is a manner-of-motion verb. These compound verbs were included in the 77 verbs researched. The English and Japanese manner-of-motion verbs used in this study appear in the appendix at the end of this paper.

The constraints and examples are as follows.

- (2) Constraint (i): Motion verbs which do not have at least one of the following implications cannot be extended to the concept of time.
 - (a) the implication of saliently high or saliently low speed
 - (b) the implication that the motion is unnoticeable for the observer
 - (c) the implication of smooth, invariable motion
 - (d) the implication of rhythmical motion
- (3)
 - a. Time hurried on. (2a)
 - b. The days slipped by. (2b)
 - c. Time flows. (2c)
 - d. Time marched on. (2d)
 - e. ??Time shuffled [limped/jogged/waddled/etc.] by. (*2a-2d)
- (4)
 - a. jikan-ga tobisaru
time-Nom fly-leave
'Time flies away.' (2a)
 - b. unmee-no toki-ga shinobiyoru.
fate-Gen time-Nom sneak-approach
'Time of fate sneaks up.' (2b)
 - c. toki-ga nagareru.
time-Nom flow
'Time flows.' (2c)
 - d. ??toki-ga oyogu [mau /chiru /haneru /etc.]
time-Nom swim /dance /scatter /leap /etc. (*2a-2d)
- (5) Constraint (ii): Motion verbs that have one or more of the following implications cannot be extended to the concept of time.
 - (a) the implication of instruments used for the motion
 - (b) the implication of sound emission

- (6) a. ??Time rocketed away. (5a)
 b. ??The years rattled by. (5b)
- (7) a. ??toki-ga roketto-de sugi-te-it-ta.
 time-Nom rocket-by pass-and-go-Past
 'Time passed by rocket.' (5a)
 b. ??toshitsuki-ga gatagata-to sugi-te-it-ta.
 year-month-Nom with-a-rattle pass-and-go-Past
 'Time rattled by.' (5b)

Both in English and Japanese, the examples that seem natural have implications (2a-d), and bad examples lack these implications or they have implications (5a-b). By checking all the 168 English and 77 Japanese manner-of-motion verbs, it is found that English manner-of-motion verbs that can be naturally used in time expressions (Moving Time metaphor) are *flow*, *fly*, *crawl*, *creep*, *dash*, *hurry*, *march*, *run*, *rush*, *sneak*, *roll*, *slide*, *slip*, and *glide*; the Japanese ones are *nagareru* 'flow', *?hashiri-saru* 'run-leave', *tobi-saru* 'fly-leave', *nagare-saru* 'flow-leave', *kake-nukeru* 'run through', *shinobi-yoru* 'sneak-approach'.

2.2. Constraints on Path

There are two constraints on the path information.

- (8) Constraint (iii): The path information is restricted to a one-dimensional line or a cyclic path (where cyclic path is restricted to the cases implying recursive experience).
- (9) a. ??Time zigzagged by.
 b. ??toki-ga dakooshi-te-it-ta.
 time-Nom zigzag-and-go-Past
 c. ??The days curved on.
 d. ??hibi-ga magat-te-it-ta.
 days-Nom curve-and-go-Past
 e. ??We curved [zigzagged] through time.
 f. ??wareware-wa toki-no naka-o magat-te [dakooshi-te]-it-ta.
 we-Top time-Gen in-Acc flow-and [curve-and]-go-Past

However, the following examples show that in some cases, more than one dimension of time can be expressed.

- (10) a. Time rolls on.
 b. toki-ga meguru / ??mawaru.
 time-Nom roll cycle

In these cases, some kind of repetitious experiences such as the four seasons, annual cultural events, and so on are implied. (Japanese makes distinction by two verbs with approximately the same meaning *meguru* and *mawaru*. Only *meguru* is used for time.) That cyclic path is restricted to repetitious experiences is supported by the next set of examples. It is unusual that we expect a repetitious experience occurring at 3:17 every day, and *the end of the world* is believed to occur only once in Judeo-Christian view of the world. This is basically the same in Japanese, though Buddhist view might allow you to say ‘the end of life came around again’.

- (11) a. Leap year [??3:17 PM / ??the end of the world] came around.
 b. Uruudoshi [??gogo 3-ji 17-fun/ ??sekai no owari] ga megut-te- ki-ta.
 leap-year pm.hour minute world-Gen end Nom round-and-come-Past
- (12) Constraint (iv): The path is restricted to the front-back axis (though the up-down axis is seen in peripheral cases).

The supporting examples are the following (Japanese counterparts are shown after each of the English examples):

- (13) a. ??Time climbed on. ?
 ?toki-ga nobot-te-it-ta.
 b. ??The days ascended away.
 ??hibi-ga agat-te-it-ta.
 c. ??Time fell by.
 ?toki-ga ochi-te-it-ta.
 d. ??We are falling into the 21st century.
 ??wareware-wa nijuuissseeki-ni ochi-te-iru.
 e. ??We ascended ten years.
 ??wareware-wa juunen agat-ta.

Thus the up-down axis seems to be rejected in this mapping. However, Japanese has some peripheral idiomatic use of the up-down axis.

- (14) a. ima-kara sanbyaku-nen sakanoboru-to, Edo-jidai dearu.
 now-Abl 300-years ascend-back-Conj Edo-era be
 ‘Ascending backward for 300 years from now, it is Edo era.’
 b. Kamakura-jidai-kara yonhyaku-nen kudaru-to, Edo-jidai dearu.
 Kamakura-era-Abl 400-years descend-Conj Edo-era be
 ‘Descending for 400 years from Kamakura era, it’s Edo era.’

- c. ??chuushoku-ga owat-te-kara ichi-jikan kudat-ta tokoro-de,
 lunch-Nom end-Part-Abl 1-hour descend-Past place-Loc
 kinkyuurenraku-ga hait-ta.
 urgent-announcement-Nom enter-Past
 ‘Descending for 1 hour after finishing lunch, we received an urgent
 call.’

Though not very productive, Japanese seems to have the EARLIER IS UP / LATER IS DOWN pair of metaphors. (14c) shows that the up-down motion seems appropriate only when a long-term consideration of time is involved, such as talking about history. Japanese also has a small set of Chinese-origin words like *joojun* ‘the upper ten days of a month’ (the first ten days), but these are fixed idioms and not productive.

2.3. Constraints on Moving Objects

The moving objects are also restricted.

- (15) Constraint (v): The moving object should be time or the observers.

There are only a few verbs that conflate the part of the moving object in English and Japanese. In English, only *rain* and *spit* are suggested (Talmy 1985). These verbs are not used for time expressions.

- (16) a. *Time rained quickly. (=Time passed quickly.)
 b. *We are raining toward Christmas. (=We are approaching Christmas.)

These are not acceptable since the verb *rain* denotes that the moving object is some kind of water that falls down from the sky. This moving object cannot be understood as time.

- (17) Constraint (vi): The moving time should not be more than one entity.

- (18) *Time trooped by.

Since *troop* denotes that the moving objects are plural, this verb cannot be used to express passing time.

2.4. Constraints on Causes, Circumstances, and Resultant States

These elements are all rejected in expressions of time passage.

- (19) Constraint (vii): Circumstances or environment of motion, causes and resultant state cannot be mapped.

The following examples support this constraint. Japanese counterparts are shown after each of the English examples.

- (20) a. ??Time swam by.
 ??toki-ga oyoi-de -it-ta.
 b. ??The years waded away.
 (Japanese has no counterpart.)
 c. ??Time wore wings to the past.
 *toki-ga kako-e tubasa-o matot-ta.
 d. ??The days blew off. (=The days passed.)
 ??hibi-ga fukiton-da.
 e. ??John blew off the weekend. ('John'= moving object)
 ??jon-ga shuumatu-kara fuki-ton-da.
 f. ??John pulled loose from the weekend.
 ??kare-ga shuumatu-kara hikinuk-are-ta.
 g. ??Time stuck to Wednesday.
 ??toki-ga suiyoobi-ni kuttui-ta.
 h. ??John stuck to Wednesday.
 ??jon-ga suiyoobi-ni kuttui-ta.
 Cf. The napkin blew off the table. (Talmy (1985: 63))
 Napukin-ga teeburu-kara fukiton-da.

(20a-b) imply that the motion took place in water, and this makes these expressions awfully unnatural, since time does not exist in water. The physical motion expression *Mary wore a red dress to the party* is acceptable, but this does not apply to time as in (20c). The Japanese counterpart is unacceptable even for physical motion; there is no counterpart for the time expression in (20c). (20d-f) show that the cause of motion cannot be applied to time expressions. This may be because time is not conceptualized as something that is moved by some outside agents. Verbs with resultant-state meaning such as *stick* cannot be used for time expressions as in (20g-h). This may be because the passage of time is conceptualized as being smooth and incessant so that time does not stay at any fixed states. All of these present clear contrasts with expressions of physical motion, where cause, circumstance and resultant state can be expressed.

3. Treatment of the Mapping Gaps

Under the assumption that the source domain of the time metaphor is 'motion,' we find more than a few mapping gaps or constraints on mappings. As shown in the above sections, the same constraints or gaps are found in English and Japanese. We must somehow explain these mapping gaps. One possibility is the Target Domain Override, as suggested by Lakoff (1993), that is, to attribute all the mapping gaps to the inherent target domain structure. However, we find that some of the mapping gaps have independent experiential motivations. These

mapping gaps do not seem to have been caused by the inherent target domain structure.

The concept of time itself does not restrict us from conceiving of time as moving in directions other than front or back. The front-back constraint seems to be motivated by our experience of basic directions of motion. Our asymmetrical body with inherent front and back, and our bodily structure designed to move in the direction of the front, mark the front-back axis as the most basic, important one for human beings. If this bodily experience motivates the front-back constraint, then it is not the inherent structure of time that causes this mapping gap. In that case, we must think of some independent metaphor as Grady (1996) suggests.

The peripheral selection of the up-down axis in Japanese also seems to be motivated experientially. For example, imagine a slope, on which you put a ball. If you leave it there, it rolls down without your making any efforts. However, if you want to take the ball up the slope, you have to consume some energy. Likewise, though we do not need any effort to go on to future experiences, we need effort, or we need to consume some energy if we want to recall the past. Thus up-down time metaphors have independent experiential motivation from front-back time metaphors. This leads us to conclude that the up-down time metaphors are different and independent time metaphors and should be separated from the front-back time metaphors.

One-dimensionality of time might also be experientially motivated. It is suggested by Evans (in preparation) that our neural capacity of differentiating one moment from a previous conscious moment motivates the one-dimensionality of the time concept.

Thus, there seem to be two different kinds of mapping gaps in TIME AS MOTION: those which come from the structure of the target concept, and those which come from experiential motivations. To fully explain these mapping gaps, it might be necessary to separate these two kinds of gaps and treat them differently. Grady et al (1996) suggest distinguishing primitive and compound metaphors, and Fauconnier and Turner (1995, 1996) suggest the blending model of metaphor. These ideas might help analyze those mapping gaps, though in this study a full analysis was not shown.

4. Conclusion

As discussed above, there are more than a few mapping gaps in TIME AS MOTION. To fully explain these mapping gaps, we must take into account the difference in the nature of the mapping gaps, i.e., the difference between those that come from the Target Domain Override and those which come from independent experiential motivations.

5. Appendix (cf. Shinohara (1997))

Motion verbs examined in this study:

Asterisk indicates that it is inappropriate to use the verb in expressions like 'Time

_____ by (away, on, etc.).'

Question marks indicate that the use of the verb is not totally inappropriate but it is somewhat strange or needs some special context (judged by two to five native speakers).

List of Motion+Manner Verbs (English) (168)

Verbs of Motion by spontaneous (internal) cause

?amble, ?bowl, *burst, ?canter, *clamber, *climb, crawl, creep, dash, *flit, fly, ?gallop, ?hasten, *hike, ?hobble, *hop, hurry, ?inch, *jog, *jump, ??lag, *leap, *limp, ?lumber, ?lurch, march, ?mosey, ?nip, ?pad, *parade, *plod, *plow, *pop, *prowl, ??race, *ramble, *roam, *rove, run, rush, ??saunter, *scramble, ??scud, ?scurry, *scuffle, ?scuttle, ??shamble, ??shuffle, *skim, *skip, *slouch, sneak, *soar, speed, ??stagger, *stalk, *stray, ?stride, *stroll, *strut, *stumble, *swagger, ?sweep, *swim, ??tear, ?tiptoe, *toil, *toddle, *totter, *tramp, *trek, *troop, ?trot, *trudge, *vault, *waddle, *wade, *walk, *wander, ?zip

Verbs of Motion by unconscious (external) cause

*bounce, *bound, *coil, ??drift, *float, flow, glide, *meander, ??revolve, roll, slide, slip, slither, *swing, *tumble, *whirl, *wind

Verbs of Motion with the type of instrument used

*cruise, *drive, *fly (by plane), *ride, *row, ??sail

Verbs derived from nouns of instruments

*bicycle, *bike, *boat, *bus, *cab, *canoe, *chariot, *cycle, *dogsled, *ferry, *helicopter, *jeep, *jet, *oar, *paddle, *pedal, *raft, *rocket, *skate, *ski, *sled, *sleigh, *taxi, *yacht

Verbs of sound emission

*babble, *bang, *beat, *beep, *burr, ??buzz, *chatter, *clash, *clatter, *hiss, *gurgle, *rattle, ??roar, *rumble, *screech, *shriek, *splash, *thump, *whistle, ??zoom

Verbs of dancing

*boogie, *dance, *jig, *jive, *polka, *rumba, *samba, *tango, *waltz

Verbs of body-internal motion

*buck, *fidget, *kick, *rock, *teeter, *twitch, *waggle, *wiggle, *wobble, *wriggle

List of Motion+Manner Verbs (Japanese) (14 single verbs and 63 compound verbs)

(I) Single Motion+Manner Verbs

*aruku (walk), *hashiru (run), *haneru (leap), *hau (crawl), *kakeru (run),

*moguru (dive), *oyogu (swim), *tobu (fly), *tobu (jump), *chiru (scatter), *korogaru (roll), nagareru (flow), *suberu (slide), *mau (dance)

(II) Compound Verbs: [V1(Manner) + V2(Path)]

*aruki-mawaru (walk around), *ayumi-deru (walk out), *ayumi-saru (walk-leave), *hai-agaru (crawl up), *hai-deru (crawl out), *hai-mawaru (crawl around), *hai-modoru (crawl back), *hai-oriru (crawl down), *hane-agaru (leap up), *hane-mawaru (leap around), *hane-modoru (leap back), *hashiri-deru (run out), *hashiri-komu (run into), *hashiri-mawaru (run around), *hashiri-oriru (run down), ?hashiri-saru (run-leave), *kake-agaru (run up), *kake-komu (run into), *kake-mawaru (run around), *kake-meguru (run around), *kake-modoru (run back), *kake-noboru (run up), kake-nukeru (run through), *kake-oriru (run down), *korogari-deru (roll out), *korogari-komu (roll into), *koroge-mawaru (roll around), *korogari-modoru (roll back), *korogari-nukeru (roll through), *korogari-ochiru (roll-fall), *korogari-oriru (roll down), *korogari-saru (roll-leave), *mai-agaru (dance up), *mai-komu (dance into), *mai-modoru (dance back), *mai-ochiru (dance-fall), *mai-oriru (dance down), moguri-komu (dive-into), *nagare-deru (flow out), *nagare-komu (flow into), *nagare-kudaru (flow down), *nagare-ochiru (flow-fall), nagare-saru (flow-leave), *nagare-tsuku (flow-arrive), *nige-dasu (sneak away), *oyogi-mawaru (swim around), *oyogi-saru (swim-leave), *oyogi-tsuku (swim-arrive), shinobi-yoru (sneak-approach), *suberi-deru (slide out), *suberi-komu (slide into), *suberi-ochiru (slide-fall), *suberi-oriru (slide down), *tobi-agaru (jump up), *tobi-dasu (jump out), *tobi-deru (jump out), *tobi-koeru (jump over), *tobi-komu (jump into), *tobi-mawaru (jump/fly around), *tobi-oriru (jump down), tobi-saru (fly away)

(III) Compound Verbs: [V1(Manner) + V2(Manner)]

*mai-chiru (dance-scatter), *mai-tobu (dance-fly)

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A cross-linguistic semantic analysis of Czech and Russian "spanning" prefixes

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1. Introduction

As closely related languages, Czech and Russian share a generally cognate inventory of verbal prefixes. These prefixes, when attached to a verbal root, derive a new, semantically related verb while simultaneously creating a perfective verb from an imperfective. In this paper I examine the semantics of two closely related prefixes, Czech *pře-* or Russian *pere-* and Czech and Russian *pro-*, which all share the same basic prototype semantics both within each language and cross-linguistically. Nevertheless, these prefixes are neither synonymous within Czech and Russian nor between the two languages and identifying the factors that distinguish them poses a tricky problem.

Recent research on Russian verbal prefixes has generally described their semantic content in abstract spatial terms, under the assumption that non-spatial interpretations derive from spatial ones by metaphor. Thus in order to simplify the task of teasing apart the basic factors which motivate these four prefixes, my research deals only with motion verbs. To address this question of contrastive prefix semantics, I showed native speaker consultants a series of short animated films involving a simple Figure moving with respect to various Ground objects, or Landmarks, of different shapes and orientations. Consultants described the scenes as the films were in progress and then once again from memory. The analysis presented here represents all examples of verbs prefixed with *pře-/pere-* or *pro-* in the current database of 1046 verb tokens in Czech and 1045 verb tokens in Russian. The results of my research show that these prefixes are often motivated by implicit deictic factors which do not motivate the verbs themselves. I also show how the choice of opposing prefixes to indicate deixis in Russian and Czech substantially affects the extended meaning of these prefixes in each language.

2. Conceptual framework

Talmy (1975) identified four basic semantic components which are integral to the concept of Motion and which are manifested uniquely in the surface forms of languages, but nevertheless are universally present in linguistic expressions of motion events. These components are the Fact of Motion itself, the Figure which moves, the Path of Motion, and the Ground with respect to which the motion occurs. Russian and Czech express Path as either a verbal prefix, a prepositional phrase, or both, as in (1):

(1) (Russian)

Sobaka pere-bežala

The dog across-ran

Figure(F) Path(P)-Motion(M)+Manner(m)

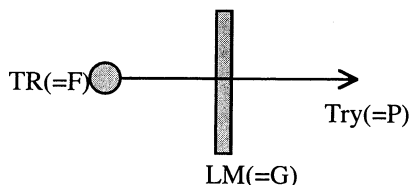
*The dog ran across the street**čerez ulicu*

across the street

Path(P) Ground(G)

Talmy's terms Figure, Ground and Path are fully compatible with Langacker's (1987) notions of Trajector (TR), Landmark (LM), and Trajectory (Try) and I use these terms interchangeably, as indicated in (2):

(2)



In terms of this framework, my research demonstrates that prefixes have their own Landmarks, Trajectors, and Trajectories independent of the verbal constructions in which the prefixes participate. Here VERBAL CONSTRUCTION refers to the full form of the verb and its complements. The verbal complements identify the participants that fill the roles of Trajector, Landmark, and Trajectory in the scenario set up by a given verb. Thus the Landmark for the full verb, often expressed as an overt nominal, may or may not coincide with the Landmark which motivates the prefix. In order to maintain the distinction between the Landmark for the verbal construction as a whole and that for the prefix alone, I refer to the former as a CONSTRUCTIONAL LANDMARK.

The prefixes *pere-/pře-* and *pro-* in Czech and Russian appear to make reference to the same basic relationship of Trajector, Landmark and Trajectory. Flier (1975) has accurately described these prefixes in Russian as 'spanning' prefixes because they refer to a scenario in which the Trajector spans the Landmark, thus stretching across the Landmark from one side to the other. When motion of the Trajector is involved, the spanning event typically indicates movement of the Trajector from one side of the Landmark to the other:

(3) Basic scenario described by spanning prefixes in Czech and Russian:

a. Czech *pře-*:

Had se pře-plazil přes celý pokoj.

A snake slithered across the whole room.

b. Russian *pere-*:

Zmeja pere-polzaet čerez kovrik.

A snake is slithering across a rug.

c. Czech *pro-*:

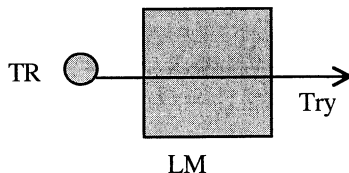
Pes pro-bíhá pokojem přes rohožku.

A dog is running through the room across a rug.

d. Russian *pro-*:

Devočka pro-exala čerez gorod na skejte.

A little girl rode through town on a skateboard.



The questions I set out to address are as follows: How do the features of a Landmark that are relevant for the verbal construction as a whole affect prefix choice for these two cognate prefixes in Czech and Russian? What other motivations, if any, exist for choosing between these prefixes in each language? Although features of the Trajectory and Trajectory can also influence prefix choice, these factors are sufficiently transparent in the case of motion verbs to allow for a controlled examination of the role the Landmark plays in prefix choice.

3. The data

3.1. Prototype Semantics of *pře-/pere-* and *pro-*

Table (4) compares the cognate prefixes in Czech and Russian. Column 1, labeled 'Constructional Landmark', indicates the presumed typology of Landmarks which appeared in the films viewed by consultants. Examples of actual Landmarks from the films are given in parentheses next to each classification. Columns 2 through 5 record how many tokens of each Landmark occur with the given prefix listed at the top of the column. The shaded areas indicate that there is considerable cross-linguistic agreement as to which Landmarks are appropriate motivators for each prefix.

(4) Cross-linguistic comparison of Czech and Russian

Constructional (overt) Landmark	Cz pře-	Russ pere-	Cz pro-	Russ pro-
horizontal linear (road, river)	26	21	0	11
bridge	14	10	0	7
horizontal surface (rug)	6	5	9	32
vertical linear (tree, lamp)	5	0	7	18
vertical surface (house)	2	0	6	8
vertical interval (two trees)	2	1	6	9
frame (arch, tunnel)	0	0	22	19
medium (forest, town)	9	2	23	23
source/goal or no overt LM	11	3	4	14
total overt Landmarks	71	42	73	128
total expressions with prefix	73	40	78	132

*Shading indicates region of overlap for cognate prefixes

The table classifies the explicit Landmarks used in verbal constructions by native speakers according to the general orientation and shape of the Landmarks. I use the terms horizontal and vertical, as well as the number of dimensions, in a non-literal way to indicate potentially salient aspects of the Landmark. In actual fact, for prefix choice the manner in which the Figure interacts with the Landmark is the significant factor. However, this is loosely related to physical orientation and dimensionality. Thus, although the actual horizontal, vertical or dimensional nature of the Landmark is not immediately relevant for prefix choice, it is a convenient shorthand for the interactional properties of the Landmark and eventually helps to clarify the semantic range of each prefix.

What is significant about the role of the Landmark for prefix choice is how its relationship to the moving Figure is construed. Thus, I have termed a Landmark horizontal if a Figure remains on top of it, even though it may have a vertical dimension, as in the case of a mountain. It is vertical if the Figure spans it by passing by it in the vertical dimension without contacting it. Dimensionality is also stated in terms of interactional properties. A river is clearly not one dimensional, but to a Figure whose purpose is to get to the other side it essentially functions as a boundary between one side of the river and the other. These Landmarks apply mostly to Figures that move in contact with a horizontal surface, although horizontality here is essentially about the gravitational relationship of the Figure and Landmark, not about

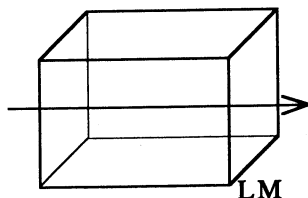
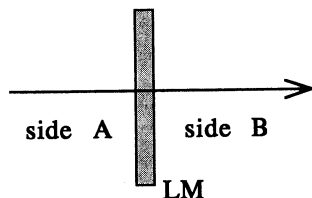
contact, thus conclusions drawn here apply equally to Figures flying or swimming.

This distribution of Landmarks, along with the usage of prepositions and cases with each prefix, allows for a clear statement of the relevant parameters which distinguish the construal of the spanning scenario defined by *pro-* versus that defined by *pere-* and *pře-*. Russian *pere-* and Czech *pře-* both describe a spanning event in which the presence of *sides* is profiled. Therefore, the Landmark is significant mainly as a boundary or divider which distinguishes 'sides'. Accordingly, the best Landmarks will be linear objects like roads and rivers. Furthermore, the Figure should typically be above the Landmark, thus horizontal objects are appropriate Landmarks. The best Landmarks, then, will be both horizontal and linear. In contrast, *pro-* construes the Landmark as a medium or passageway for motion, where the notions of boundary or sides, and the 'above' relation are not significant. Consequently, the best Landmarks for *pro-* are volumetric Landmarks which envelop the Figure, such as a forest or water, or things like arches and tunnels, which guide the Figure on its Path.

(5) Prototype scenario for Czech and Russian spanning prefixes

a. *pere-*, *pře-*: LM functions as a horizontal boundary which defines 'sides'

b. *pro-*: LM functions as a medium or passageway for motion



3.2 Differences in the distribution of Landmarks

Despite the cross-linguistic similarities of these cognate prefixes, Russian and Czech display some significant differences in the distribution of Landmarks. Czech *pře-* admits vertical Landmarks, as in (6), whereas Russian *pere-* simply does not.

(6) Czech *pře-*:

Holčička pře-chází strom a jde pořád pomalu pryč.

A little girl walks **by a tree** and keeps on going slowly away.

Volumetric Landmarks are admissible with *pere-/pře-* in both languages, exemplified by (7a-b), but only marginally so in Russian, (7b):

(7)

a. Czech *pře-*:*Holčička pomalu přichází k vodě, pře-chází jí(-INSTR)...je po pás ve vodě...*A little girl slowly approaches the water, she walks **through** it...she's up to her waist in the water...b. Russian *pere-*:*Mal'čik zašel v komnatu, pere-šel čerez komnatu, podošel k lestnice...*The boy entered the room, walked **across** the room, approached the stairs...

Here it is worth noting that there are only two examples like (7b) with volumetric Landmarks in Russian and in both examples a room serves as the constructional Landmark for a human Figure. In these cases it might be argued that the most salient property of a room for a moving human Figure is the horizontal surface with which the Figure is in contact. This suggests that these two examples might be categorized as instances of a horizontal surface, and that Russian in fact does not admit volumetric Landmarks with the prefix *pere-*.

Czech *pro-* on the other hand, is not acceptable with horizontal linear Landmarks, whereas for Russian this is possible and even common, as demonstrated in (8).

(8) Russian *pro-*:*Mašina pro-exala čerez dorogu, navstreču дево́чке, котора́я выбе́жала из соседнего дома.*A car drove **across** the road to meet a girl who ran out from a neighboring house.

Furthermore, Russian seems to prefer this prefix for horizontal surfaces as well, which is obviously not the case for Czech. Finally, note that Czech shows a balanced distribution of the two prefixes in general, with 73 instances of *pře-* and 78 of *pro-*, whereas Russian drastically favors *pro-* (132 instances of *pro-* and only 40 of *pere-*).

Table (9) shows these same numbers with the Russian prefixes side by side and the Czech prefixes side by side so that the region of overlap in each language is readily apparent. In Czech, not surprisingly, the overlap between the two prefixes occurs in the domain which is not prototypical for either prefix. In Russian, however, the overlap occurs in the same domain as the prototypical meaning for the prefix *pere-*.

(9) Intra-linguistic comparison of Czech *pře-/pro-*, Russian *pere-/pro-*

Constructional (overt) Landmark	Cz <i>pře-</i>	Cz <i>pro-</i>	Russ <i>pere-</i>	Russ <i>pro-</i>
horizontal linear (road, river)	26	0	21	11
bridge	14	0	10	7
horizontal surface (rug)	6	9	5	32
vertical linear (tree, lamp)	5	7	0	18
vertical surface (house)	2	6	0	8
vertical interval (two trees)	2	6	1	9
frame (arch, tunnel)	0	22	0	19
medium (forest, water)	9	23	2	23
source/goal or no overt LM	11	0	3	14
total overt Landmarks	71	73	42	128
total expressions with prefix	73	78	40	132

*Shading indicates region of overlap for the two different spanning prefixes

4. The role of deixis

The question arises as to what is different about the nature of the spanning indicated by these two prefixes that produces this distribution of acceptable Landmarks. What I would like to propose is that these prefixes may also indicate a spanning relationship with the speaker and/or the speaker's visual field, a situation I have termed DEICTIC SPANNING. This function of deictic spanning is taken up by opposing prefixes in Russian and Czech and this fact can account for the differences in the distribution of the prefixes cross-linguistically.

Evidence for this comes from cases where constructional Landmarks serve as points of origin or destination (that is, sources or goals) of motion rather than spanned objects, or where the overt Landmark is otherwise clearly not the spanned object (that is, no Landmark is specified or the Landmark is locational), as in the examples given in (10a-d):

(10)

a. (Russian)

Kosmičeskij korabl' priblizilsja k planete, prizemlilsja, iz nego vyšel čeloveček, on pro-šel k sopke, vlez na nee...

A space ship approached a planet, landed, a little man came out of it, he walked over to a volcano, climbed on it...

b. (Russian)

...v"exali na druguju dorozku, *pro-exali dal'she*, v"exali v gorod...

...they drove onto another road, **they drove on**, they drove into a town...

c. (Czech)

Z díry se had pře-plazil na cestu.

Out of a hole a snake **slithered across** onto the road.

d. (Czech)

Děvčátko pře-šlo před stromem(-INSTR).

The girl **walked by** in front of the tree.

In these cases, the spanned object is actually something like space itself—the undifferentiated terrain within the visual field of the speaker. In my own experiments, it is also clear that the spanned object is often the computer screen, and the presence of the screen may have increased the number of tokens with spanning prefixes over ordinary usage.

The motivation for prefix choice may not be mentioned at all, and may be combined with a linguistically overt Landmark that is also spanned. In this case the screen or visual field of the viewer serves as a partial motivation for prefix choice, while the suitability of the spanned Landmark for each prefix will also contribute to prefix choice. In particular, the data indicate that where the screen, the observer's visual field, or space in general serve as motivators for a prefix, Russian will favor *pro-* and Czech will favor *pře-*. In Czech, there were 11 examples of the prefix *pře-* with no overt spanned Landmark (with no Landmark mentioned at all, or only with source/goal Landmarks.) Russian has only 3 similar instances of the prefix *pere-*, all of which can easily be interpreted as implicit boundary crossing events:

(11) (Russian)

a. *Mal'čik privez na mašine gruz i pere-nes ego v dom.*

A boy drove up with a load in a car and **brought it over** into the house (crossing a boundary from outside to inside the house.)

b. *Zmeja pere-polzla na našu kartinu.*

A snake slithered over onto our screen (crossing the boundary from off-screen to on-screen.)

In contrast, Russian shows 14 such instances of *pro-* with no overt spanned Landmark, while Czech has 4. Thus, it appears that Czech uses the prefix *pře-* and Russian uses the prefix *pro-* for deictic spanning—a spanning relative to the speaker's perspective.

What remains to be done is to account for why the opposing prefixes are chosen for this function, given that they appear to prefer the same constructional Landmarks and have similar prototype meanings in each language, and to explain how this choice affects the patterning of

constructional Landmarks with each prefix. One important point in this regard concerns the use of the instrumental case in Czech. One function of the instrumental case in Slavic languages is to construe a nominal as a "medium" or guiding path of motion—in other words, an instrument of motion, as in (12).

(12) (Czech)

Prošli jsme Vodičkovou ulicí-(INSTR)

We went by way of Vodičková street.

Indeed, when there is no preposition further specifying the relationship of the Landmark to the motion event, Czech requires the instrumental case for Landmarks with the prefix *pro-*, emphasizing the instrumental case's function of construing the Landmark as a means that is used to get somewhere and is spanned in the process. Russian, on the other hand, has Landmarks in the accusative case in the absence of prepositions. This is a clue to the greater specificity of Czech *pro-* as compared to Russian *pro-*: the construal of Landmark as means or medium is reinforced by the instrumental case, prohibiting a looser interpretation of simply moving through space, a usage available in Russian, which makes *pro-* seem at times redundant with the idea of motion itself.

This flexible interpretation of *pro-* in Russian makes it much less restrictive than *pere-*, which profiles the notion of sides or boundary, as well as requiring a horizontal Landmark, and it makes *pro-* a more suitable choice for the function of deictic spanning. The fact that Russian *pro-* may comfortably combine with horizontal linear Landmarks while Czech *pro-* cannot, can now be explained by the fact that the choice of prefix is often motivated primarily by traversal of the visual field of the observer, space, or even, as an artifact of experimental design, of the computer screen. While the preposition does the work of explaining the relationship of the constructional Landmark, the prefix is at least partly motivated by factors not explicit in the linguistic expression, saying in effect, "The Figure crossed a river while in the process of traversing some space in front of me." This usage of *pro-* in Russian also explains the territory of semantic overlap for *pere-* and *pro-* in Russian (see Table 9). While *pro-* can reasonably apply to almost any situation involving movement through space, including those with boundary crossings and horizontal LMs, *pere-* is restricted to situations with boundary crossings and horizontal LMs, making these scenarios the only ones in which overlap can occur.

Since *pro-* in Czech is much more restricted in defining the LM as a medium of motion, it is inappropriate as an indicator of motion across the visual field, across the screen, or simply past the observer. Instead the prefix *pře-* is extended for this usage, accounting for its increased use and

flexibility in Czech relative to Russian. The extension of Czech *pře-* to indicate deictic spanning—traversal of space where sides are defined by viewer perspective—may have set the stage for extension of this prefix to apply to any LM on which nebulously defined sides may be imposed. This weakens the link to specifically horizontal LMs and allows vertical Landmarks to appear with the prefix in Czech, while they are prohibited in Russian. If a Figure passes from side to side of the visual field of the speaker, it is fully compatible with the possibility of passing a tree or house in the process. Thus, while both Russian *pere-* and Czech *pře-* have as prototypes Landmarks which serve as boundary markers, Czech extends this to a point where the notion of boundary is no longer significant and the stipulation of horizontal Landmark does not always apply, whereas Russian does not show such an extension.

(13) Prototype scenarios and extensions from the prototype for Czech and Russian spanning prefixes

a. *pere-/pře-*

Prototype scenario

(Russian and Czech):

LM functions as a horizontal boundary which defines “sides”

Extension for *pře-*

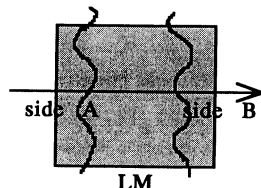
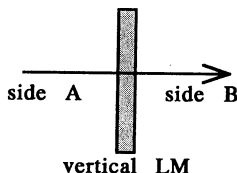
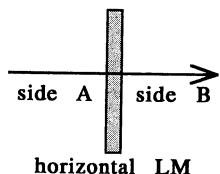
(Czech):

LM may be vertical

Extension for *pře-*

(Czech):

LM need not be linear, does not act as boundary; “sides” imposed on LM



b. *pro-*

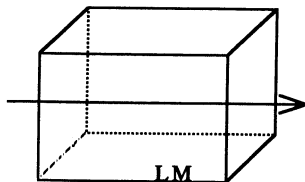
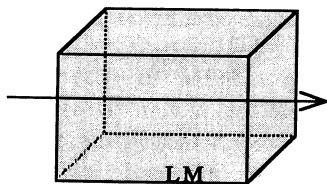
Prototype scenario

(Russian and Czech):

LM functions as a medium or passageway for motion

Extension for *pro-*

(Russian only): LM not strictly interpreted as a medium (LM=undifferentiated terrain)



5. Conclusion

In conclusion, by examining the patterning of explicit constructional Landmarks with Czech and Russian prefixes, I have shown how prefix choice is motivated by a combination of construction-level factors and deictic factors. Thus, the use of a prefix may be multiply motivated, and factors which do not also motivate the larger verbal construction will not receive explicit linguistic expression in the construction. I have also demonstrated that the choice of opposing spanning prefixes in Russian and Czech for the purpose of indicating deictic spanning has a major effect on the manner in which the semantic network of each prefix extends from the prototype, thereby explaining why the distributional patterns of these prefixes diverge in the two languages in spite of the fact that they share the same prototypes.

It is worth noting that Janda (1986) also used the notions of Landmark, Trajector, and Trajectory to analyze the semantics of Russian prefixes. However, she uses the Landmarks, Trajectors and Trajectories of the entire verbal construction to do so. She states that prefixes delineate the metaphorical shape of the verbal activity, acting as a type of verbal classifier which groups otherwise unrelated actions together on the basis of some perceived unity in the Trajectory of the action. My research demonstrates that the Trajectory designated by Russian and Czech verbal prefixes is not always motivated by the participants in the verbal construction itself. In other words, the prefixes possess their own Landmarks, Trajectors and Trajectories and do not simply indicate the shape of a verbal action or classify verbs. Thus, prefixes possess relational content independently of the verbs they attach to.

The potential for multiple and independent motivation of prefixes demonstrates the complex manner in which meaning is constructed at semi-autonomous linguistic levels (here between prefix morphemes, the base verbs to which they attach, and the full verbal construction with its complements.) This semantic independence of morphemes within a single lexical item shows that even in the restricted subset of Slavic motion verbs, prefix semantics are not as transparently compositional as they at first appear and the relationship among elements described by the prefix is not limited to the elements immediately picked out by the verb, but is available to signify other aspects of the situation depicted by the speaker. This is limited in the final analysis only by the speaker's imaginative ability to construe some aspect of a situation as appropriately described by the abstract relationship designated by

the prefix. Where such implicit factors are the dominant motivators, there is ample room for alternate interpretations by speakers, such that prefixes may serve as excellent sources for semantic shift.

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The layered lexicon

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0. Introduction

Generalizations concerning the well-formedness of words in a language are usually not true of all words in that language.¹ In German, for example, lexical words may begin with a coronal stop, which may be voiced or voiceless. So, both *Tag* 'day' and *Dach* 'roof' are good German words. If an article starts with a coronal stop, however, it must be voiced. Thus, though *der*, *die* or *das* ('the' masculine, 'the' feminine and 'the' neuter, respectively) are well-formed articles, there are no articles like **ter*, **tie* or **tas*. In this respect the lexicon is layered. Two observations can be made. First, the difference in phonotactics between these words has something to do with the difference in morphosyntactic category. Second, the set of coronal stops allowed to begin a lexical word is {t, d}, whereas the set of coronal stops allowed to begin an article has only one member, {d}. These two observations are accounted for in this paper in a uniform way. Extending a proposal by Ito and Mester (1998) which says that markedness constraints can be separated by blocks of faithfulness constraints, it is conjectured here that faithfulness constraints may be indexed with a morphosyntactic category label. In the case of German, one block of faithfulness constraints is labeled 'lexical' (shorthand for noun, verb, adjective), while another block of faithfulness constraints is labeled 'non-lexical' (shorthand for article).² These faithfulness constraints are ranked among the markedness constraints, which include a constraint prohibiting words from starting with a *t* (*t) and a constraint prohibiting words from starting with a *d* (*d). In order to allow lexical words starting with either *t* or *d*, a faithfulness constraint that requires a faithful parse of underlying *t*'s or *d*'s and which is labeled 'lexical' must dominate both markedness constraints. Another faithfulness constraint labeled 'non-lexical' must only dominate **d* and must, in turn, be dominated by **t*. Thus, the indexing of faithfulness with morphosyntactic labels allows an explanation of the differences between the phonotactics of morphosyntactic categories, while the ranking of these indexed constraints —among markedness constraints— explains the set-subset relation between the phonotactics of different morphosyntactic categories.

The indexing of faithfulness constraints with morphosyntactic categories is a small and natural extension of a use of indices that is widely accepted. In a paper by McCarthy and Prince (1994), phonotactic differences between a root and a reduplicative affix are attributed to the effect of ranking a markedness constraint between two faithfulness constraints, one of which is labeled 'root' and the other 'reduplicative affix'. The effect of this ranking, dubbed *Emergence of the Unmarked*, is that one category shows the effects of a markedness constraint, while that same markedness constraint may be violated in the other category. As

will be argued below, the same *Emergence of the Unmarked* effect can be observed when two morphosyntactic categories are compared.

More specifically, this proposal builds on ideas advanced in Ito and Mester (1998). In their paper, they discuss the nature of the Japanese lexicon, which consists of various layers, called Yamato, Sino-Japanese, Foreign and Onomatopoeic, which differ from one another in terms of the influence of markedness constraints. The phonology of Yamato is the most restrictive, or, put differently, subject to the highest number of markedness constraints of all the layers. Various phenomena that are not attested in the Yamato part of the lexicon are allowed in the Sino-Japanese lexicon. The most liberal part of the lexicon is the Onomatopoeic part. In Ito and Mester (1998)'s proposal these differences are captured in terms of markedness constraints which are ranked among indexed faithfulness constraints.

The remainder of this paper is organized as follows. In section 1 the differences between the phonotactics of various morphosyntactic categories in Dutch and Kashaya are discussed. It will be shown that the variation can be captured by the theory sketched above. In section 2, a process with a morphologically delimited application is considered and it is shown that the theory proposed here actually predicts (and explains) such effects. In section 3, the question is taken up as to why only faithfulness constraints, but not markedness constraints can be co-indexed. Alternative approaches designed to deal with comparable issues are discussed in section 4, and section 5 contains some conclusions.

1. Indexed faithfulness

1.1. Prepositions in Dutch

Simple prepositions in Dutch are syllabically less complicated than nouns, verbs and adjectives. This statement raises two questions: a) what are simple prepositions and b) in what sense are they less complicated than nouns, verbs and adjectives?

Consider the prepositions, given in (1).

(1) *Simple prepositions*

aan, bij, door, in, na, om, op, uit, voor
achter, binnen, boven, buiten, onder, over, tegen.

The simple prepositions can be distinguished from complex prepositions on the basis of two criteria. First, simple prepositions freely allow both nominal and verbal compounding and second, neuter pronominal complements of prepositions are replaced with an R-pronoun (Zwarts 1995).

(2) •*Nominal compounding*

aanval, bijkeuken, doorgang, intocht, nadorst, ombouw, optocht, uitgang, voorkant, achterklap, binnenbrand, bovenkant, buitenkant, ondergang, overtocht, tegenzet.

• *Verbal compounding*

aandoen, bijvallen, doorzetten, invallen, naijlen, omdoen, opzetten, uitvoeren, voorvallen, achterstellen, binnenvaren, bovendrijven, buitenspelen, ondergaan, oversteken, tegenvallen.

An example of replacement is given in (3).

(3) *Neuter pronominal complements must be replaced with R-pronouns*

Ik zit op het gras.

Ik zit erop.

*Ik zit op het.

I sit on the grass.

I sit there on.

I sit on it.

Complex prepositions, given in (4), contrast with simple prepositions in this respect.

(4) *Complex prepositions*

• *With complex margins:*

benevens, behoudens, betreffende, blijkens, conform, contra, dankzij, exclusief, inclusief, jegens, omstreeks, krachtens, luidens, omtrent, middels, namens, niettegenstaande, nopens, ondanks, ongeacht, onverminderd, overeenkomstig, qua, rond, sedert, sinds, staande, tijdens, trots, uitgezonderd, volgens, wegens.

• *With simple margins:*

à, aangaande, beneden, benoorden, beoosten, bewesten, bezijden, bezuiden, gedurende, gegeven, getuige, gezien, halverwege, hangende, ingevolge, inzake, naargelang, nabij, per, richting, te, vanwege, versus, via, zonder

These prepositions neither allow nominal nor verbal compounding. Moreover, their neuter complements cannot be replaced or left out. This can be seen in (5), where the behavior of the simple preposition *voor* is compared with the behavior of the complex preposition *tijdens*.

(5) a. *Complex prepositions*

Ik schuil tijdens het onweer.

I take cover during the storm.

*Ik schuil ertijdens.

I take cover there during.

*Ik schuil tijdens het.

I take cover during it.

b. *Simple prepositions*

Ik schuil voor het onweer.

I take cover from the storm.

Ik schuil ervoor.

I take cover there from.

*Ik schuil voor het.

I take cover from it.

In other words, as Zwarts (1995) has argued, simple prepositions can be distinguished from complex prepositions on morphological as well as on syntactic grounds. He proposes two representations for prepositions. Simple prepositions have only a feature 'preposition', whereas complex prepositions are characterized as a lexicalized phrase consisting of a prepositional head and a nominal, verbal or adjectival complement. In other words, complex prepositions have an underlying feature 'preposition' as well as a feature 'noun', 'verb' or 'adjective'. Complex prepositions, therefore, have the same phonotactics as these lexical categories.

The next step is to compare the phonotactics of nouns, verbs and adjectives with the phonotactics of (simple) prepositions.

1.1.1. Lexical words and prepositions

Lexical words such as nouns, verbs and adjectives allow complex onsets and codas, both at the margins of a word (6) and word internally (7).

- | (6) | <i>Complex Onsets</i> | | <i>Complex codas</i> | | <i>Complex margins</i> |
|-----|-----------------------|--------------------|----------------------------|--|-------------------------|
| a. | <i>nouns</i> | kraan 'tap' | kink 'hitch, twist' | | plank 'plank' |
| b. | <i>verbs</i> | krijg 'get' | karn 'churn' | | pronk 'show off' |
| c. | <i>adjectives</i> | groot 'big' | mank 'crippled' | | flink 'vigorous' |
-
- | | | |
|--------|------------------|---|
| (7) a. | <i>noun</i> | zebra 'zebra' |
| b. | <i>verb</i> | beklijf 'to stick to one's mind' |
| c. | <i>adjective</i> | écru 'ecru' |

No complex margins are allowed in simple prepositions (cf. (1)), thus it seems that the constraint banning complex margins is active in prepositions but inactive in nouns, verbs and adjectives. This is expressed by having a faithfulness constraint labeled 'noun, verb, adjective' (NVA, henceforth; FAITH_{-nva}) ranked above a constraint against complex margins (*COMPLEX). This constraint, in turn, outranks a faithfulness constraint labeled 'preposition' (FAITH_{-preposition}). As a result, no simple preposition will ever have a complex margin.

The ranking of these constraints is established in tableaux (8) and (9). In tableau (8) the noun *brok* 'chunk, piece, bit' is considered. Two candidates are considered: one with a complex onset and one without a complex onset. The one with the complex onset is better than the one with the simple margin, therefore FAITH_{-nva} will be ranked above *COMPLEX.

(8) FAITH_{-nva} >> *COMPLEX

	FAITH _{-nva}	*COMPLEX
<i>brok</i>		*
<i>bok</i>	*!	

Tableau (9) illustrates the ranking of *COMPLEX over FAITH_{-preposition}. The candidates *voor* and *vvoor* for the preposition *voor* 'for, before, in front of' are considered. Since the candidate with the simple onset wins, the ranking must be *Complex >> FAITH_{-preposition}.

(9) *Complex >> FAITH_{-preposition}

	*Complex	FAITH _{-preposition}
☞ <i>voor</i>		*
<i>vvoor</i>	*!	

By transitivity, FAITH_{-nva} is ranked above FAITH_{-preposition} and the full ranking is:

(10) FAITH_{-nva} >> *Complex >> FAITH_{-preposition}

The theory presented here thus explains why complex margins are allowed in nouns, verbs and adjectives, while they are never attested in prepositions. Another claim made in the introduction was that one set is always a subset of the other. The reason for this is the ranking scheme of the *Emergence of the Unmarked* (McCarthy and Prince 1994), in which a markedness constraint is ranked between two faithfulness constraints, each of which specifies a morphological category. The category whose faithfulness constraint dominates the markedness constraint will allow violations of the markedness constraint if this is necessary to satisfy the faithfulness constraint. In the morphological category in question everything that is allowed by the markedness constraint is allowed plus everything that is needed to satisfy the faithfulness constraint. In the morphological category of the faithfulness constraint that is dominated by the markedness constraint the set of possibilities is determined by the markedness constraint. The set of possibilities of the latter is therefore (at least) a subset of the set of possibilities of the former.⁴

A final point that should be made here is that no statements concerning possible inputs are needed. The input is chosen in such a way that the correct output is the one that violates the constraint ranking minimally. No statements concerning the input are necessary, since the grammar determines well-formedness. In other words, this proposal is in conformity with the principle of *Richness of the Base* (Prince and Smolensky 1993). This principle says that the only thing that Optimality Theory has to say about inputs is that they are universal. The grammar—the constraint ranking—will always arrive at the correct input-output pairing. Whether the input of prepositions has complex or simple margins, the winning candidate should always be the one with simple margins. Since the markedness constraint barring complex margins dominates the prepositional faithfulness constraint, it will always be more optimal for a candidate to have simple margins, even if this means violating the relevant

faithfulness constraint. For lexical categories, the optimal input-output pairing is the one in which margins are faithfully parsed.

1.2. Instrumental prefixes and verbal roots in Kashaya

In Kashaya, a Pomoan language, instrumental prefixes differ phonotactically from verbal roots in three respects (Buckley 1994).⁵ First, instrumental prefixes never contain closed syllables, but such syllables are allowed in verbal roots. Second, instrumental prefixes do not allow long vowels, while these may occur in verbal roots. Third, mid vowels do not appear in instrumental prefixes, but they do appear in verbal roots.

In Kashaya syllables are of the shape CV, CVC or CVV. Word-finally, superheavy syllables may be found: CVVC and CVCC. These syllable types are not uniformly distributed across the lexicon. Monosyllabic verbal roots may have the following shape: (^H)CV(:)(C). The superscripted H is a laryngeal increment, a laryngeal feature that has the effect of making the preceding syllable heavy. Focusing on the rest of the template, it can be concluded that both open and closed syllables with long vowels are allowed. This contrasts with instrumental prefixes, which have a CV template. Moreover, of the five vowels of Kashaya (i, e, a, o, u), only three are found in instrumental prefixes (i, a, u), whereas all vowels occur in verbal roots. The latter point is explained by Buckley (1994) as a prohibition of the feature [-high], which, in his analysis, exclusively characterizes (e, o), in instrumental prefixes.

Two issues arise here, both of which are connected to the difference between verbal roots and instrumental prefixes. The first is how the difference in the syllable structure of verbal roots and instrumental prefixes can be captured. The second is how the feature [-high] can be blocked from occurring in instrumental prefixes. Both can be explained in terms of a markedness constraint, which is sandwiched between indexed faithfulness constraints.

The absence of codas and long vowels in instrumental prefixes can be captured by ranking markedness constraints against such prosodies above faithfulness to instrumental prefixes.

- (11) *CODA, *LONGVOWEL >> FAITH_{instrumental prefix}

The result of this ranking will be that no instrumental prefix will ever surface with either a long vowel or a coda or both. One may object that the instrumental prefixes' failure to attract stress could explain why they contain no long vowels. However, even though instrumental prefixes are never stressed, the relationship between stress and long vowels in Kashaya is not strong enough to explain the lack of long vowels in instrumental prefixes. Unstressed long vowels do occur, as shown in (12).

- (12) Unstressed long vowels

q[?]a:múç[?]ba

'after leaving each other'

his [?] u:ʔaqólay	‘long arrows’
ʔima:tá	‘woman’
ca:dú	‘fly’

In short, although stress is the only other factor potentially capable of explaining the distribution of long vowels systematically, it does not seem to be the relevant factor. Since prosody does not determine the distribution of long vowels in Kashaya, their distribution has to follow from something else. Here, the distribution of long vowels is explained in terms of the ranking of a markedness constraint against long vowels with respect to indexed faithfulness constraints.

Since both codas and long vowels are allowed in verbal roots, a faithfulness constraint pertaining to verbal roots will be ranked above the markedness constraints *CODA and *LONGVOWEL.

(13) FAITH_{verbal root} >> *CODA, *LONGVOWEL

The vowel set of Kashaya consists of five vowels, (i, e, a, o, u). The mid vowels (e, o), which are characterized by the feature [-high] in the analysis of Buckley (1994), occur in verbal roots but not in instrumental prefixes. The absence of the feature [-high] in instrumental prefixes, which causes the set of vowels in instrumental prefixes to be smaller than the set of vowels in verbal roots, is explained by the ranking of the markedness constraint *[-high] above FAITH_{instrumental prefix}. No vowel with the feature [-high] will ever be optimal in instrumental prefixes. The constraint *[-high] is dominated by FAITH_{verbal root}, in verbal roots.

In sum, Kashaya verbal roots and instrumental prefixes differ in at least three respects. First, instrumental prefixes do not allow long vowels. Second, they do not allow closed syllables and, third, the feature [-high] never surfaces in instrumental prefixes. These differences can be explained by assuming that the relevant markedness constraints are ranked between indexed faithfulness constraints. This correctly describes their respective phonotactics and it captures the fact that the set of possibilities in verbal roots is larger than the set of possibilities in instrumental prefixes.

Below, in section 2, it will be argued that this indexed faithfulness is capable of explaining why certain phonological processes have a limited scope of application.

2. Morphologically delimited processes

Many phonological processes only apply in certain morphologically determined contexts. A case at hand is Aspirate Dissimilation, an instantiation of Grassmann's Law, in which an aspirated stop is deaspirated if a following consonant is also aspirated (Buckley 1994). This process occurs between an instrumental prefix and a verbal root. If the instrumental prefix starts with an

aspirated segment and the first segment of the verbal root is also aspirated, the aspiration of the instrumental prefix disappears.

- (14)
- | | | | |
|-------------------------|---|--------------|---|
| $p^h i^h$ - h mi-w | → | pihmíw | ‘see in detail’ |
| p^h u- h c h a-w | → | puhc h áw | ‘blow over’ |
| p^h a-hol-ʔ | → | pahólʔ | ‘look for an unseen
object with the end of
a stick’ |

Why does aspirate dissimilation occur in this environment? The answer is, once again, that various indexed faithfulness constraints can be ranked differently with respect to markedness constraints. The feature [aspiration] is forced to surface due to a faithfulness constraint. This faithfulness constraint can be indexed for certain morphological features, and differently indexed faithfulness constraints may be ranked in a different way with respect to a markedness constraint which says that word-initial consonants may not be aspirated if an aspirated consonant follows. This constraint could be formulated as an OCP constraint on adjacent aspirated consonants.

- (15) OCP_[asp]
Aspirated consonants may not be adjacent.

In the case of instrumental prefixes, OCP_[asp] dominates the relevant faithfulness constraint (FAITH-[asp]_{instrumental prefix}). These constraints, in turn, are dominated by a constraint saying that any [asp] feature in the root must be faithfully parsed. The result is that the consonants of instrumental prefixes surface without aspiration if the next consonant is aspirated. An example is the underlying form $c^h i^h$ - c^h a:-w ‘grasp with handled instrument’, which surfaces as $c i c^h áw$. The constraints FAITH-[asp]_{root} >> OCP_[asp] >> FAITH-[asp]_{instrumental prefix} yield this output, as can be seen in (16). Four candidates are evaluated, one with aspiration on both the instrumental prefix and on the root, one with an [asp] feature on the root only, one with an [asp] feature on the instrumental prefix only and one without any [asp] feature.

(16) Tableau of input $c^h i^h$ - c^h a:-w

$c^h i^h$ - c^h a:-w	FAITH-[asp] _{root}	OCP _[asp]	FAITH-[asp] _{instrumental prefix}
$c^h i^h c^h áw$		*!	
$c i c^h áw$			*
$c^h i c áw$	*!		
$c i c áw$	*!		*

Aspirate dissimilation does not apply in a number of cases. It does not apply to word-internal stops (17a), nor does it apply to word-initial aspirates followed

by an aspirate, or if aspiration is added by an affix which is not an instrumental prefix (17b; in this case a causative affix: ^hqa). It is also triggered by coda aspiration, which aspirates underlyingly plain stops in coda position. This can be observed in (17c), where the final *t* of the first morpheme is aspirated.

(17) Contexts where aspirate dissimilation does not occur

- | | | | | |
|----|--|---|-------------------------------------|------------------------|
| a. | hi- ^h c ^h a- ^h qa-w | → | hihc ^h āhqaw | ‘knock over’ |
| b. | ^h c ^h a- ^h qa-w | → | c ^h āhqaw | ‘cause to fall’ |
| c. | c ^h at-qa-ti | → | c ^h āt ^h qati | ‘going to go trapping’ |

If the constraint in (15) were highly ranked in Kashaya, no adjacent aspirated consonants would ever surface. However, as can be observed in (17a-c), there are adjacent aspirated consonants in well-formed Kashaya words. In (17a-b), adjacent aspirated consonants surface because of a higher ranked constraint which says that [asp] features of affixes must be faithfully parsed (FAITH-[asp]_{aff}). In (17c), another markedness constraint outranks OCP_[asp]. This markedness constraint has the effect of not allowing plain coda consonants (see Buckley 1994 for more details).

In short, the ranking FAITH-[asp]_{root} >> OCP_[asp] >> FAITH-[asp]_{aff} explains why Aspirate Dissimilation occurs in such a limited environment. Whenever an [asp] feature occurs in another context, it is required there either by faithfulness (17a-b), or by markedness (17c). Indexed faithfulness does not only explain differences in phonotactics between morphological and/or syntactic categories, but it is also capable of explaining why certain processes apply only in certain morphologically defined contexts.

3. Why not indexed markedness?

In the sections above it has been argued that morphosyntactically indexed faithfulness is capable of explaining phonotactic differences between morphosyntactic categories. It has also been argued to explain why certain processes have a limited scope of application.

One may now ask whether these facts could not just as well be accounted for in terms of indexed markedness constraints rather than in terms of indexed faithfulness constraints. The reason for preferring the indexed faithfulness constraints is that they allow a more intuitive treatment of the data. This can be illustrated by reconsidering the data from Dutch that were discussed in section 1.1. above.

Recall that in Dutch nouns, verbs and adjectives differ from prepositions in that the former do allow complex margins while the latter do not. There are basically two ways to account for this distribution in terms of indexed markedness constraints. First, we might assume that there is an indexed markedness constraint that says ‘lexical words must have complex margins.’ This constraint could be kept in check by another constraint saying that the input must be faithfully parsed.

The faithfulness constraint would have to be ranked above the markedness constraint, otherwise all lexical words would have complex margins, which is at odds with the reality of Dutch. With the faithfulness constraint over the indexed markedness constraint, the fact that a word might lack a complex margin must be due to a faithfully parsed underlying form. Turning to prepositions, difficulties arise with this account. Obviously, there would have to be a constraint requiring prepositions to have complex margins. Since no preposition has a complex margin, the constraint would have to be outranked by a faithfulness constraint requiring a faithful parse of the input. No input could have complex margins, since no output has complex margins and, given the high rank of the faithfulness constraint, all outputs would be faithful renderings of the input. The real question, which is why there would be no prepositions in the input with complex margins, remains unanswered, however.

The second way to use indexed markedness constraints to account for the difference between lexical and non-lexical words in Dutch employs a constraint saying 'do not have complex margins'. If the ranking were 'do not have complex margins- prepositions' >> Faith >> 'do not have complex margins- lexical words', there would be no prepositions with complex margins, whereas lexical words might have complex margins. The constraint below Faith is irrelevant. The constraint against complex margins only applies to prepositions and for all other inputs the faithfulness constraint is the highest ranked constraint. In fact, it is hard to see how this ranking would differ from a morpheme structure constraint, which would say that in the set of morphemes there are no complex margins. However, one of the goals of Optimality Theory is to derive such statements from constraint ranking. In the theory presented in this paper, with markedness constraints which are ranked in between indexed faithfulness constraints, the difference between two morphosyntactic categories follows from the interaction of constraints.

In conclusion, there is something arbitrary about a theory based on indexed markedness constraints. One could, for instance, imagine a language in which there were two markedness constraints, one prohibiting high vowels in lexical words and another one prohibiting the segment *t* in non-lexical words. The relation between the phonologies of these word classes would seem to be arbitrary and such arbitrariness is never found in natural languages. The theory presented in this paper contrasts with the tentative analysis based on indexed markedness constraints in that it is capable of expressing the relation between the phonotactics of two word classes in one language. All in all, a theory based on indexed markedness constraints causes more problems than it solves, which is a bad omen for any theory.

4. Alternative approaches

The problem dealt with in this paper might find an alternative treatment. In this section, I will show that this treatment is less constrained than the proposal advanced here.

The different phonologies of prepositions and lexical categories in Dutch might be captured in terms of two different grammars. One grammar, which

would allow complex margins, would be applicable to lexical categories such as nouns, verbs and adjectives while another grammar would be applicable to prepositions. Such co-phonologies are very unconstrained and are not capable of explaining the relation between two morphosyntactic categories. In order to see this, consider the example given in the introduction. Lexical categories in German may begin with a voiced or with a voiceless coronal stop {t, d}. If non-lexical categories begin with a coronal stop, it must be voiced {d}. In a co-phonology approach, there would be two separate and distinct rankings to deal with this. In one phonology the constraints would be such that the set of coronal stops would be {t, d}, while in the other phonology only a {d} would be allowed to surface. The fact that one set is a subset of the other set is a coincidence in this approach. Since the co-phonologies are distinct, the differences between two morphosyntactic categories in one language need not be related to each other at all. In the approach defended here, markedness constraints are sandwiched between faithfulness constraints that pertain to different morphosyntactic categories. This ranking scheme, which has been called *Emergence of the Unmarked* by McCarthy and Prince 1994, results in one category being unmarked with respect to another category.

5. Conclusions

In this paper, a theory has been advanced which explains the phonotactic differences between different morphosyntactic categories. The theory presented here builds on ideas put forward in McCarthy and Prince (1994) and Ito and Mester (1998). McCarthy and Prince (1994) propose a general ranking scheme to capture the observation that different morphological categories may be distinguished in terms of markedness. Here it is observed that different morphosyntactic categories can also be distinguished in terms of markedness. Therefore, it is proposed that different morphosyntactic categories follow the same general ranking scheme: a markedness constraint, which is ranked between faithfulness constraints. The idea that faithfulness constraints can be indexed is taken from Ito and Mester (1998). Novel is the idea that faithfulness constraints can be indexed with morphosyntactic information. This not only explains phonotactic differences between different morphosyntactic categories, but it also makes it possible to define domains of application of certain phonological processes.

It remains to be seen whether all differences between different morphosyntactic categories can be explained in this way. However, the approach sketched here seems promising enough to pursue as a line of research.

Notes

- ¹ Beneficial comments, which have led to an improvement of both content and form, have been provided to me by Kirsten Brock and Caroline Féry and I would like to thank them both.
- ² Since no morphosyntactic feature theory is being proposed, the features in this paper are rather naive. They serve expository purposes only and no claim is being made concerning their validity in a full fledged theory of morphosyntactic features.
- ³ Except for *rond*, which only allows verbal compounding (*rondlopen*, *rondvaren*).
- ⁴ Sometimes, due to the phonology of a language, it may not be so clear that there is a set subset relation between two morphosyntactic categories. In English, for example, lexical words may not start with voiced interdental fricatives and articles may not begin with a voiceless interdental fricative. This seems like a case of morphological complementary distribution and not a set subset relation. However, in related languages such as Dutch and German there is a set- subset relation of what is historically the same sound in the same environment. Moreover, the relationship between voicing and fricatives in Germanic languages is complicated. It seems to me that a better understanding of the phonology of voicing and fricatives will clear this matter up. It will not be pursued here, since it will take us too far afield.
- ⁵ All data in this section are taken from Buckley 1994.

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PARASESSION:
LOAN WORD PHENOMENA

Loan words in the English of Modern Orthodox Jews: Yiddish or Hebrew?¹

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1. Introduction

(1) Examples of sentences with loan words

- a. You're going *stam* for the music and not for the social scene. ('only') [Hebrew, Yiddish]
- b. We had a little *maxloket*. ('argument') [Hebrew, (Yiddish)]
- c. Nu, what's the *nafḵa miṉa*? ('practical difference') [Aramaic, Yiddish]
- d. But that's the whole *iḵar*! ('central point') [Hebrew, Yiddish]
- e. They have class *dafḵa* on Saturday mornings. ('specifically, with intent, to spite someone [no exact English correlate]') [Aramaic, Yiddish, Hebrew]

For over two-thousand years, wherever Jews have lived, they have created sentences like these, using varying forms of the language spoken by their neighbors or by their ancestors' neighbors and incorporating loans from previous Jewish languages. This paper looks at a local Jewish language, the speech of Ashkenazic Modern Orthodox Jews in America, and discusses the interaction of its Yiddish, Hebrew, and Aramaic borrowings. The quotes above include words that exist in Yiddish, in Modern Hebrew, and in the textual languages of Hebrew and Aramaic.² Which of these should be considered the lending language? The answer is: all three. In answering this initial question, I came upon other issues, including the existence of alternate pronunciation norms stemming from various affiliations and the importance of spoken languages in the transmission of textual borrowings.

The data in this paper were gathered in 1997, during four months of field work in a community of modern Orthodox college students at Columbia University in New York. (Modern Orthodox Jews are distinct from the Ultra-Orthodox, as they are more integrated into non-Jewish society, and distinct from non-Orthodox Jews, as they adhere to strict observance.³) Loan words are prevalent in their speech in both religious and secular settings. Many of these loans stem from the Germanic, Slavic, and Romance components of Yiddish, but the majority (about 85% of my corpus) are of Old Hebrew or Aramaic origin. The speakers of Modern Orthodox Jewish English consider the textual languages, especially Old Hebrew, to be the main source of their borrowings. When they talk about how "Jewish" someone's speech is, they usually discuss the number of Hebrew words they use. What they do not realize is that many of these words also exist in the Old Hebrew

and Aramaic component of the language spoken by their great-grandparents, Yiddish. These textual words are not necessarily or only textual borrowings.

1.1 Previous literature

Some of the dictionary-style books about Jewish English make their own assumptions about etymologies. In Steinmetz's lexicon, *Yiddish and English* (1987), most of the etymologies he gives are Yiddish, a few are Modern Hebrew, and none are textual Hebrew/Aramaic. He points out the importance of the yeshivahs ('Jewish learning institutions') in disseminating Jewish English, but he does not mention the possibility of textual borrowings. In *FrumSpeak: The First Dictionary of Yeshivish* (1995), Weiser assigns a Yiddish etymon only to words that do not exist in Hebrew, and a Hebrew etymon to every word that does. But it seems that he is merely giving the original etymology, not determining which language was the source of borrowing. He does accept a textual component independent of Yiddish, as he says, "Yeshivish borrows Semitic words [Hebrew and Aramaic] because those words call to Yeshivish people from books. It borrows Yiddish words because its speakers respect their forebears" (Weiser 1995). Glinert's *Joys of Hebrew* (1992) posits a combination of three languages in the formation of Hebrew borrowings in English today: Yiddish of the immigrant generation, Modern Hebrew of Israel, and elements from the "ancient sources" (Glinert 1992:7-8). I agree with this formulation, and in this paper I show, by exploring sources of contact and issues of phonology, morpho-syntax, and semantics, that the loans in question were borrowed from an inextricable combination of Yiddish, Modern Hebrew, and textual Hebrew/Aramaic.

2. Sources of contact

2.1 Yiddish

The participants in my study are almost all grandchildren and great-grandchildren of Yiddish-speaking Jews who immigrated to America from Eastern Europe in the late 19th and early 20th centuries. However, only two of the 50+ participants could carry on a simple conversation in Yiddish. Some have contact with Yiddish via their grandparents, and their parents likely had more. Lexical and other influences from Yiddish have been passed down for three to four generations.

Another locus of contact is the yeshivah. Almost all of the participants went to private Orthodox schools through high school and spent a year *learning* ('studying Jewish texts') in yeshivahs in Israel before college. The language of instruction in these schools is usually some variety of English, and the texts are all in Hebrew or Aramaic. However, as Fishman points out (1985:15), yeshivah students learn Yiddish words and calqued Yiddish expressions from their instructors, who studied Talmud in Yiddish. According to the participants in this

study, some of their teachers knew Yiddish, and those who did not likely had teachers who did. The contact with Yiddish is indirect but significant.

2.2 Textual Hebrew and Aramaic

At this point, it is important to distinguish between the Whole Hebrew Element (WHE) and the Merged Hebrew Element (MHE), terms coined by Max Weinreich (1980:352). WHE is the Hebrew/Aramaic that Jews read or recite while praying, learning, or participating in other rituals. MHE is the Hebrew/Aramaic component of their spoken language, which is the focus of this paper. The Hebrew and Aramaic words that have been integrated into Jewish English, whether or not they can also be considered Yiddish loans, comprise the MHE.

The participants in this study encounter the WHE daily in the prayers they recite and the biblical and rabbinic texts they study. Interestingly, I did not find any borrowings that exist solely in the liturgy. Study seems to contribute more loans. Both women and men in this community set daily or weekly times to *learn* traditional texts in the original Hebrew and Aramaic.

2.3 Modern Hebrew

Most of the informants had Israeli Hebrew teachers in elementary and secondary school, and they had minimal contact with Israelis during their post-high school year in Israel. In addition, many of them took part in Zionist youth groups and camps that made use of Modern Hebrew words, such as:

(2) Modern Hebrew loans

- a. *tiyul* ('trip, hike, esp. in Israel') [not in Yiddish]
- b. *madrix*, *madrixa* ('counselor, trip leader, tour guide') [also exists in Yiddish but means 'spiritual guide']
- c. *shabaton* ('institutional gathering for the duration of Sabbath (esp. youth groups)') [not in Yiddish except in a set phrase]
- d. *kippa* ('skullcap') [not in Yiddish]
- e. *ivrit* ('Modern Hebrew') [in Yiddish too, but only as a recent borrowing from Modern Hebrew]

3. Context of loan use

Many of the loans are used in everyday speech and do not have a Jewish-specific usage (see (1)). But the majority refer to customs and concepts specific to Jews. Below are seven of these areas of borrowing, with examples. (a)-(e) are areas that would likely be discussed in a family setting: (a) ritual garments, (b) traditions, rituals, (c) dietary laws, (d) synagogue, and (e) life cycle events; and (f)

and (g) are school-related: (f) Jewish learning and (g) Jewish law and values. All of these words exist in textual Hebrew or Aramaic, and most also exist in Yiddish and Modern Hebrew, with varying pronunciations.

(3) Some categories of borrowings

a. ritual garments

- talis ('prayer shawl')
- tfilm ('phylacteries')
- cicit ('ritual four-cornered undergarment or its fringes')
- kipΛ ('skull cap')

b. traditions, rituals

- moci ('blessing over bread')
- shaləshudəs ('third meal of Sabbath')
- mīnhag ('tradition')
- zmirəs ('songs sung after a Sabbath meal')

c. dietary laws

- koshər ('ritually acceptable, has rabbinic approval')
- treyf ('not kosher')
- toyvəl ('immerse in ritual water to render kosher')
- kashər ('render kosher')

d. synagogue life

- drΛshΛ ('sermon')
- sfΛrim ('Jewish religious books')
- mīnxΛ ('afternoon prayer service')
- məxīcΛ ('partition between men's and women's sections')

e. life cycle events

- bris ('circumcision ceremony')
- ləvayΛ ('funeral')
- xΛsən ('groom')
- yixəd ('period of seclusion for the bride and groom following the marriage ceremony')

f. Jewish learning

- nafkΛminΛ ('practical difference')
- kal vəxomer ('*a fortiori*, all the more so')
- shiər ('lesson')

- pʌsək ('sentence of text')

g. Jewish law and values

- midʌ ('good personality trait')
- ʌsər ('forbidden')
- mutər ('allowed')
- maxmir ('strict in observance')

These words were borrowed from some combination of Yiddish, textual Hebrew and Aramaic, and Modern Hebrew, as I will demonstrate by examining the phonology, morpho-syntax, and semantics of the loans.

4. The Hebrew/Aramaic Words: Phonology, Morpho-syntax, and Semantics

4.1 Phonology

The Hebrew phonology of Yiddish speakers, known as the Ashkenazic tradition, differs greatly from the Hebrew phonology of Israelis today and of other groups of Jews around the world. The Modern Orthodox Jews in my study have phonological input both from the Ashkenazic tradition and from Modern Hebrew. They hear Ashkenazic Hebrew in the prayers (WHE) and everyday loan words (MHE) of their grandparents and sometimes parents, who were taught this style in European or American Jewish schools. But after the establishment of the State of Israel, Modern Hebrew pronunciation became the norm in American Jewish education (outside of the Ultra-Orthodox community). The changing educational standards have impacted both the WHE and the MHE of American Jews.

What is the difference between Ashkenazic and Modern Hebrew pronunciations? Two conspicuous differences are stress and [s]~[t] variation. Ashkenazic Hebrew stresses most words penultimately, and Modern Hebrew stresses most words ultimately. Some variations that occur in Modern Orthodox Jewish English are:

(4) Variation in pronunciation: stress

Mod. Orth. Jew. Eng.	Yiddish	Mod. Heb.	('gloss')
shíər ~ shiúr	shíər	shiúr	('lesson')
haláxʌ ~ halaxá	halóxə	halaxá	('Jewish law')
díkdúk ~ díkdúk	díkdúk	dikdúk	('grammar')

Another difference is the rendering of the Hebrew letter that was [θ] in Tiberian Hebrew. In Ashkenazic Hebrew it is [s], and in Modern Hebrew it is [t]. Therefore, some variations in Jewish English include:

(5) Variation in pronunciation: [s]~[t]

Mod. Orth. Jew. Eng.	Yiddish	Mod. Heb.	(‘gloss’)
maxlókes ~ maxlóket	maxlókes	maxlóket	(‘argument’)
shábəs ~ shabát	shábəs	shabát	(‘Sabbath’)
cícis ~ cicít	cícis	cicít	(‘ritual garment, fringes’)

These variations occur even within idiolects. For example, one subject, in the same conversation, used two pronunciations of the Hebrew month February/March: [ʔdár] ~ [ʔdər].

Why is there so much variation in the English of Modern Orthodox Jews? I posit that there are alternate influences stemming from two joint ideals: religiosity and Zionism. The Ashkenazic pronunciation represents the speech of their ancestors in Eastern Europe and of their more religious contemporaries, the Ultra-Orthodox, and the Modern Hebrew style represents commitment to Israel. Since both ideals are important to most Modern Orthodox Jews in America, it is common to find influences from both Ashkenazic Hebrew and Israeli Hebrew in the same individual’s speech. Of course, there are limits on the speakers’ consciousness of these influences. Here are some more examples of variation that stems from joint influence. It is not uncommon to hear both alternate forms from the same person, even within the same utterance.

(6) Joint influence

Mod. Orth. Jew. Eng.	Yiddish	Mod. Heb.	(‘gloss’)
kípʌ ~ kipá	-----	kipá	(‘skullcap’)
ivríť ~ ívrít	-----[ivríť]	ivríť	(‘Modern Hebrew’)
mínyən ~ minyán	mínyən	minyán	(‘prayer quorum, gathering’)
mínħag	mínəg	mínħag	(‘custom’)
tórʌ	tóyrə	torá	(‘Pentateuch, Jewish wisdom’)

What can pronunciation tell us about the origin of the loan words? Can we automatically conclude that any word with Ashkenazic stress was borrowed from Yiddish? No. Some counter-examples are the words [kípʌ] and [ivríť], two Hebrew words that do not exist in Yiddish and in Jewish English are sometimes rendered with Ashkenazic stress, while in Israel they are [kipá] and [ivríť]. Of course, these pronunciations may also be influenced by the predominance of penultimate stress in English.

Can we automatically conclude that any word with ultimate stress was borrowed from Hebrew? Again, no. A counter-example is Jewish English [minyán], as compared to Yiddish [mínyən] and Modern Hebrew [minyán]. In Hebrew, Yiddish, and Jewish English this means ‘prayer quorum of ten males’, but in Yiddish and Jewish English it also means ‘place of prayer gathering’. So

we see that it borrows semantic material from Yiddish and phonological material from Modern Hebrew. [mínyán] exists in alternation with the Ashkenazic pronunciation [mínyən], which is more common in Jewish English.

Because of this variation, which exists even within idiolects, we cannot draw conclusions about sources of borrowing by looking at the phonology. It would not make sense to say that [mínyən] is a Yiddish borrowing and [mínyán] is a Hebrew borrowing, especially when they are uttered within the same sentence. However, it is possible to conclude that the word [mínyən]~[mínyán] has two sources; it is both a Yiddish and a Hebrew loan.

Now the question arises: where does textual Hebrew fit in? While languages often borrow lexical items from written languages, it is not so likely that phonological material is borrowed from textual Hebrew. Speakers do not have ready access to ancient pronunciations. An exception might be the Jewish English word [mínħag]. It is not the same as the Modern Hebrew [minhág] or Yiddish [mínæg]. Although its Jewish English usage and penultimate stress are similar to Yiddish, it cannot be a straight Yiddish borrowing because of the presence of the [h]. This may be a joint Yiddish-Hebrew borrowing and an example of textual influence, where the speakers try to say the word as they know it is written. Even a textual language can have some influence on the phonological realization of a loan word.

4.2 Morpho-syntax

The Yiddish language, during its development in Europe, created a number of innovations in words derived from Hebrew. Does Jewish English maintain these Yiddish innovations? Here are some examples of what happens to words whose forms have innovations in Yiddish.

(7) Variation in form

<u>Mod. Orth. Jewish English</u>	<u>Yiddish</u>	<u>Old+Mod. Hebrew ('gloss')</u>
shaləx manəs ~ mishloax manot	shaləx monəs	mishloax manot ('Purim gifts')
shaləshudəs ~ suda shlishit	shaləshudəs	səuda shlishit ('3rd meal')
tsniəsdiḱ ~ tsanua	tsniəsdiḱ	tsanua ('modest')

Both forms exist in Jewish English, although the Yiddish forms are more common. It is likely that Jewish English borrowed both the Yiddish forms and the Modern Hebrew forms.

What happens to plurals that differ in Yiddish and Hebrew when they are borrowed into Jewish English?

(8) Variation in plural (the singular forms are given in *italics*)

Mod. Orth. Jewish English	Yiddish	Old+Mod. Hebrew	(‘gloss’)
shab ^{as} im ~ shabatot ~ shab ^{as} iz	shabosim	shabatot	(‘Sabbaths’)
<i>shab^{as} ~ shabat</i>	<i>shab^{as}</i>	<i>shabat</i>	(‘Sabbath’)
taleysim ~ talitot ~ talisiz	taleysim	talitot	(‘prayer shawls’)
<i>talis ~ talit</i>	<i>talis</i>	<i>talit</i>	(‘prayer shawl’)
batey midrash ~ beys medr ^{ash} iz	bot ^e midroshim	batey midrash	(‘study halls’)
<i>beys medr^{ash} ~ beyt midrash</i>	<i>beys medr^{ash}</i>	<i>beyt midrash</i>	(‘study hall’)

As you can see, for most of the words, the English list includes both the Yiddish and the Hebrew forms, as well as its own innovation, the English plural marker [ɪz]. This variation shows the combined impact of Yiddish and Hebrew on the morphology of loan words in Jewish English.

Another impact of Yiddish on the Hebrew/Aramaic component of Modern Orthodox Jewish English is verb formation. The Jewish English verbs *pask^{en}* (‘render a religious decision’), *kash^{er}* (‘render kosher’), and *toyv^{al}* (‘immerse in ritual water to render kosher’) are borrowed from the identical Yiddish words, which are variations of Hebrew loans. Also, in Modern Orthodox speech, the periphrastic construction is common:

(9) Periphrastic constructions using Hebrew words (Format: *Jewish English construction*, (‘gloss’), “sample sentence, (recorded in the Columbia Orthodox community, spring ‘97),” [*Yiddish correlate*])

- a. *to be m^akab^{al}* (‘to accept’): “I’m not m^akab^{al} that.” [*m^akab^{al} zayn*]
- b. *to be m^akar^{av}* (‘to introduce non-religious Jews to the principles of Orthodoxy’): “Being m^akar^{av} is the same as practicing kiruv [‘outreach’].” [*m^akar^{av} zayn*]
- c. *to be kovey^a* (‘to set, establish’): “I’m kovey^a a certain time to learn every day.” [*koyvey^a zayn*]
- d. *to be yoci* (‘to be discharged of an obligation’): “You are yoci me.” (‘your obligation [to fulfill a commandment] is discharged via me’) [*yoyc^a zayn*]
- e. *to be m^asamey^{ax}* (‘to entertain, esp. at a wedding’): “We do all that shtik to be m^asamey^{ax} the xatan v^akala^l.” (‘we do all those routines to entertain the groom and bride.’) [*m^asamey^{ax} zayn*]

These constructions sound strange to most non-Orthodox Jews, especially when used with objects. They are borrowed directly from the Yiddish periphrastic construction, which adds the verb *zayn* (‘to be’) to a borrowed Hebrew verb: *m^akab^{al} zayn*, *m^akar^{av} zayn*, *m^asamey^{ax} zayn*. We can see the joint influence of Hebrew and Yiddish in (c) and (d), where the words are placed in a construction

borrowed from Yiddish but are rendered partly with Modern Hebrew phonology: *kovéyā* (Yid. *koyvéyā*, Mod.Heb. *kovéa*) and *yóci* (Yid. *yóycā*, Mod.Heb. *yoci*).

4.3 Semantics

In Yiddish, a number of Hebrew borrowings differ in meaning and in use from their Hebrew etymons. The continued use of these new meanings in Jewish English demonstrates the impact of Yiddish:

(10) Loans whose usages likely come from Yiddish

JewEng word	Yiddish and Jew.Eng. meanings	Textual Hebrew meaning
a. <i>kídesh</i>	'Sabbath social; wine blessing'	'sanctification, wine blessing'
b. <i>návi</i>	'prophet, Book of Prophets'	'prophet'
c. <i>torá</i>	'Pentateuch, Jewish wisdom'	'Pentateuch'
d. <i>seyfer</i>	'Jewish religious book'	'book'
e. <i>shulxən</i>	'table on which the Torah is read'	'table'
f. <i>gəməra</i>	'Talmud, [incl. Mishnah]'	'commentary on the Mishnah'
g. <i>mazəl táv</i>	'congratulations'	'good luck'
h. <i>moci/hamoci</i>	'name for blessing over bread'	'(word in blessing over bread)'

The Modern Hebrew versions of words (a)-(e) have only the right-hand meanings. Modern Hebrew also includes the left-hand usages for (f)-(h), although they are likely borrowed from Yiddish, as are many usages in Modern Hebrew. Both Yiddish and Modern Hebrew are possible sources for (f)-(h), but (a)-(e) should be seen as Yiddish borrowings, at least in usage.

We could learn much by examining the semantic shades and syntactic usages of every loan word in Jewish English. We might create a list, comparing all possible meanings and usages in textual Hebrew and Aramaic, Yiddish, Modern Hebrew, and Jewish English. Perhaps then we could draw more conclusions about the origins of each individual loan. Until that is done, it will be impossible to say definitively whether certain words were borrowed from Yiddish or Hebrew.

This is the case with the five examples given in (1):

stam ('only')

maxloket ('argument')

naḥkā minā ('practical difference')

ikər ('central point')

dafkā ('specifically, with intent, to spite someone [no exact English correlate]')

While all of them except *maxloket* are phonetically more similar to Yiddish than Modern Hebrew, there are no morphological or semantic clues to help us answer the question. *Nafka minā* and *maxloket* appear frequently in the Talmud and are used to some extent in Yiddish, and *dafka* and *stam* are extremely common in Yiddish. All except *nafka minā* are used frequently in Modern Hebrew. These are yet more examples of the intertwining of the three determinants in the creation of Jewish English loan words.

5. Conclusion

All of the languages of contact – Yiddish, Modern Hebrew, and textual Hebrew and Aramaic – have been crucial to the formation of a Hebrew and Aramaic component in Modern Orthodox Jewish English. Yiddish provides intergenerational dissemination, specific usages and shades of meaning, and some phonological and morphological norms. Textual Hebrew and Aramaic contribute to the maintenance of many words, through education and religious traditions, and even somewhat to pronunciation norms, based on Modern Hebrew phonology. Modern Hebrew contributes pronunciation norms and some lexical borrowings. The ideals of Zionism and religiosity lead to variation between Modern Hebrew influence and Yiddish influence.

This paper raises issues for general linguistics. First, it gives an example of the complexity of etymological identification for loan words. We might find the same problems in other languages that have multiple sources of contact. Some contemporary examples are North African Jews in France, many of whom speak French with loans from Judeo-Arabic, textual Hebrew and Aramaic, and Modern Hebrew; and Sephardic Jews in Turkey, many of whom speak Turkish with loans from Judezmo (Ottoman Judeo-Spanish), textual Hebrew and Aramaic, and Modern Hebrew. The extent of these influences calls for research.

Second, this paper deals with the question of how a language (via its speakers) borrows from texts. If a community without any input from Yiddish or another spoken Jewish language picked up Hebrew and Aramaic texts and made them a part of their regular study routine, would they eventually borrow words from those texts into their everyday speech? In the case of Jewish English, spoken languages are crucial to the dissemination of textual loanwords. In addition, religion and education play a major role in the maintenance of these words. This situation might be compared to learned Latin borrowings in English, to Sanskrit borrowings in languages of Hindus and to Classical Arabic borrowings in languages spoken by Muslims. Another comparison is the deaf community, in which their regular language of communication, ASL, has contact with written English.

By analyzing this incipient variety of Jewish English, we can better understand how spoken and written lending languages interact. Using the speech

of Modern Orthodox Jews in America as a model for Jewish language genesis, we might conclude that Hebrew and Aramaic words in other Jewish languages were actually borrowed partially from their previous Jewish languages.⁴ This study sets the stage for future analysis and cross-linguistic comparison of borrowing situations, especially in languages of the Jews.

Notes

¹ Thanks to Rakhmiel Peltz for his advice on the initial study (1998), and thanks to Elizabeth Traugott, Joshua Fishman, Penny Eckert, Eve Clark, Paul Kiparsky, John Rickford, Mark Bunin, and others for their help on this paper. Shortcomings are my own.

² Textual Hebrew and Aramaic are often dealt with as one language, based on the Yiddish concept *loshn koydesh* ('holy language; Biblical and Rabbinic Hebrew and Aramaic').

³ See Heilman & Cohen (1989) on Modern Orthodox Jews' joint identities as 'cosmopolitans and parochials'.

⁴ See Weinreich (1980), a foundational text of Jewish linguistics, for an introduction to the various components of Jewish languages. Also see Fishman (1985) and Benor (1999) about the sociology of Jewish languages and Gold (1985) and Steinmetz (1981) on Jewish English.

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Implications of Itelmen agreement asymmetries

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1. Introduction¹

The inflected verb in the Chukotko-Kamchatkan languages of Russia's Bering Sea coast (Itelmen [also called "Kamchadal"], Koryak, Alutor, Kerek and Chukchi) shows agreement simultaneously with both subject and one object (or oblique). This agreement is expressed by a combination of prefix and suffix as illustrated for intransitive (1) and transitive (2) verbs from Itelmen:²

- | | | | | |
|-----|----|--|----|--|
| (1) | a. | kma t-k'ot̚-kič̚en
I 1SGS/A-come-1SGS
'I came/arrived' [S3:13] | b. | q-k'ot̚-xč̚
2S/A(IRR)-come-2SGS
'(You) come !' [S3:20] |
| (2) | a. | kma t'-əlč̚qu-[ɣ̚]in
I 1SGS/A-see-2SGO
'I saw you' [S1:71] | b. | q-əlč̚qu-βum kma
2S/A(IRR)-see-1SGO me
'(You) look at me!' [S1:75] |
| | c. | n-əlč̚qu-[ɣ̚]in
3PLS/A-see-2SGO
'They saw you' [S1:77] | d. | n-əlč̚qu-z-um
3PLS/A-see-PRES-1SGO
'They see me' [S1:77] |

In this paper, I develop and extend the analysis in Bobaljik & Wurmbrand 1997, presenting evidence that the prefix is the "primary exponent" (in the sense of Carstairs 1987) of subject agreement while the suffix is the primary exponent of object agreement. Apparent instances of subject agreement in the suffixes arise from a process akin to allomorphy. In essence, the claim is that the suffixes *agree* with the object, but show allomorphy for ('sensitivity to') features of the subject.

The argument is in part based on an asymmetry between the two positions—while the correct choice of suffix is in certain well-defined instances dependant on features canonically expressed by the prefix, the choice of prefix is never sensitive to properties of the suffix (i.e., object). This asymmetry reflects, I believe, a systematic asymmetry in the language—sensitivity to agreement features is uniquely *outwards*. That is, the form of a given morpheme may be conditioned by agreement features expressed further out, but not by agreement features expressed further in. This paper thus continues a line of investigation set out by, e.g., Carstairs 1987 and Noyer 1997, an attempt to find systematicity and order in the maze of intricate interdependencies and cooccurrence restrictions in inflectional morphology.

The paper is organized as follows. Section 2 summarizes the arguments from Bobaljik & Wurmbrand 1997 that the agreement prefix is subject-oriented while the suffix is object-oriented, and that the apparent subject agreement in the suffixes is essentially allomorphy. In Section 3 I investigate the asymmetric nature of this allomorphy like sensitivity and present the generalizations which suggest that allomorphy conditioned by agreement features is uniquely outwards-sensitive. Section 4 sketches an account of how this might follow from a theory in which morphology is *realizational*, and in which the process of providing a syntactic terminal node with a phonological matrix is akin to a rewrite rule, much along the lines envisioned in Chomsky's (1965) *Aspects* model.

2. Itelmen agreement in a nutshell

As (1)-(2) illustrate, the choice of prefix is determined by the person and number of the subject (and mood), while the features reflected in the suffix position are those of the object of transitive verbs, but of the subject of intransitive verbs. This curious situation, which occurs in all of the Chukotko-Kamchatkan languages, has been described as a unique type of ergative split by e.g., Comrie 1981:247, Spencer 1996:1—nominative-(accusative) prefixes co-occurring with (ergative)-absolutive suffixes. [Note that in Itelmen, direct arguments—subject and object—do not bear any case marking. This contrasts with the other C-K languages which have an ergative-absolutive case system.]

Bobaljik & Wurmbrand 1997 argue that this “split” in Itelmen is epiphenomenal and that the entire agreement system is fundamentally aligned in terms of subject versus object, with subject agreement in the suffix being secondary. The prefixes are indeed clearly subject-oriented and do not (with one exception) distinguish between transitive and intransitive subjects (e.g., $t \Leftrightarrow [1.SG.SUBJ (realis)]$). This is the canonical NOMINATIVE grouping. However, the suffixes show a much more complex pattern. For one thing, the suffix may agree with an indirect (DATIVE) object and fail to agree with the ABSOLUTIVE (Volodin 1984, Bobaljik & Wurmbrand 1997). More tellingly, Volodin & Vakhtin 1986 observe that despite the apparent alignment of the suffix position along ABSOLUTIVE lines (grouping together intransitive subject and transitive object, to the exclusion of transitive subjects), there are no truly ABSOLUTIVE suffixes. For instance, the suffix corresponding to a [1.SG.INTRANS.SUBJ. = “S”] is *-kičen*, while that corresponding to a [1.SG.OBJ = “O”] is *-βum*. The unity of transitive and intransitive subject prefixes, and the lack of a corresponding unity of intransitive subject and object suffixes, is quite general as can be seen from the relatively full paradigm in (3).³

(3)

ITELMEN AGREEMENT (CLASS I)			
person-number	A	S	O
1sg. REAL IRREAL	t- m-	t- -kičen m- -kičen	-βum
2sg. R I	q-	-č q- -xč	-yin
3sg. R I	xən-	-n xən- -n	[see below]
1pl. R I	nt- mən-	nt- -kičeʔn mən- -kičeʔn	-βuʔm
2pl. R I	-sx q- -sx	-sx q- -sx	-sxn
3pl. R I	n- xən-	-ʔn xən- -ʔn	[see below]

Note that for 1st and 2nd person objects, the features of the object alone control the agreement suffix. With 3rd person direct objects, the situation is more complex in that only the object number is expressed (e.g., by the glottalization of “n”, or a glottalized “n”—written ʔn—the regular plural throughout the language); the form of the suffix is conditioned also by the features of the subject.

(4)

ITELMEN AGREEMENT: 3 PERSON DO		
SUBJECT	DIRECT OBJECT	
	3sg	3pl
1sg, pl IMPERSONAL	-čen	-čeʔn
2sg REAL	-(i)n	-(i)?n
IRREAL	-x(č)	-(x)i?n
2pl	-sx	-sxi?n
3sg, pl	-nen	-neʔn

Bobaljik & Wurmbrand 1997 observe that the correct generalization to be made here is this: the agreement suffix in Itelmen is determined by the person and number features of the object when it has such features. When the object does not have the appropriate features, then the features of the subject are coopted. This gives rise to the apparent double expression of subject agreement in intransitive verbs as in (1); the prefix is true subject agreement, but the suffix reflects the person and number features of the subject only due to the fact that there is no object to contribute these features. Independent evidence for an analysis along these lines comes from the forms in (4). On the not unfamiliar assumption that 3rd "person" objects lack person features, but have number (cf. Benveniste 1956, Forchheimer 1953, Ritter 1995, Noyer 1997), we see these as evidencing a split: the number features of the suffix are contributed by the object, while the person features reflect those of the subject.⁴

3. Hierarchy and The Implications of Class.

3.1 Inwards and Outwards Sensitivity

An important aspect of the account sketched above is that it displays an asymmetry. The choice of suffix depends in certain instances (intransitives and transitive clauses with 3rd person direct objects) on features expressed by the prefix (i.e., subject person and number), but the choice of prefix never depends on features expressed by the suffix (i.e., object person and number).⁵

As discussed in detail by Carstairs 1987 we may speak of dependencies in morphology as being either *outwards* or *inwards*. Outwards sensitivity, for example, is the case in which the shape of a particular morpheme (e.g., choice of allomorph) depends on properties expressed by a morpheme more peripheral in the word. A straightforward example is vowel change (ablaut) in the verb stem, conditioned by agreement features (agreement being more peripheral than the stem), as in German. As illustrated in (5), certain "strong" verbs undergo a vowel change in the present tense, conditioned by 2nd or 3rd person singular subject agreement. That this change is sensitive to morphosyntactic features (as opposed to simple phonology) is shown by the fact that of two identical suffixes (3rd singular and 2nd plural) only one triggers the vowel change.

(5)	<i>geben</i> 'give':	<u>SINGULAR</u>	<u>PLURAL</u>
	1 person	ich geb-e	wir geb-en
	2 person	du gib-st	ihr geb-t
	3 person	er,sie gib-t	sie geb-en

Turkish provides a clear case of inwards sensitivity between two affixes, as can be seen in (6).

(6) Turkish (Carstairs 1987:156): *gel-* 'to come'

Aorist Simple:	1sg.	<i>gel-ir-im</i>	1pl.	<i>gel-ir-iz</i>
Past Simple:	1sg.	<i>gel-di-m</i>	1pl.	<i>gel-di-k</i>

The inflected Turkish verb consists of a root, followed first by a tense marker (*-ir-* in the Aorist and *-di-* in the Past) and, more peripherally, an agreement morpheme. The 1st person singular suffix is *-(i)m* with allomorphy conditioned solely by phonology. However, the 1st person plural agreement suffix shows two allomorphs, *-iz* and *-k*, the choice among which is determined by the tense.

The Itelmen case involves interaction between a prefix and a suffix and thus it is not a priori clear whether this sensitivity is inwards or outwards. However, by looking further into Itelmen morphology, it is possible to construct an (indirect) argument that contextual allomorphy conditioned by agreement features is uniquely outwards. The argument comes from an examination of the allomorphy for the marker of the second conjugation class.

3.2 Class in Itelmen

Transitive verbs in Itelmen fall into one of two conjugation classes. Class I (by far the largest) is unmarked, while Class II is marked in all forms by a suffix which typically precedes the agreement (and non-finite) morphemes, and follow tense and aspect suffixes. Though there is some inter- and intra- speaker variation concerning class membership, Volodin 1976:205 lists 16 verbs as belonging to Class II.⁶ Pairs of Class I and Class II verbs are given in (7)-(8). In each pair, the (b) example shows a Class II morpheme (boldfaced) between the present tense morpheme (*s/z*) and the agreement suffixes.

- (7) a. *t'-əŋkzu-s-čəʔn* (1stel¹ku-ʔnɬ-aʔn) (mouse-PEJOR-PL)
 1SG-help-PRES-1>3PL
 'I'm helping the mice.' [KL:17]
- b. *t-tɕ-s-ki-čəʔn* (...č'eʔuzlaχ-aʔn kɬčl-eʔn)
 1SG-bring-PRES-II-1>3PL (... tasty-PL rotten.heads-PL)
 'I'm bringing tasty rotten (mouse) heads' [KL:25]
- (8) a. *əlčqu-z-in* (məzin kist)?
 See-PRES-2SG>3SG our house
 'Do you see our house?' [KL:16]
- b. *tɕ-s-čŋ-in* (əŋqa)?
 Bring-PRES-II-2SG>3SG what
 'What are you bringing?' [KL:25]

Of immediate relevance is the shape of the Class II morpheme which is different in the two (b) examples. Indeed, there are a range of Class II allomorphs, given with the contexts for their occurrence in (9).

(9) **Class Markers:** **Caveat:** some variation

	<u>/environment</u>
-k	[non finite] (including participles)
-čij	[3SG>3]
(-čij-	[2sg>3.realis])
-čy ^w ə(i)	[3PL>3] [2SG>3.REALIS] [2SG>3PL.IRR]
-ik ⁷	[2PL>3SG] [2SG>3SG.IRR]
-xk	[1.OBJ] [2SG.OBJ] [2PL>3PL]
-ki	[2pl.OBJ] [3.IO] [1>3] [Ø>3]

It is clear that the choice of allomorph for the Class II marker is determined largely by agreement features (person and number) of both the subject and object. Importantly, like the sensitivity considered in the previous section, this allomorphy is asymmetrical. Quite generally, the Class marking does not influence the choice of agreement suffix or prefix, as can be seen in (7)-(8); other than the phonologically conditioned voicing alternation, the inflectional morphemes underlined in each (a) example are the same as in the corresponding (b) examples. The choice of Class suffix depends on features expressed by the agreement suffix (i.e., object person and number) and prefix (i.e., subject person and number), but the choice of prefix and object agreement suffix (almost) never depends on the feature expressed by the Class suffix (i.e., Class II).⁸

Directing our attention to the two suffixes (class and agreement) we see that we may provide a partial answer to the question posed at the beginning of this section: allomorphy of the Class II morpheme is conditioned by features of the more peripheral object agreement suffix. This sensitivity is asymmetrical (thus "pure" in Carstairs's terms) and clearly outwards. At this point, we may assume that sensitivity conditioned by agreement features obeys a unique direction of sensitivity, in this case outwards. Since (both) the object agreement suffix (and the class suffix) are conditioned (asymmetrically) by agreement features of the prefix (as discussed in section 2), we would conclude that the prefix is more peripheral in the word than either of these two. This line of reasoning leads to the hierarchical structure in (10), with the properties as indicated.

(10) [A- [[[STEM] -C] -B]]		
POSITION	Exponent of:	Allomorphy for:
A <u>Pref-</u>	SUBJ-AGR	— (MOOD)
B <u>-Suf.Agr</u>	OBJ-AGR	SUBJ-AGR
C <u>-Suf.Class</u>	CLASS (II)	SUBJ-AGR; OBJ-AGR

On the assumption that all allomorphy for these features is outwards-sensitive, only the hierarchical structure indicated actually explains the array of attested and unattested dependencies in the right-hand column of (10). The most embedded suffix, Class II, shows allomorphy conditioned by features of the agreement prefix and suffix, both of which are further out. The next most peripheral affix is the suffixal object agreement. This suffix shows allomorphy conditioned by features of the prefix (which is further out) but not for class (which is further in).

Finally, the most peripheral of the affixes considered here is the subject agreement prefix which shows no allomorphy for agreement or class features expressed elsewhere (though it does show portmanteau-like allomorphy for mood).

Note that the crucial assumption is not directly warranted by the data originally considered. In the one case of allomorphy for which the direction of sensitivity was demonstrable, the sensitivity was seen to be outwards (the dependence of class II on object agreement). The argument above hinges on extending this observation to the case in which the directionality is not directly observable (i.e., the relation between prefix and suffix). Importantly, though, it is not clear that any conceivable alternative would fare equally well in predicting exactly the range of dependencies indicated in the right-most column of (10). For example, a flat structure—or, equivalently, the assumption that sensitivity for syntactic features may be either inwards or outwards, as in Halle & Marantz 1993—would admit the attested sensitivities, but it would leave as accidental the range of non-attested dependencies. Thus, there would be no account of why the prefix does not depend on person-number of the object or on conjugation class. The importance of the assumption that all allomorphy considered thus far is uniquely outwards-sensitive (and thereby the justification of this assumption) is that it explains not only what dependencies do occur but also what dependencies do not. In the following section, I will sketch an account of what this particular assumption may follow from.

4. Inwards and Outwards Sensitivities⁹

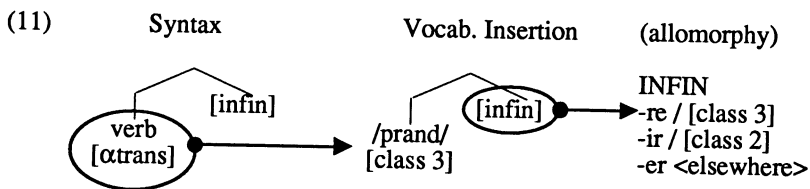
In the previous section it was shown that a succinct account of the range of dependencies attested (and unattested) among the inflectional morphemes of Itelmen relied on the assumption that all allomorphy conditioned by agreement features is outwards-sensitive. If various problems, put aside here, can be overcome, this should be an interesting generalization in and of itself. However, we should also wonder why allomorphy in Itelmen might work this way. In the remainder of this paper, I will propose that allomorphy conditioned by agreement features is outwards-sensitive in Itelmen because it is always outwards-sensitive and show how this may follow from the theory of Distributed Morphology (Halle & Marantz 1993). I will then turn very briefly to a consideration of how this may be reconciled with the results of Carstairs 1987 whose Peripherality Constraint (p.193) dictates that no allomorphy for features such as agreement should be outwards.

The key, I propose, lies in the distinction between morpho-syntactic features (i.e., those features relevant to the syntactic computation) and morpho-phonological features (those relevant only post-syntactically). I will argue here that allomorphy conditioned by morpho-syntactic features must be outwards-sensitive, while that conditioned by morpho-phonological features must be inwards-sensitive. The latter claim is explicit in Halle & Marantz 1993, while the former will follow from treating vocabulary insertion (i.e. lexical insertion) as a post-syntactic operation that replaces a syntactic terminal node (a bundle of syntactic features) with a phonological entity (essentially the position taken in Chomsky 1965, chapter 2 and in Halle 1992).

4.1 Two kinds of features

Distributed Morphology¹⁰ [DM] is a realizational model of morphology in the sense that the actual phonological material we see/hear is taken to realize properties of the syntax. It is a tenet of the theory that the syntax manipulates abstract entities which are bundles of syntactic features grouped into terminal nodes (roughly as in Chomsky's 1965 *Aspects* model). In the syntax (when operations such as head-movement apply) these nodes are concatenated and otherwise manipulated, but are devoid of phonological content. After the syntactic component has concatenated complex words, and placed these words in the appropriate environments for their inflectional features, the Morphology assigns phonological strings to the syntactic terminal nodes. Halle & Marantz argue that this insertion must be cyclic, beginning with the root and proceeding outwards. That morphology is post-syntactic in this way is required in order that syntactic information may be available to the determination of the correct allomorph. The exact details are not important for this paper, however, what is important is the order in which information is realized internal to a complex word.

As noted, DM takes the syntax to concatenate elements consisting of syntactic features. Features which have no relevance in syntax, such as the phonological matrix of a particular morpheme and diacritics such as conjugation or declension class are added post-syntactically. It follows that any sensitivity to phonological material and diacritics must be to previously inserted morphemes. It follows in turn (specifically, from the assumption that vocabulary insertion is cyclic, root-out) that allomorphy for diacritics will always be inwards. Consider by way of illustration, French infinitives. Verb stems are divided into a series of arbitrary classes, a division which plays no role in syntax. However, this division dictates the choice of infinitive suffix (-er, -ir, -re). It should be clear that the choice of infinitive allomorph must wait until the verb stem has been inserted, i.e., until the information about conjugation class membership has been added to the representation. This is illustrated schematically in (11).



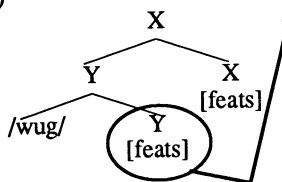
The syntactic representation contains only the information that the root is a verb, perhaps with specification as to transitivity and perhaps aspectual class (Aktionsart). This is concatenated with an infinitival node. Post-syntactically, Vocabulary Insertion must provide the stem with a phonological form and attendant diacritics prior to deciding the appropriate allomorph for the infinitive marker. The infinitive marker must therefore be displaying inwards sensitivity to the diacritic feature "conjugation class". Again, in this manner it follows that all sensitivity to particular vocabulary items, i.e., to their phonological features (and morphophonological diacritics) must be inwards. Itelmen is not exceptional in this regard, in that the difference between class I (no suffix) and class II (suffix) is conditioned by the features of the stem, which by definition is more central. (As

noted above, this sensitivity for conjugation class is not restricted to adjacent environments, e.g., the present tense marker intervenes in (7)-(8)).

Agreement features are, on the other hand, presumably present in the syntax (i.e., at least to the extent that agreement is determined by syntactic configurations). In this way, they should be "visible" for the determination of contextual allomorphy prior to vocabulary insertion. That is, allomorphy at a given node may "see" syntactic features further out. If the characterization of the Itelmen data given above is correct, we do indeed see outwards-sensitivity of exactly this sort in Itelmen. What is missing at this point, though, is an account of why such sensitivity to syntactic features is *always* outwards.

As characterized by Halle & Marantz (1993) vocabulary insertion consists of providing the phonological matrix and diacritics to a terminal node post-syntactically. By implication (and explicitly for Noyer 1997:*lxii*), the syntactic features persist into the phonology. However, an alternative suggests itself (and is made explicit in Halle 1992, Trommer 1999). Namely, vocabulary insertion could be cast as the replacement of the syntactic entity (a terminal node) with a phonological entity (a "vocabulary item"). On this latter view, syntactic features would be deleted by the process of vocabulary insertion. One implication of this seemingly innocuous change in the theory is that it predicts exactly the state of affairs argued above to exist in Itelmen. If syntactic features no longer persist after they have been replaced by phonological matrices, it follows that sensitivity to syntactic features may only be to those positions which have not yet been subject to vocabulary insertion. Again, assuming that vocabulary insertion is root-outwards (as above), in any given structure it is only those syntactic features which are more peripheral which will be able to act as the context for allomorphy. This is illustrated schematically in the following:

(12)



Next point of insertion may be sensitive both inwards and outwards BUT

Outwards: only for morpho-syntactic features.
Inwards: only for specific vocab items
(= phonology and diacritics)

This schema represents an intermediate stage in a derivation. The syntax has concatenated a series of terminal nodes, creating a complex word consisting solely of (bundles of) syntactic features. Vocabulary insertion (as in (11)) has begun at the most central node, and has replaced the syntactic features with an appropriate phonological matrix (in this case /wug/). The next point of insertion is the node Y. Allomorphy at this point may be conditioned by all and only those features which are present in the representation at this stage. In addition to the syntactic features at Y itself, the only syntactic features which may thus condition allomorphy are those which are more peripheral, i.e., at X. The syntactic features which had been present at the root have been replaced (cf. (11)). Conversely, phonological features (including arbitrary diacritics such as conjugation class) are present only at the root and have yet to be determined further out. This model thus predicts the directions of sensitivities attested in Itelmen.

Thus the schema in (12) directly captures the properties of the Class Marker in Itelmen. The shape of this morpheme (its presence or absence) is conditioned by

an arbitrary diacritic of the verb stem (inwards: the stem has already been inserted), and simultaneously by syntactic features of the subject and object agreement affixes (outwards: the features are there, but not the actual items).

Once again, the important property of the present view is not that it predicts what kinds of allomorphy may be found in language but that it also predicts what may not be found. For Itelmen, laying aside certain complications (see the endnotes and references there), the picture appears to be broadly correct. What remains to be seen is how this will fare cross-linguistically. Preliminary results, though, lead to optimism (see Bobaljik 1999) with one major caveat, which I address immediately.

4.2 The Peripherality Constraint

Carstairs 1987, in investigating the kinds of sensitivities explored here, proposed the Peripherality Constraint (p. 193).

- (13) The realisation of a [morphosyntactic] property P may be sensitive inwards, i.e., to a property realised more centrally in the word-form (that is, closer in linear sequence to the root), but not outwards to an individual property realised more peripherally (further from the root).

This is obviously directly at odds with the results of this paper. Importantly, though, the examples which Carstairs adduces to support this claim (including the Turkish example (6), above) involve sensitivity between adjacent morphemes. I suggest that this involves an additional complication, namely, that adjacent morphemes may interact with each other independent of the inwards-outwards distinction. The generalization proposed above (the opposite of Carstairs's Peripherality Constraint) holds of non-adjacent morphemes.

That adjacency may be a sufficient condition for providing a context for allomorphy is suggested by work on Greek (Bader 1997) and by German data reported (in a somewhat different context) in Wurmbrand 1999. The key observations for German are these: first, in addition to the outwards sensitivity noted in (5), there is an inwards-sensitivity in which the choice of form for 1st and 3rd person singular agreement suffix depends on what the verb is next to. The two agreement paradigms are given in (14).

- (14) German: Two verbal agreement patterns (Wurmbrand 1999)

	Pattern 1		Pattern 2	
	Singular	Plural	Singular	Plural
1 st person	-(ə)	-(ə)n	Ø	-(ə)n
2 nd person	-st	-t	-st	-t
3 rd person	-t	-(ə)n	Ø	-(ə)n

In the present tense, Pattern 1 forms occur next to a main verb [with the exception of *wissen* 'to know'] and Pattern 2 forms occur with modals. Thus, in the present tense (which is unmarked for tense) the verb stem and the agreement suffixes show mutual conditioning.

The second observation for German is that in the past tense (in which a—possibly null—tense suffix intervenes between the verb stem and the agreement suffix), both of these dependencies disappear. While vowels may

change for tense, there are no vowel changes like those in (5) conditioned by agreement features across an intervening tense morpheme. Similarly, the distinction between agreement allomorphs for main and modal verbs in (14) is neutralized (in favour of Pattern 2) in the past tense. In German, then, adjacency is an important factor in conditioning the environment for allomorphy.

Importantly, the Itelmen case cannot be reduced to adjacency. The class marker, in addition to being sensitive to the verb stem's conjugation class diacritic, is sensitive to features of both the prefix and suffix. The only way that it might be (hierarchically) adjacent to both would be if it were between them. However, in that case, the suffix would not be adjacent to the prefix and should thus not be sensitive to the latter's properties, contrary to fact. Alternatively, a flat (or ternary branching) structure would allow all three affixes to be hierarchically adjacent (if not linearly so), but as we have seen above, such a structure would deprive us of an account of the asymmetrical nature of the relationships among morphemes investigated here.

Clearly, there are issues to address and further examples to consider. In this sense, the above paper serves as the impetus to a research programme, one which continues in Bobaljik 1999 and which I hope will continue further as more relevant data becomes available.

5. Conclusion

The present paper has been preliminary in many ways and somewhat speculative in nature. What I hope to have shown in the above discussion is the following. By assuming the treatment of Itelmen inflection proposed in Bobaljik & Wurmbrand (1997), an asymmetric relationship emerges between the agreement prefixes and suffixes in that the suffixes are sensitive to properties of the prefixes, while the prefixes are insensitive to properties of the suffixes. This relationship, I have argued, is a part of a systematic set of asymmetries in Itelmen inflection in which allomorphy may be conditioned by syntactic features (e.g. agreement) expressed more peripherally in the word, but not by syntactic features which are closer to the root. In the final section, I offered an admittedly dense sketch of how this generalization might in fact follow from a particular theory of morphology. In so doing, I hope to have contributed a small step towards demystifying the complexities of interactions and dependencies among inflectional morphemes, and to have shown that there is perhaps some sense of order where there appeared to be none.

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² Of three major dialects of Itelmen attested in the eighteenth century, only the Western variety survives, spoken currently by fewer than 50 people on the central Okhotsk coast of the Kamchatka peninsula. Examples in this paper are from the Sedanka (Northern) sub-dialect, and were collected

during field work in 1993-4 and 1996. More detailed treatment of some of the material presented here is to be found in Bobaljik & Wurmbrand 1997 and Bobaljik 1999. The only monograph length grammar of Itelmen is Volodin 1976.

³ A small number of transitive verbs take "class 2" conjugation, which involves an additional morpheme typically occurring before the agreement suffixes in this table. This is the focus of section 3, below. There are two ways in which the data in the table deviates from the general characterization of the morphology given in the text. First, the suffix *-sx* occurs with all [2pl] subjects—the only instance of true suffixal agreement with a transitive subject. Note, though, that *-sx* occurs peripheral to the other suffixal agreement morphology, e.g., *q-iϕli-xk-um-sx* [2.SUBJ-BRING-CLASS2-1SG.OBJ-2.PL.SUBJ] and is strange within Itelmen morphology in other ways as well. Second, the prefix for a [3PL] subject varies for transitivity (*n-~∅*). See note 5. This contrasts sharply with the situation in Chukchi, Alutor and Koryak, as discussed in Bobaljik 1999.

⁴ This analysis in terms of sharing or copying of features was first introduced for this data in Bobaljik & Wurmbrand 1997. Since then, a number of similar cases have been identified in a range of languages, see, e.g., Hale & Fernández on K'ichee' and Basque and Bobaljik 1999 for others.

⁵ The third person plural indicative prefix alternates between *n-* (transitive) and *∅* (intransitive) but even this is not sensitive to the features of the object, but only to the presence or absence of an object.

⁶ There is no apparent syntactic, semantic or phonological coherence to this list; it is simply an arbitrary diacritic. The verbs Volodin lists are: *sxzu-k-es* 'to carry (s.o., s.th.) on one's back', *əntxla-k-es* 'to carry, convey by vehicle [include. horse]', *iϕli-k-es* 'to bring', *k'zi-k-es* 'to grab (s.o.) by the nape of the neck', *ənk-k-es* 'to catch', *əi?e-k-es* 'to get (s.o., s.th.) from below, beneath the water', *tzil-k-es* 'to catch up to, overtake', *čke-k-es* 'to find', *čəβa-k-es* 'to meet', *χaq til-k-es* 'to recognize, know (s.o.)', *qeze-k-es* 'to welcome, treat (s.o.)', *čel-k-es* 'to choose, elect (s.o.)', *la-k-es* 'to give out (s.o.)', betray; to tell (s.th.)', *txit-k-es* 'to remember', *i'k'ne-k-es* 'to press down on, squeeze', and *əmpika-k-es* 'to hit with all one's strength'.

⁷ *-ik* alone among the Class II allomorphs surfaces to the right of the agreement suffixes. Note though that it occurs only with 2nd person subjects, which add a range of complications to the pattern described here. See Bobaljik & Wurmbrand 1997: 417ff for some discussion, and Bobaljik 1998:§2.2.1 for a comparison to Chukchi.

⁸ The apparent exceptions have once again to do with 2nd person subject, in this case, 2nd person subjects acting on 3rd person objects in the irrealis mood. When the object is 3PL, the forms are Class I: *q-VERB-xi?n* vs. Class II: *q-VERB-čy?-i?n*. The lack of an */x/* in Class II may have a phonological explanation. With 2SG subject acting on 3SG object (irrealis) the forms are Class I: *q-VERB-x* vs. Class II: *q-VERB-xčik*. The *č-∅* alternation is mysterious (though the *-xč* form surfaces also with intransitives 2SG subj, irrealis); this form also involves the anomalous peripheral Class II suffix mentioned in note 7.

⁹ This section is somewhat of a postscript in that in the oral presentation of this paper in February, I had offered no account of why the sensitivity discussed here must be uniquely outwards. Having limited the discussion to Itelmen, I had simply offered as a conjecture the claim that all sensitivity to syntactic features was outwards-sensitive. This is immediately falsified of course by the kinds of examples discussed by Carstairs 1987 (including the Turkish example above) but when one focuses the investigation on non-adjacent morphemes the generalization appears to hold. See section 4.2 for discussion. One remaining counter-example is the "Subject Marking Anomaly" described by Weber 1989:97 from Huallaga (Huánuco) Quechua, brought to my attention by Erin Dorgan. See Bobaljik 1999 for discussion and accounts of other apparent counter-examples.

¹⁰ A succinct overview of this framework, with references and links, is available at <http://www.ling.upenn.edu/~moyer/dm/>.

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Stress, epenthesis, and segment transformation in Selayarese loans

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1. Introduction

Loanwords normally undergo changes that bring them into conformity with native language phonological patterns. Among the most commonly seen changes are phoneme substitution and prosodic adjustment, illustrated by the Japanese pronunciation *kurisumasu* 'Christmas' in which the English schwa is replaced by [a], and [u] is inserted in three positions to create legal Japanese syllables. In a serial framework, such changes are frequently problematic, requiring processes that are not well motivated by native language data (such as rules converting schwa to [a] and rules of vowel epenthesis), or requiring a filtering mechanism to bring inputs of the borrowed forms in line with NL inputs (e.g. Silverman 1992).

Many of these problems disappear in an output-oriented, constraint-based framework. Phoneme substitution follows from the constraint set, with no need to filter inputs; the lack of particular phonemes in some or in all positions in the native vocabulary is accounted for by a set of output constraints which, when ranked below faithfulness constraints, will prevent the disallowed phonemes from surfacing should they appear in the inputs of borrowed words. And since all possible output candidates are considered in parallel, there is no need to posit processes specific to loanwords. In many instances then, loanwords are accounted for by the same grammar that accounts for the native language data, with no special pleading.

In the following sections I discuss the transformation of loanwords from Bahasa Indonesia into Selayarese, a Makassar language of South Sulawesi, Indonesia. I will argue that the shape of the borrowed words is consistent with well motivated constraints and consider whether such rankings are motivated by the native language data, and if not, whether they correspond to the default, initial-state rankings. I will first discuss the stress of borrowed words, and then the treatment of illegal codas, which undergo either epenthesis of a vowel or transformation of the coda consonant into a legal Selayarese coda segment. In the latter section, I argue that the loanword data argue against a transparency analysis of epenthesis (as proposed in McCarthy, to appear), and in favor of an analysis closer to classical phoneme substitution, in which the borrowing language alters segments to conform to the native language phonotactic constraints.

2. Selayarese Stress and Epenthesis Interactions

Selayarese stress in monomorphemic words is normally penultimate, regardless of syllable structure:

- | | | |
|-----|--------------|-----------------|
| (1) | a. sampúlo | 'ten' |
| | b. palóla | 'eggplant' |
| | c. balíkaʔ | 'arm' |
| | d. barámbar̃ | 'chest' |
| | e. kalihára | 'ant' |
| | f. kalumánti | 'big black ant' |
| | g. búlaŋ | 'moon, month' |
| | h. tímbo | 'grow' |
| | i. góntiŋ | 'scissors' |

The sole exception involves monomorphemic words with antepenultimate stress:

- | | | | |
|-----|--------------|------------|-----------------|
| (2) | a. sáhala | /sahal/ | 'profit' |
| | (cf. sahála | /sahala/ | 'sea cucumber') |
| | b. lámberē | /lamber/ | 'long' |
| | c. bótoro | /botor/ | 'gamble' |
| | d. sússulu | /sussul/ | 'burn' |
| | e. páʔrisi | /páʔris/ | 'painful' |
| | f. maŋkásara | /maŋkasar/ | 'Makassar' |
| | g. kasíssili | /kasissil/ | 'mosquito' |
| | h. barúasa | /baruas/ | 'cookie' |
| | i. hállasa | /hallas/ | 'suffer' |

In all monomorphemes with antepenultimate stress, the final vowel is absent before a vowel-initial, non-clitic suffix (Basri, Broselow, Finer, and Selkirk 1997):

- | | | | | |
|-----|------------|-----------|--------------|----------------------|
| (3) | a. lámberē | lambérañ | /lamber+añ/ | 'long/longer' |
| | b. lóhe | lohéañ | /lohe+añ/ | 'many/more' |
| | c. hállasa | hallási | /hallas+i/ | 'suffer/make suffer' |
| | d. rúppa | rúppái | /ruppa+i/ | 'face/confront' |

Furthermore, all monomorphemic forms with antepenultimate stress end in *V-r/l/s-V*, where the two final vowels are identical. These forms have thus been analyzed as derived from stems ending in *r, l, or s* via epenthesis of a vowel which copies the quality of the preceding vowel (Mithun and Basri 1986, and for Makassarese, Aronoff, Arsyad, Basri, and Broselow 1987, McCarthy & Prince 1994.) Since Selayarese allows no complex onsets, and allows in coda position only velar nasal and glottal stop (plus word-internally, the first half of a geminate or a nasal followed by a homorganic stop), vowel epenthesis makes it possible to syllabify stem-final *r, l, s*. (See section 2 for discussion of why only *r, l, s*, and not other illegal codas in loans, trigger epenthesis). The epenthetic vowel is apparently invisible for the purposes of stress, giving rise to the antepenultimate stress pattern. This pattern has been described by Alderete (to appear) as the result of a constraint HEAD-DEP, which

forbids the inclusion of epenthetic material in the main stress foot. Thus, while the normal stress pattern involves the building of a bisyllabic trochaic foot aligned with the right edge of the prosodic word (as in *lam{béraŋ}* 'longer', where curly brackets indicate foot boundaries), the foot may be shifted one syllable to the left to avoid including the epenthetic vowel in the main stress foot (as in *{lámbə}rɛ* 'long', with the epenthetic vowel underlined).

Loanword stress provides interesting confirmation of the account of stress-epenthesis interactions sketched above. As expected, antepenultimate stress with final epenthetic vowels is seen in words that contain the final vowel in the Selayarese pronunciation, but not in the corresponding Bahasa Indonesia (BI) form. (Most borrowings in Selayarese come through Bahasa Indonesia, even where the original source is clearly another language).

(4) a. $\sigma\sigma E$: final epenthetic vowel outside stress foot

BI	Sel	Gloss
bótol	bóto <u>l</u> ɔ	'bottle'
árus	áru <u>s</u>	'current'
sénter	sénter <u>e</u>	'flashlight'
kəlás	kála <u>s</u> a	'class'
bərás	béras <u>a</u>	'rice'
kábal	kábala <u>a</u>	'cable'
kikir	kíkiri	'metal file'
kípas	kípasa	'fan'

b. $\sigma\sigma\sigma E$: final epenthetic vowel outside stress foot

bələbás	balábasa	'ruler'
---------	----------	---------

However, loanwords, unlike native vocabulary, motivate the postulation of epenthetic vowels in word-internal positions, as well as in final position. Interestingly, an epenthetic vowel in penultimate position is stressed:

(5) $\sigma E\sigma$: penultimate epenthetic vowel inside stress foot

kártu	kará <u>t</u> u	'card'
súrga	surú <u>g</u> a	'heaven'
cə'rmin	sarám <u>m</u> ɛŋ	'mirror'
bákri	baká <u>r</u> i	proper name
búrhan	burú <u>h</u> aŋ	proper name
rámli	ramá <u>l</u> i	proper name

We might then be tempted to assume that final epenthetic vowels are always invisible for stress, while internal epenthetic vowels are visible. But the forms in (6), which contain both final and medial epenthetic vowels, have penultimate stress, requiring the final epenthetic vowel to be visible:

- (6) $\sigma E \sigma E$: final epenthetic vowel inside stress foot
- | | | |
|--------|----------|------------------|
| sólder | solódéré | 'weld' |
| kárcis | karatísi | 'ticket' |
| tépal | tarapála | 'tarpaulin' |
| tápsir | tapasére | 'interpretation' |

Closer inspection shows that this pattern is just what we would expect, given the generalization that incorporation of epenthetic material in the main stress foot is to be avoided where possible. With medial epenthesis, such avoidance is not an option, and so the normal pattern of a right-aligned foot emerges (Alderete, to appear, discusses a similar pattern, though with left-aligned feet, in the Papuan language Yimas). The following constraints will serve to derive the stress patterns seen above:

(7) Stress Constraints:

- FT BIN(σ), FT TROC: Feet are bisyllabic and trochaic. These constraints are never violated (and therefore will not be illustrated in tableaux).
- ALIGN HEAD-R: No foot may intervene between the most prominent foot and the right edge of a prosodic word.
- PARSE-2: Two adjacent syllables cannot be left unfooted.
- HEAD-DEP: The head foot of a word may not contain an epenthetic vowel (Alderete, to appear prohibits any epenthetic material in head foot).
- ALIGN PWD-R: The right edge of a prosodic word must be aligned with the right edge of a foot.

These constraints will give us the invisibility of a single epenthetic vowel in final position, and the visibility of a single epenthetic vowel in medial position. We first consider trisyllabic forms, in which Head-Dep and Align PWD are the deciding constraints. Because a high ranking constraint requires all feet to be bisyllabic, trisyllabic forms may contain only one stress foot. It is possible to build a bisyllabic foot without incorporating a final epenthetic vowel, as in (8):

(8) /botol/ 'bottle'	ALIGN HEAD	PARSE-2	HEAD-DEP	ALIGN PWD
a. bo {tólo}			*!	
b. {bóto} lo				*

But there is no way to avoid incorporating the medial vowel in (9) in a bisyllabic foot, and therefore, since HEAD-DEP cannot be satisfied, the optimal candidate (9a) is the one that satisfies the lower-ranking ALIGN PWD-R:

(9) /kartu/ 'card'	ALIGN HEAD	PARSE-2	HEAD-DEP	ALIGN PWD
☞ a. ka {rá <u>tu</u> }			*	
b. {ká <u>r</u> a}tu			*	*!

Forms longer than three syllables may contain more than one bisyllabic foot. For quadrisyllables with a final epenthetic vowel, three options are available for satisfying HEAD-DEP. Two of these violate the higher-ranked constraints; making the lefthand foot the head, as in (10a), violates ALIGN HEAD, while footing only the two leftmost syllables, as in (10b), violates PARSE-2. The candidate with antepenultimate stress (10c) wins, since it satisfies these constraints as well as HEAD-DEP, violating only the lowest ranked ALIGN PWD.

(10) /bələbas/ 'ruler'	ALIGN HEAD	PARSE-2	HEAD-DEP	ALIGN PWD
a. {bála} {bas <u>a</u> }	*!			
b. {bála} bas <u>a</u>		*!		*
☞ c. ba {lába} s <u>a</u>				*
d. {bala} {bás <u>a</u> }			*!	

In contrast, satisfaction of HEAD-DEP is impossible in (11), since incorporation of some epenthetic vowel into the head foot is unavoidable. Lower-ranked ALIGN PWD therefore ends up being decisive, choosing the form with penultimate stress. (See Broselow 1999 for the inadequacy of derivational approaches to these data.)

(11) /solder/ 'weld'	ALIGN HEAD	PARSE-2	HEAD-DEP	ALIGN PWD
a. {só <u>l</u> o} {dere}	*!		*	
b. {só <u>l</u> o} der <u>e</u>		*!	*	*
c. so {ló <u>d</u> e} r <u>e</u>			*	*!
☞ d. {sol <u>o</u> } {dé <u>r</u> e}			*	

We now consider both whether the rankings required for the loanwords are consistent with the native vocabulary, and whether the native language vocabulary determines a ranking for these constraints. We have seen that the evidence for epenthesis in native forms comes from anomalous stress, and from the disappearance of final vowels before vowel-initial suffixes. These patterns cannot provide evidence for stem-medial epenthesis, but there is one case in which epenthetic vowels at the ends of stems show up word-medially—before possessive suffixes, which are the only consonant-initial suffixes to attach to stems within a prosodic word (Basri, Broselow, Finer, and Selkirk 97). In this case, the epenthetic vowel appears in penultimate position, and is stressed:

- (12) a. sáhala ‘profit’
 b. sahaláʔna ‘his/her/their profit’
 c. sahaláʔmu ‘your (familiar) profit’

(For the appearance of glottal stop in the possessed forms, see Basri, in preparation). This stress pattern is derived by precisely the constraints and rankings assumed to account for stress in the borrowed forms; an epenthetic vowel in penultimate position cannot be left out of the head foot without violating high ranked constraints, so the choice falls to ALIGN PWD:

(13) /sahal+na/ '3 p's profit'	ALIGN HEAD	PARSE-2	HEAD-DEP	ALIGN PWD
a. {sáha} {l _a ʔna}	*!			
b. {sáha} l _a ʔna		*!		*
c. sa {há l _a ʔ} na			*	*!
d. {saha} {l _a ʔna}			*	

3. Selayarese Coda: Segment Transformation

3.1. Segment Transparency vs. Segment Transformation

We saw above that epenthesis is a response to the illegality of *r, l, s* as Selayarese codas. Since the consonant set of Selayarese includes many more consonants than *r, l, s* and the legal codas velar nasal and glottal stop, why do we find evidence of epenthesis only after *r, l, s*—that is, why are there no native words like hypothetical *kálimi*, *kálutu* (from hypothetical inputs /kalim/, /kalut/)?

One answer to this question with respect to the related dialect Makassarese has been suggested by John McCarthy (McCarthy, to appear), who argues that epenthesis can take place only after 'transparent' consonants. What I will call the Segment Transparency Analysis relies on three assumptions: that epenthesis involves sharing

of vocalic features between the stem vowel and the epenthetic vowel; that all such feature sharing is strictly local (as argued in Gafos 1996), so that any intervening segments must also share the vocalic features; and that *r, l, s* are the only Selayarese consonants able to accept vocalic features. As we saw above, the epenthetic vowel in Selayarese (as in Makassarese) is a copy of the preceding stem vowel, as in *lámberē* 'long', *bótoro* 'gamble'. McCarthy's constraint rankings force epenthetic vowels to acquire their features from some input segment rather than by insertion of some new set of vocalic features:

- (14) Feature Copy vs. Feature Insertion (McCarthy, to appear):
 DEP (VPLACE) >> I-O NOSPREAD VPLACE

For input /*lamber*/, (14) chooses *lámberē* over **lamberi*, for example. To rule out forms like hypothetical stems /*kalim*/ → *kálimi*, /*kalut*/ → *kálutu*, McCarthy assumes, following Gafos & Lombardi (in preparation), that coronal consonants are more likely to accept vocalic features than dorsal or labial consonants, and, following Ito, Mester, and Padgett (1995), that fricatives and sonorants are more likely to accept vocalic features than continuants. The constraints that permit *r, l, s* to acquire secondary vocalic place features, and therefore to allow vowel copy across them, are ranked below those that permit other consonant types to acquire vocalic features. Ranked between these two sets of constraints are those that provide an alternative means of dealing with unsyllabifiable codas, such as deletion of the consonant:

- (15) Transparency of *r, l, s* vs. Other Consonants
 a. *PLACE/LAB, DORS+ VPLACE >> MAX (C) >> *PLACE/CORONAL+VPLACE
 b. NO V-STOP LINK, NO V-NASAL LINK >> MAX (C) >> NO V-FRICATIVE LINK, NO V-LIQUID LINK

For hypothetical inputs /*kalim*/, /*kalut*/, (15a) chooses *káli* over *kálimi*, while (15b) chooses *kálu* over *kálutu*. Because consonant deletion makes the input form opaque, such forms will presumably be reanalyzed as vowel-final.

The loanword data motivate an alternative analysis of why the epenthetic stems in Selayarese end only in *r, l, s*. I will argue that illegal coda segments are transformed into the "closest" legal coda, either glottal stop or velar nasal (where the notion of "closest" is defined by the rankings of language-specific constraints on featural identity). The Segment Transformation Analysis will allow us to account for both the absence of epenthetic roots ending in consonants other than *r, l, s* in the native language vocabulary, and for the transformation of loanwords, which is problematic for the Segment Transparency Analysis.

To see this, we consider consonant-final loans from Bahasa Indonesia (the principal donor to Selayarese), which permits a much wider range of codas, including but not limited to *r, l, s*:

- (16) a. Selayarese consonants: p,t,k,ʔ,b,d,j,g,m,b,nd,ŋj,ŋg,m,n,ɲ,ŋ,s,h,r,l
 Selayarese word-final codas: ʔ,ŋ
 b. BI word-final codas: p,t,k,b,d,g,m,n,ŋ,r,l,s

We have already seen that final *r,l,s* in borrowings from Bahasa Indonesia trigger epenthesis in Selayarese. All other BI final consonants are realized in borrowed words as one of the two acceptable final Selayarese consonants, with all stops realized as glottal stop, and all nasals realized as velar nasal:

- | | | | |
|------|--------|----------|-----------|
| (17) | BI | Sel | |
| a. | atap | ataʔ | 'roof' |
| | adab | adaʔ | 'culture' |
| | aŋkat | aŋkaʔ | 'lift' |
| | ahad | ahaʔ | 'Sunday' |
| | sendok | sondoʔ | 'spoon' |
| b. | jarum | jaruŋ | 'needle' |
| | cəɾmin | sarammeŋ | 'mirror' |
| | baraŋ | baraŋ | 'goods' |

To account for these facts, we need a set of constraints that allow stops and nasals to be transformed to glottal stop and velar nasal, respectively, but do not provide this option for *r,l,s*. As a first approximation, we consider the constraints in (18). (18a) forbids deletion of consonants. (18b,c) define legal codas, prohibiting coronals and labials, as well as any obstruent, in coda position. (18d), mandating faithfulness to input continuancy and nasality, are ranked higher than faithfulness to other features, such as place (18e). Since transformation of *r,l,s* to glottal stop or velar nasal would constitute a violation of (18d), this constraint must outrank the constraints forbidding vowel epenthesis, favoring epenthesis of a vowel after final *r,l,s* over the option of transforming *r,l,s* into either glottal stop or velar nasal.

- (18) a. MAX(C): Each consonant in the input must have an output correspondent (prevents deletion of consonants). This constraint is never violated.
 b. *CODA(COR, LAB): Codas may not contain coronal or labial segments (prevents *r,l,s,p,b,t,d,c,j,m,n,ɲ* from surfacing in coda).
 c. *CODA(OBS): Codas may not contain obstruents (prevents *p,b,t,d,c,j,k,g,s* from surfacing in coda).
 d. IDENT (CONT) and IDENT (NAS): Input and output correspondents must have the same feature specifications for [cont] and [nas] (prevents *r,l,s* from being realized as output ʔ,ŋ).
 e. Other IDENT constraints: Input and output correspondents must have the same feature specifications for all features other than [cont/nas].

To this point, the Segment Transformation Analysis and the Segment Transparency Analysis, while different in spirit, seem empirically indistinguishable. But when we consider loanwords with medial internal clusters, we will begin to see that the two analyses make different predictions. Recall that according to the Transparency Analysis, epenthesis is restricted to *r, l, s* because only these consonants accept vocalic features (due to low ranking of constraints prohibiting linking of vowel place to coronal continuants). Once we broaden our scope to include medial consonants, we find that epenthesis is indeed possible after consonants other than *r, l, s*:

- | | | | |
|------|---------------|------------|---------------------------|
| (19) | BI | Sel | |
| | a. syamsuddin | samasúddin | proper name (*sansuddin) |
| | b. syamsia | samasía | proper name (*sansia) |
| | c. bakri | bakári | 'interpretation' (*ba?ri) |

The internal codas in (19) could be rendered legal by loss of place or obstruency, since *ns* and *ʔr* are legal word-internal sequences (*ansuluʔ* 'get out', *ʔa ʔa ʔa* 'I want'; word-internally, nasals must agree with a following consonant in place). Instead, however, the consonant is licensed by vowel epenthesis. Thus, epenthesis is the preferred strategy for dealing with illegal codas in medial position, but in final position epenthesis is possible only with *r, l, s*. We can account for this asymmetry by assuming the following constraint:

- (20) ALIGN STEM-R: The right edge of the stem must be aligned with the right edge of a syllable (cf. McCarthy and Prince 1994).

ALIGNSTEM-R discourages epenthesis after a stem-final consonant, but is irrelevant for medial codas. This pattern results from ranking DEP (V), the constraint banning epenthesis, below all IDENT constraints, giving the ranking in (21):

- (21) Final Selayarese Ranking:
 Max(C) >> *CODA (COR/LAB/OBS), IDENT (CONT/NAS) >>
 ALIGNSTEM-R >> Other IDENT >> DEP(V)

These rankings will have the desired effects of distinguishing *r, l, s* from 'transformable' segments (stops and nasals), and distinguishing final and medial positions. First consider forms containing a labial nasal in final position (22) and in medial position (23):

(22) /jarum/ 'needle'	*CODA (COR/LAB/OBS)	IDENT (CONT/NAS)	ALIGN STEM	OTHER IDENT	DEP(V)
a. jarum	*!				
☞ b. jaruŋ				*	
c. jarumu			*!		*

(23) /syamsuddin/ proper name	*CODA (COR/LAB/OBS)	IDENT (CONT/NAS)	ALIGN STEM	OTHER IDENT	DEP(V)
a. samsu...	*!				
b. sansu...				*!	
☞ c. samasu...					*

The ranking ALIGNSTEM-R >> IDENTPLACE favors transformation of labial nasal to velar nasal in final position. But with a medial nasal, where ALIGNSTEM-R is irrelevant, the ranking IDENTPLACE >> DEP(V) favors epenthesis over change of place. In contrast, both final and medial *r, l, s* trigger epenthesis, because neither can be transformed into a legal coda without violating identity constraints that outrank ALIGNSTEM-R and DEP(V):

(24) /botol/ 'bottle'	*CODA (COR/LAB/OBS)	IDENT (CONT/NAS)	ALIGN STEM	OTHER IDENT	DEP(V)
a. botol	*!				
b. botoʔ		*!			
☞ c. botolo			*		*

(25) /surga/ 'heaven'	*CODA (COR/LAB/OBS)	IDENT (CONT/NAS)	ALIGN STEM	OTHER IDENT	DEP(V)
a. surga	*!				
b. suʔga		*!			
☞ c. suruga					*

To summarize the analysis to date, epenthesis is the generally preferred strategy, but ALIGNSTEM-R disfavors epenthesis in final position. Word-finally, epenthesis is the last resort, used only for those segments (*r, l, s*) for which no substitute matching the input in continuancy and nasality is available. It would be difficult for a Transparency Analysis to account for this positional asymmetry, since in the Transparency Analysis, epenthesis is blocked just when the intervening consonant cannot accept vocalic features. It is not clear why consonants in stem-final position should be less willing to accept vocalic features than those in stem-medial position.

The analysis developed above receives additional confirmation from subminimal loans. All Selayarese words contain at least two syllables (an effect of the high ranking requirement that feet be bisyllabic), and monosyllabic borrowed words are augmented by the addition of an additional syllable. For borrowed words ending in *r* or *l*, we see the familiar copy vowel epenthesis (the epenthetic vowel in monosyllabic *s*-final BI loans is always high, a fact for which I have no explanation):

(26)	gol	gólo	'ball'
	pil	péle	'pill'
	per	pére	'metal spring'
	gas	gasi	'gas'

Borrowed monosyllables ending in nasals do not, however, take final epenthesis; rather, the final nasal is changed to velar nasal, and a copy of the stem vowel is inserted internally, with a glottal stop separating the two identical vowels:

(27)	bom	bóʔoŋ	'bomb'
	ban	báʔaŋ	'tire'
	seŋ	séʔeŋ	'corrugated iron used on roof'

At first glance, this looks like evidence for the Transparency Analysis; if epenthesis with vowel copy is possible across *r, l* but not across a nasal, the vowel cannot be inserted after a nasal. Presumably, glottal stop accepts vocalic features (consistent with the fact that vowel copy across glottal stop is widely attested), motivating the internal insertion of a copy vowel and a glottal stop. However, this analysis does not hold up when we consider BI monosyllables ending in a stop:

(28)	sop	sóʔoʔ	'kind of soup'
	cet	céʔeʔ	'paint'
	pak	páʔaʔ	'pack (of cigarettes, etc.)'

In these cases, as in the nasal-final forms, the final consonant is transformed to a legal Selayarese coda, and glottal stop and copy vowel are inserted internally, bringing the forms up to the bisyllabic minimum. This poses a problem for a

Transparency account: the Transparency Analysis provides no explanation of why /sop/ surfaces as *soʔoʔ*, rather than **soʔo*, which satisfies both the bisyllabic minimality constraint and constraints on copy across transparent consonants.

The behavior of the subminimal forms is entirely consistent, however, with the Segment Transformation Analysis developed above. ALIGNSTEM-R requires the stem-final consonant to remain in syllable-final position. When the consonant can be transformed to a coda-legal substitute, the augmentation of the monosyllabic stem is accomplished by internal vowel epenthesis (and with addition of a glottal stop, which is generally inserted between identical vowels in Selayarese native vocabulary: *toa* 'old' + *aŋ* (comparative) => *toa ʔaŋ* 'older'). Tableaux (29-31) illustrate the effect of our constraint system on forms ending in *l*, nasal, and stop; input forms correspond to output forms bearing the same subscript:

(29) /go _l / 'ball'	*CODA (COR/LAB /OBS)	IDENT (CONT /NAS)	ALIGN STEM-R	OTHER IDENT	DEP(V)
☞ a. golo			*		*
b. goʔol	*!				*
c. goʔoʔ ₃		*!		*	*

(30) /bom ₃ / 'bomb'	*CODA (COR/LAB /OBS)	IDENT (CONT /NAS)	ALIGN STEM	OTHER IDENT	DEP(V)
a. bomo			*!		*
b. boʔom	*!				*
☞ c. boʔoŋ ₃				*	*

(31) /sop ₃ / 'kind of soup'	*CODA (COR/LAB /OBS)	IDENT (CONT /NAS)	ALIGN STEM	OTHER IDENT	DEP(V)
a. sopo			*!		*
b. soʔop	*!				*
☞ c. soʔoʔ ₃				*	*

As (32) illustrates, a Transparency Analysis of these facts will fail: these constraints choose (32d), indicated by the black hand, while the unhappy-faced candidate (32c) is the actual output:

(32) /sop ₃ / 'kind of soup'	CODA	NO V-STOP LINK	OTHER IDENT	DEP (C)
a. sopo		*!		
b. soʔop	*!			
⊗ c. soʔoʔ ₃			*	*!
☛ d. soʔ ₃ o			*	

And even augmented with ALIGNSTEM, the Transparency Analysis cannot account for the asymmetry of medial and final positions, wrongly choosing (33c) as optimal:

(33) /syamsuddin/ 'proper name'	CODA	ALIGN STEM	NO V-NASAL LINK	OTHER IDENT
a. samsu	*!			
⊗ b. sam <u>a</u> su			*!	
☛ c. sansu				*

(34) /jarum/ 'needle'				
a. jarum	*!			
b. jarum <u>u</u>		*!	*	
☛ c. jaruŋ				

Thus, the loanword data support an analysis in which segments of the donor language that are illegal in particular positions in Selayarese are transformed to the closest native language segment, where "closest" is defined by language-particular rankings of constraints on individual aspects of featural identity.

3.2. Constraint rankings

The analysis developed above accounts not only for the puzzling gap in the inventory of native language stems (that is, the absence of any of the numerous proscribed codas other than *r, l, s* in stem-final position), but also for the transformation of final consonants in loanwords. The question we now confront is whether the crucial rankings that allowed us to account for the loanword data are motivated by the data from the native language. This question points out one of the very interesting ways in which the study of loan phonology can potentially illuminate our understanding of the language faculty. Let us consider the situation in which, as in Selayarese, the transformation of loanwords is quite systematic (this contrasts with the situation described by Ross (1996), who argues that variation in the pronunciation of loanwords in Tagalog is due to variation in the rankings of various constraints, because the native vocabulary of Tagalog underdetermines their rankings). If we find speakers behaving in a way that is consistent only with a particular constraint ranking, it is possible that the rankings required to account for systematic transformation of loanwords are those of the initial, default-state grammar.

In Selayarese, at least some of the rankings needed to account for the loanword segment transformations are indeed determined by the native language data. Evidence for low ranking of IDENT (DORS) comes from the pervasive assimilation of nasals to following consonants:

- | | | |
|------|----------|---|
| (35) | gontin | 'scissors' |
| | gontinta | 'your (honorific)/our (inclusive) scissors' |
| | gontimba | 'our (exclusive) scissors' |

Change of place in the nasal is clearly preferred to epenthesis of a vowel or deletion of the consonant as strategies for implementing requirements on codas (here, that nasal codas share place with a following consonant). The forms in (35) are consistent with the ranking IDENT(NAS/SON) >> ALIGNSTEM-R >> IDENT (PLACE) >> DEP (V), since the velar nasal's stem-final position makes it resistant to epenthesis. However, the native language data is not sufficient to fully motivate this particular ranking. The ranking is designed to account for the asymmetric behavior of illegal codas in medial and final position, and the native language presents no clear evidence for such asymmetry, since it presents no clear evidence for stem-internal epenthesis (recall that as we saw in section 2, once epenthesis has taken place stem-internally, no evidence remains to point to the status of the epenthetic vowel as different in any way from an underlying vowel). How then, do speakers arrive at this ranking? Three possible explanations suggest themselves: that a more complete analysis of the language will turn up evidence for these rankings solely from native language data; that loanwords are pervasive enough in this speech community to count as primary evidence determining the shape of the grammar; or that these rankings are the default, and therefore should be found in the early grammars of children from various

speech communities. A choice among these alternatives must depend on fuller analysis of not only the phonology but also the sociolinguistics of this speech community.

Notes

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Problems in studying loans

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Borrowing raises at least four major problems: delimitation of corpus, nomenclature, "quality" of items, and antedating and etymology. Delimitation is complicated by the fact that **loans**, a rubric term for **loanwords** and various kinds of **translation**, are essentially unlimited. That is, the total loans from one language into another include huge numbers of biographical or geographical terms which belong in encyclopedias and atlases rather than in the lexicon.

In updating my dictionary of Arabic loans in English (1994a, 1997, 1998a), I rechecked the first complete English translation of the Koran, which Alexander Ross rendered in 1649 from the French version in that same year. The French version employs many transliterations and translations. Ross, who acknowledged that he did not know Arabic, introduced several of the items into English via French, as in his Arabic *kitab* 'book'. When I checked the Arabic text, as elaborated in George Sale's notes to his 1734 English translation directly from the Arabic, it was clear that Muhammad believed in the Arab classes of benevolent or malevolent spirits with supernatural powers said to inhabit the earth. Presumably not knowing the Arabic names *jann*, *shaitan*, *efreet*, *Marid*, and *jinn*, Ross used bland English words like *spirit* and *devil*. However, since these names appear in subsequent English versions of the Koran and in some recent unabridged dictionaries, though in few of the space-restricted college dictionaries, they remain in my Arabic corpus.

E. J. Brill's ongoing new edition of *The encyclopaedia of Islam* (1960-) and English concordances to the Koran could add thousands of obscure religious words that belong in any English corpus of Islamic loans. But their exclusion from nonencyclopedic dictionaries indicates that they would skew a general corpus. Similarly, a corpus concerned with Persian rugs could gain 73 specialized loans from the index alone of Ford's *The Oriental carpet* (1981:348). To prevent such dilution, any item not recorded in standard dictionaries, which are the usual source for a general corpus, should be rejected. Oral forms can be ephemeral, have rare variants, and lack attested currency.

Modern readers demand more and more encyclopedic-type words in their dictionaries, particularly the unabridged ones. Needing a larger vocabulary to compete with *Webster's third new international dictionary of the English language* (W3, 1961), the first edition of the *Random House dictionary of the English language* (1966) uniquely included 30 items denoting Japanese swords and sword fittings. My reasoning was that the words' appearance in this modern, generally currency-based collection could outweigh the fact that almost all were found only in Gunsaulus' specialized monograph (1923). Though they were excluded from Random House's second edition in 1987, I accepted them in my dictionary of Japanese loans (1996:65-6), and thereby falsely elevated the category of Swords to the seventh highest among the 40 semantic categories comprising the 1,425 loans. Recent reconsideration of the technical usage of the 30 rare items and their recording solely in an encyclopedic-

type dictionary led me to delete them and thus drop the Swords category to its proper low ranking among the Japanese cultural aspects lexically represented in English.

The subtitle of the famous *Century dictionary: An encyclopedic lexicon of the English language* (1889-91) suggests the unique inclusions that somewhat disqualify it as a general source. The name of the Iranian president, Muhammad Khatami, is likely now being added to comparable new collections, especially in view of his call for a people-to-people dialogue with Americans that could end the U.S. effort to isolate Iran. By ultimately substantially reducing the flow of Farsi words into English, this effort demonstrates that politics can affect language contacts in once mutually beneficial situations (Cannon 1998c). Names like *Khatami* in the sense of 'current Iranian president' and *Tehran* as 'Iranian capitol' do not belong in a general corpus. *Mao flu* or names like *Nehru* and *Mao* 'a kind of coat' do throw light on neology by exhibiting semantic shifts motivated by English speakers' observation of the coat that these two Asians wore. But as these leaders did not call the coats by their own names, there was no lexical transfer; such words are not loans.

Proper nouns should not automatically be rejected (Mufwene 1988). An encyclopedic-type dictionary records some names that belong in a general corpus, because they provide information about dating, currency, word-formation, and inflections. The preface to *Webster's new international dictionary of the English language* (W1, 1909:vi) describes Merriam-Webster's innovative "pearl" section, containing "various minor words, foreign words and phrases, abbreviations", mere variants, and "less-common and less looked-for terms" in narrow columns and small type on every page. An effort was made to place the purely geographical and biographical terms in a gazetteer and pronouncing biographical dictionary (pp. 2375-2545). *Webster's second* (W2, 1934) reduced the number of pearl items.

Then, especially to save space, W3 adopted the principle of the *Oxford English dictionary* (OED, 1933), by excluding encyclopedic-type terms and, unfortunately, the pearl section, which permits one to track such items. Of the 132 loans in my 1994 Arabic corpus not recorded in the OED and/or *Webster's tenth* (1993), the fact that only 23 were not originally pearls validates the OED's principle. W1 is the earliest record of 76 of these, of which 68 were pearls (Cannon 1998a:108). Nine lacked the currency to continue in W2 even as pearls, but were admitted to W3. Italian *melongene* 'eggplant' and Ar. *Liḥyanite* 'an ancient Semitic language' were validated by inclusion in the second edition of the OED (OED2, 1989). Spanish *almaciga* 'Philippine timber tree' and German *zwetschgenwasser* 'plum brandy' began as pearls in W1, but became regular entries in W2 and W3. Ar. *Kitalpha* 'a star in Equuleus' experienced the reverse, because, after gaining regular status in W2, it was excluded from W3. Such evidence about "first" dates and currency led me to reduce my Arabic corpus by 191 encyclopedic items found only in the unabridged dictionaries that accept such terms (Cannon 1998a:119).

Some otherwise encyclopedic entries contain information about derivation

and pluralization. Though rejecting the Sassanian name *Yezdegird III*, I accepted its adjectival form because of the *-ian* suffix, which exhibits a common derivational pattern. The simultaneous 1954 transfer of both *Chicana* and *Chicano* preserves the Spanish gender-differentiation. Loans like *Chicanismo* and *Sandinista* (but not **Chicanism* and **Sandinist*) and *Fidelist* - *Fidelista* give insight into the loss or retention of borrowed bound forms. W3 eschews the noun form of purely geographical names, but records the usually unchanged adjectival form. Some of these functional shifts are acceptable when they reveal contrasts, as in *Tehran* 'in the manner of Tehran etc.', vs. the also recorded noun *Tehrani* 'Iranian inhabitant', which pluralizes with *-s*.

Common derivatives like *Chinese* and *Japanese* also merit inclusion to show that they take a zero plural. Inflections are seldom borrowed. Yet the many loans from English into High German since World War II have evidently completed the standardizing of the borrowed *-s* plural alongside the historical G. *-Ø*, *-e*, *-er*, and *-(e)n*, which had been initiated by Low German and French loans. Thus *der Account Executive* takes *-s*; and *die Ability*, *-ies*. And many of the large number of abbreviations from English have not received a German article, mainly for international precision and economy. That is, does G. *die USA* convey the same meaning as G. *USA*? Transfers like the article-less *Aids* have considerably expanded the number of German nouns exhibiting the continued leveling of grammatical gender (Pfeffer and Cannon forthcoming, Carstensen 1993-96, Wennrich 1976-80).

Nomenclature, the second problem, can be approached by updating Haugen's article (1950) and Deroy's book (1980), though the great variety of loans in the world's languages precludes a wholly empirical classification. As said, **loans** consist of loanwords and various types of translation. The term *loanword* is itself a loanword, naturalized from the German compound *Lehnwort* to fit English phonetic and graphemic patterns. Loanwords are usually introduced in one of three major types, based on the degree of differences between the etymon and features in the target language. First, the only change is in any needed pronunciation and transliteration. Thus in recent transfers like It. *Gran Turismo*, Japanese *yakuza* 'a Japanese gangster', Malay *ringgit* 'Malaysian monetary unit', and Sp. *numero uno* (see Cannon 1987:69-97), bilinguals have influenced the preserving of some native phonetic features. **Adaptation**, the second type, involves relatively minor formal change. It ranges from the loss only of the German initial capital letter, as in changing the plural forms of *Auge* 'eye' and *Griebe* 'goose crackling' to *augen* and *griebe*. Almost as straightforward are the adapting of G. *Aktivismus* 'a philosophical theory' to *activism* (chiefly clipping the terminal syllable and anglicizing the *k* to *c*), and the respelling of the *k* and *ie* in G. *Laparoskopie* as *laparoscopy* 'visual examination of the peritoneum' (see Pfeffer and Cannon 1994:119-22). **Alteration**, the third type, can extend into a gray area, where the change is nearly large enough to constitute a translation. For example, the bilingual's pronunciation of *-wort* with a /v-/ is

outweighed by the majority, monolingual reader's word, with a respelling also of *Lehn* to give a good translation of the German etymon. Within these three types of change, loanwords may undergo initial, medial, and/or terminal **clipping**, either at the time of transfer or in later productivity, as in *Taj* from Urdu *Taj Mahal* (< Per., lit. 'distinguished place'), and *Mir* 'a fine Saraband rug' from the Persian place-name *Mirabad*. **Expansion**, the reverse, is often motivated by the addition of a terminal noun to redundantly explain the foreign element, as in *chenar tree*, *afghani rupee*, and *Shiraz lamb*.

The three major types of translation also belong in a loan corpus because they entail contact with the lending language, when there is no possibility of independent coinage semantically uninfluenced by another language. A **loan translation** may be the trickiest, even when one can prove that the putative source sufficiently antedates its would-be rendering. While items like E. *as if* (< G. *als ob*) are fairly straightforward, Fr. *la Sublime Porte* might have been a French speaker's spontaneous creation upon seeing the majestic gate. This phrase is usually analyzed as a loan translation of Turkish *Babiali* 'the Sublime Gate' (< Per. < Ar. *Bab* 'gate'). If Fr. *la Porte* was the transfer of only part of the Turkish source, it was a **partial translation**, rather than a later French clipping of the originally full translation. When English took Fr. *Porte* as a loanword, the otherwise impressive French structural equivalence was lost. In recent decades English has been borrowing both the loan translation and its source at roughly the same time: Chinese (*wallposter*, *dazibao*), French (*black comedy*, *comédie noire*), German (*guest worker*, *Gastarbeiter*), Spanish (*refried beans*, *frijoles refritos*), etc. (cf. *Sasquatch* < Salish *se'xsač* 'wild men' c. 1929 vs. *Bigfoot* in 1962 - see Cannon 1994b:49). The third type, **expanded translation**, can pose problems. Was *tower of silence* created by simultaneously adding the prepositional phrase *of silence* terminally to the translated Per. *dakhma* 'tower'? Or did an early English speaker coin the entire phrase, *tower of silence*, upon seeing the distant Malabar towers eerily disturbed only by the carrion birds?

Two old philological terms can be useful. **Hybrid** can diachronically characterize the German source of E. *Autobahn*, borrowed from the German compounding of the clipped Fr. *automobile* and G. *Bahn*. **Graeco-Latin terms** are often viewed as being outside the lexicon. These usually originally technical compounds or derivatives, coined from classical elements, may contain few or even no features of the neologizers' language, in systematically characterizing the object named. A dubious, still unaccepted synonym is *International Scientific Vocabulary* (ISV), which Philip Gove introduced in W3 for items whose "language of origin is not positively ascertainable but they are known to be current in at least one language other than English" (p. 7a).

Moeritherium (1902), etymologized in W3 and OED2 as New Latin, will illustrate. OED2's all-German citation guided Pfeffer and me (1994:xxvii) to the 1901 *Verhandlungen* of the Fifth International Zoological Congresses (v:528). The

archaeologist Sir William Andrews named this extinct proboscidean mammal, in his German paper presented there. Compounded from Gk. *Moíros* 'the name of an Egyptian lake' and *thērion* 'wild beast', *Moeritherium* employs no special features from German or English. Yet, like many other polysyllabic words created for a technical international audience, it has moved from restricted usage into the general language and now appears in college dictionaries. Inasmuch as Greek and Latin have provided a word-horde of elements for English, German, Italian, French, Arabic, etc., the artificial origin of such items with a more general currency makes them a special type of loan. Görlach (1996) criticized Pfeffer-Cannon's 1994 German corpus for accepting some Graeco-Latin terms. However, ours have considerable usage and usually contain German features. *G. der Aktograph* 'a device that records experimental animals' movements' has a gender-marking article and a capitalized first letter, requiring change for borrowing into English and other languages. Though English dropped the masculine *der* when transferring *actograph*, languages often retain the article, as the Romance languages have done with Ar. *al*. Portuguese *albacora* 'albacore' did so in taking Ar. *al-bakūrah*, as did English when taking the mediated Portuguese form and recent direct loans like *Al Fatah*. Many ultimately Arabic items in English like *alchemy* and *algebra* retain the *al* (Cannon 1994:119-34). An English speaker who buys *rotenone* 'insecticide' or *Dekontaminol* 'graffiti-remover' probably neither knows nor cares that these mixtures were created and specially named by a Japanese and a German speaker, respectively, from non-English elements. Word-formation categories like abbreviations include huge numbers of items coined for special purposes (Cannon 1989, 1998b:21-3).

The concept of special types raises the third problem, the "quality" of loans. Of course, no loan is abstractly inferior or superior to any other. The appropriate, major criticism of the dictionaries of German, Arabic, and Japanese loans was the rarity of many items, by comparison with high-frequency ones like *biology*, *statistics*, *alcohol*, *Arab*, and *soy*. Actually, I first relied on the old German tripartite scale of *Gastwort*, *Fremdwort*, and *Lehnwort*, emending it with the *naturals*, *denizens*, *aliens*, and *casuals* jocularly advanced by OED1, which recognized that three levels were insufficient. The need to include translated items in a loan corpus and resolve other inadequacies eventuated in my somewhat fluid four-degree scale, numbered 1-4, as partly determined by the four general levels found in a 368-item Malaysian corpus. With a primary base of productivity and currency, the assignment of a given degree to a word is chiefly determined by the word's admission to current editions of the eight constantly updated college dictionaries (listed in the References). The scale was first applied to the Malay loans (1992:137) and successively refined for the German and later collections. It is readily adaptable to measure the currency of nonloans as well.

Some Turkish loans will illustrate. After 24 encyclopedic terms like *charik* 'rawhide sandal' (found only in W2) are excluded, the extremes are easily

recognizable. New loans or older, seldom-used items normally requiring glosses and/or special punctuation like italics or quotation marks receive a [1], whereas fully naturalized loans receive a [4] (Cannon 1997:178, Pfeffer and Cannon 1994:xxxiii). The obsolete *Mussulmanlik* 'Islam' is a [1] because it appears only in a 1625 citation in OED2. By contrast, *jackal* is not only in OED2, but also in the unabridged dictionaries and all eight college ones. It has been functionally shifted to an adjective and a verb, has produced the compound *jackal buzzard* and the adjective *jackalled*, and has developed three additional senses since its 1603 transfer denoting a kind of wild dog. While some Turkish items with a [4] are household words, all lack the high currency and productivity of old loans like *sultan* (as in the name *Sultan of Swat* given to Babe Ruth), *desk*, and *art*, which occupy the top layer of [4]. But, as is normal for lexical transfers, even these three words experienced decades of usage in rising from the introductory degree of [1], unlike the remarkable, near-instantaneous [4] merited by a few recent loans into English like Ar. *intifada* and Russian *perestroika*. Even if a higher degree is reached, the currency can change. Various items in Burchfield's *Supplement* to OED1 (1972-86) demonstrate that their widespread usage during the Renaissance has sagged to a [1] or [2] in modern times.

Most of the 291 collected Turkish loans (Cannon 1999) merit only a [2], such as *araba* 'wheeled carriage'. Like *Mussulmanlik*, it has been unproductive since its 1845 introduction. However, wider usage gained its admission to the OED, W1/2/3, and other unabridged collections, but to only one college dictionary. The verb *chouse* receives a [3] primarily by virtue of its acceptance in all the unabridged dictionaries and four college ones, but without semantic extension since its borrowing in 1659 as a restricted item (slang and chiefly British) denoting a cheat or trick. Unlike *araba*, *chouse* later provided forms like *choused* and *chousing* and a functional shift to a noun.

If a historical record like OED2 reliably dates a loan, and if there is adequate time between its original transfer and its productive forms, assignment to this naturalization scale is relatively simple. Reliable dates are necessary to prove that there has been any translation, development of extended senses, functional shift, compounding, derivation, and/or clipping (Pfeffer and Cannon 1994:119-20). For example, English borrowed the German spelling *Kaffeeklatsch* in 1888. Was the E. *coffee klat(s)ch* five years later a partial translation of a **reborrowing**, which would entail a new exposure to the German source and thus require a tabulation of two loans rather than one? Or was it a routine alteration or adaptation of the 1888 transfer? Was the *klat(s)ch* of 1953 a modern clipping of the 1888 transfer or of a reborrowed etymon? Such perhaps trivial details can determine the precision of an etymology in unabridged dictionaries.

If reborrowing cannot be demonstrated by much later exposure to the original source in an unchanged sense and form, the new occurrence should probably be considered as a **revival**, which itself can be a century or so later. If an altered

meaning is still sufficiently related to the original one possibly to be a semantic extension, reborrowing is difficult to prove. Thus the old Urdu *shalwar-kameez* 'women's loose-fitting trousers and long tunic' was first used in English by colonial residents on the Indian subcontinent. After a long hiatus, the word reappeared in 1955 with roughly the same sense, except that this attire is worn by Western rather than Asian women. As for linguistic productivity, English received the verb *plunder* from G. *plündern* by 1632; was there adequate time for the English noun usage in 1643 to be a functional shift rather than a borrowing of the German noun *plünder*? G. *Allergin* was transferred as *allergen* in 1910; was the E. *allergy* of 1911 from G. *Allergie* or a derivative of E. *allergen*?

Description can be further complicated by antedating and etymology, the fourth problem. Dates are again critical, especially in a **mediated** transfer. The editors of the third edition of the OED estimate that they have antedated a fourth of the subsenses of words ("OED3: An overview" 1997). Concordances for successively translated works like the Koran and the Bible can mislead, as in several supposed occurrences of the Turkish *jackals* in the King James Version, but which actually did not appear until the modern replacement of the original *dragons* conveying the "jackals" meaning. OED2's earliest record of *inshallah* is 1857, with citations as recent as 1971. But as 1857 is greatly antedated by Gothard Arthus' *Dialogues in the English and Malaiane languages* (London, 1614:2), Malay was technically the original source for this religious word in English, with Arabic remaining the chief source. The same is true for some other religious words mediated by non-Arabic. The earliest OED2 record may contextually identify the transmitting language, but an antedated context can correct that standard etymology (Cannon 1998a), as when both English and Persian borrowed Ar. *shūrā* 'religious consultation'. After Afghan Persian extended the meaning to include the Afghan parliament, both Arabic and English borrowed this Afghan sense. Each thereby has two senses from the same ultimate source, and the English senses require two dictionary entries so as not to suggest semantic extension of the original transfer from Arabic.

French, Spanish, and Portuguese transmitted numerous Arabic and Persian items to other languages. In historically language-mixed areas like the Middle East and Central Asia, it can be impossible to distinguish among Persian, Turkish, Arabic, and Hebrew as the major and especially the first known source of some loans. Zenker (1866-76) records various near-identical sets of loans. Most Islamic senses originated in Arabic, just as the Talmudic senses came from Hebrew; but the Semitic cognate words for the two may be quite similar. This huge subject permits only the generalization here that at least unabridged dictionaries should attempt to specify the earliest source, even if it is later eclipsed by another language. E. *choppstickes* was a 1615 translation of Jp. *hashi*--in 1894 Lafcadio Hearn wrote of "hashi (chopsticks)". But actually, this was submerged after 1699 by the dialectal Chinese form, which provided the *cho/chaku* for the Sino-Japanese reading of the Japanese character for

chopsticks, and then became the chief conveyor of *chopsticks* to English (Cannon 1996:104). An item may name a ubiquitous thing and thereby become a kind of lingua-franca term. Revealing studies can be made of the worldwide representations of *orange* (ult. < Dravidian), *algebra* (ult. < Arabic), etc.

So a loan can have a direct, single/multiple, and/or mediated transmission. When a mediated form differs substantively from its etymon, it becomes a **distant loan**—e.g., the many hybrids that Ar. *qahwah* ‘coffee’ has motivated, such as the several phrases like *café au lait* that French created and gave to English. If a Spanish dictionary, say, does not specify the distant Arabic source in etymologizing *café con leche*, it may imply that *café* is natively Spanish. Similarly, the addition of the Swahili *ki-* prefix and other changes obscure the distant Ar. *nūr* ‘light’ in *kinara* ‘Kwanza candle holder’, though not in *Kiswahili*. In the English borrowing of Ar. *Iblis* ‘devil, chief of the wicked jinn’, the Arabic dropping of the original /d-/ in Gk. *diābolos* has shrouded that distant Greek etymon of Ar. *Iblis*. *Diābolos* is not the source of E. *Iblis*; Arabic is.

Numbers of Japanese neologisms taken into English are etymologically troublesome for a different reason. As long as an item constructed wholly from English elements is not borrowed by English, the etymology presents no difficulty, as in the Japanese alteration of *mass communication* to *masū-komyunikēshon*, which, of course, was not needed in English. But after Japanese blended E. *camera* and *tape recorder* into Jp. *kamukōdā*, to name an original Sony product that was quickly exported to the world, *camcorder* came into English as an instantaneously naturalized loanword exemplifying English patterns, with an immediate currency of [4]. A lexicographer who does not know the Japanese source is unlikely to suspect that loans like *camcorder*, *AutoCut VCR*, *glocal*, *multivalve engine*, and *Walkman* are not native English (Cannon 1995). The non-Asian context and immediate loss of the Japanese phonetic features have led some dictionaries to misetymologize probable calques like *high/low profile* (< *kō-shisei* ‘high posture’ and *tei-shisei*).

In summary, a general model is needed for studies of loans. A refined model utilizing principles like those sketched here might help to resolve the four major problems and permit more incisive comparisons among languages and language families. My data from Chinese (1988) and some other languages show that they are receptive to lexical borrowing (see Décsy’s 1973 scale for levels of receptivity). These data offer comparative information on semantic fields, degree of naturalization, word-formation, variant forms, percentages of form-classes, productivity, chronology and rate of inflow, and other aspects. French, Japanese, German, and Spanish, in that order, seem to be the leading lenders to English since 1961 (1998b:41). Such data from languages in contact show how the cultures represented have impacted and continue to influence each other. The widening linguistic interaction may be moving us all closer to a world citizenship.

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The combinatory properties of Halkomelem lexical suffixes

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0. Halkomelem lexical suffixes

This paper is part of on-going research into the morphosyntactic structure of lexical suffixes. I explore some properties of lexical suffixes in Halkomelem, one of twenty-three Salishan languages. Halkomelem is spoken in southwestern British Columbia in the vicinity of Vancouver and on the east coast of Vancouver Island. The data are from the Island dialect of Halkomelem (*həlqəmínəm*). This dialect is currently spoken by around two hundred elders.¹

Lexical suffixes are suffixes that have substantival meaning. That is, they have meanings usually carried by nouns in other languages. Lexical suffixes usually bear no phonological similarity to free-standing nouns of similar meaning.²

(1)	-as	'face, round object'	s'aθəs	'face'
	-cəs	'hand, finger'	celəš	'hand'
	-šən	'foot, leg'	sʰə́nə	'foot'
	-wıl	'rib, vessel'	ləwə́x	'rib'
	-θən	'mouth, edge'	θaθən	'mouth'
	-əwtx ^w	'building, room'	lelə́m	'house'
	-əyə́ł	'baby, child'	qe q	'baby'

Most Salishan languages have approximately one hundred lexical suffixes denoting body parts (*hand, foot, heart, nose*), basic physical/environmental concepts (*earth, fire, water, wind, tree, rock*), cultural items (*canoe, net, house, clothing*), and human/relational terms (*people, spouse, child*). The suffixes, especially the body part suffixes, extend to take on shape, locative, and relational meanings (Hinkson 1999) and some are grammaticized into grammatical morphemes functioning as desideratives, applicatives, etc. (Gerds and Hinkson 1996).

One common use of lexical suffixes is to form compounds. The suffix is added to a verb or noun root to form a noun, as seen in (2).³

(2)	ʔi wəyə́ł-əwtx ^w	'church' (pray + building)
	ʔitət-əl wət	'pajamas' (sleep + clothing)
	təm ə́ł-əpsəm	'woodpecker' (ochre + neck)
	q'leý-šən	'shoe' (log + foot)

Lexical suffixes also frequently appear in verb phrases. Here they can play the role of an oblique nominal adding a locative or manner meaning to the verb phrase, as illustrated in (3).

- (3)
- | | |
|-----------|--|
| q̣t-aθən | 'walk along (a shore etc.)' (go along + mouth) |
| q̣ət-néc | 'go around end of lake' (go along + bottom) |
| q̣a-šin-t | 'accompany him' (accompany + foot + transitive) |
| q̣p-as-əm | 'assemble, gather face to face' (gather + face + middle) |

The commonly accepted view of lexical suffixation is that it does not alter core argument structure, as noun incorporation does, but rather it adds an adverbial or adjectival specification to the stem. For example, Anderson (1992) and Bach (1995) make this claim for the neighboring Wakashan languages. In this paper, I present evidence that runs counter to this view of lexical suffixation. I claim instead that lexical suffixes can in fact occupy argument positions in initial structure. That is, they are exactly parallel to incorporated nouns, which are attested in many languages of the world.

First, note that lexical suffixes frequently appear in verb phrases carrying the role of theme, as in (4); in my corpus this use is more common than that in (3).

- (4)
- | | |
|-------------------------------------|--|
| q ^w s-eýən | 'set a net' (throw out + net) |
| səwq-iws | 'search for a lost person' (seek + body) |
| ləc-əlqən | 'shear wool' (cut + hair) |
| p ¹⁰ -əlməx ^w | 'milk a cow' (wring out + breast) |

In this use, lexical suffixation is functionally parallel to compounding noun incorporation (Rosen 1989, Gerdtz 1998). The lexical suffixation of the theme detransitivizes the clause. This can be seen by comparing the form with the lexical suffix in (5) to the clause with a free standing nominal in (6).

- (5)
- | | | |
|-----------------|-------------------------|----------|
| ni [?] | šk ^w -əyəl | lə Mary. |
| aux | bathe-baby | det Mary |
| | 'Mary bathed the baby.' | |
- (6)
- | | | | |
|-----------------|------------------------------------|------------------------------|----------|
| ni [?] | ša ^k -ət-əs | lə sleni [?] /*Mary | lə qeq. |
| aux | bathe-tr-3erg | det woman/*Mary | det baby |
| | 'The woman/*Mary bathed the baby.' | | |

The clause in (6) is transitive and thus has a transitive suffix and ergative agreement while (5) lacks these. Furthermore, proper noun ergatives are prohibited by many speakers of Island Halkomelem, as seen in (6). But note that *Mary* in (5) is not subject to this prohibition; it is an absolutive nominal due to the lexical suffixation of the object.

This paper seeks to give further evidence that the lexical suffix is an argument in underlying structure, based on the combinatory properties of lexical suffixes. As seen in the basic verb template given in (7), lexical suffixes occur in position 1, following the verb root.

(7)	-1	0	+1	+2	+3	+4
	prefixes	root +aspect	applicative suffixes; lexical suffixes	transitivity suffixes	object suffixes; reflexive suffixes; reciprocal suffix	subject suffixes

This paper discusses three combinations of lexical suffixes with other suffixes. First, I discuss the combination of lexical suffixes with other position 1 suffixes, the applicatives. Then I discuss lexical suffixes and causative, a position 2 suffix. Finally, I discuss lexical suffixes and reflexive, a position 3 suffix.

1. Lexical suffixes and applicatives

First, let us see how lexical suffixes interact with applicative constructions. Halkomelem has several applicative constructions, as discussed in Gerdts (1988). The benefactive applicative is illustrated in (8).

- (8) niʔ q̣ʷəl-əlc-θámš-əs ʔə kʷθə sce:ltən.
 aux bake-ben-tr+lobj-3erg obl det salmon
 'He baked the salmon for me.'

The suffix -əlc- is added to the verb root, the benefactive is the surface object, and the theme, if it is expressed, is an oblique phrase. Benefactive applicatives are totally productive. Any verb that has a simple transitive form can also have a benefactive as long the meaning makes sense. Some examples are given in (9).

- | | | | | |
|-----|---------|------------|------------|---------------------------|
| (9) | q̣ʷələt | 'bake it' | q̣ʷələlɬət | 'bake it for him/her' |
| | ʃəlɬ | 'write it' | ʃələlɬət | 'write it for/to him/her' |
| | kʷənət | 'take it' | kʷənəlɬət | 'take it for him/her' |
| | pətʰət | 'sew it' | pətʰəlɬət | 'sew it for him/her' |
| | θəyt | 'fix it' | θəyəlɬət | 'fix it for him/her' |

It has been noted by Mithun (1984), Baker (1988), and others that the theme in the applicative construction in some languages can appear as an incorporated noun. Baker (1988) cites the following Tuscarora example from Williams (1976):⁴

- (10) Waʔ-khe-taʔnar-atyaʔt-hahθ.
 PAST-1sS/3fO-bread-buy-APPL+PUNC.
 'I bought her some bread.'

Halkomelem shows parallel facts. The theme in the applicative construction can appear as a lexical suffix:

- (11) škʷ-əyəl-əlc-θámš.
 bathe-baby-ben-tr+lobj
 'Bathe the baby for me.'

- (12) ʔ^əʃ^w-əlwət-əlɕ-ət.
wash-clothes-ben-tr
'Wash clothes for him/her.'
- (13) q̣p̣-əwəl-əlɕ-ət.
tie-vessel-ben-tr
'Tie up the canoe for him/her.'

The benefactive applicative -əlɕ- follows the lexical suffix.

The applicative -əlɕ- is used only on transitive forms. A different applicative, -meʔ- is used to form the benefactive applicative based on intransitive verbs:

- (14) k^wuk^w-meʔ-t.
cook-appl-tr
'Cook for him/her.'

The verb in (14) is an intransitive cooking action k^wuk^w 'cook' (from English). This contrasts with the verb in the first example in (9), q̣^wələt 'bake it', which is a transitive cooking action, as seen by the presence of the transitive suffix -t. Note that the latter forms an applicative with the benefactive suffix -əlɕ-. The examples in (15) illustrate other instances where a benefactive applicative formed with -meʔ- is based on an intransitive.

- | | | | | |
|------|------------------------|----------|----------------------------|----------------------|
| (15) | q̣ ^w əyíləʃ | 'dance | q̣ ^w əyíləʃmeʔt | 'dance for him/her' |
| | ya:ys | 'work' | ya:ysmeʔt | 'work for him/her' |
| | l̥xíləʃ | 'stand' | l̥xíləʃmeʔt | 'stand for him/her' |
| | ʔəʃəl | 'paddle' | ʔəʃəlmeʔt | 'paddle for him/her' |

The applicative suffix -meʔ- can not be used with lexical suffixes to form benefactives, as seen in (16). Examples like these are ungrammatical regardless of the order that the lexical suffix and the applicative appear in.

- (16) *ʃk^w-əyəl-meʔ-θámʃ or *ʃk^w-meʔ-əyəl-θámʃ
 *ʔ^əʃ^w-əlwət-meʔ-t *ʔ^əʃ^w-meʔ-əlwət-t
 *q̣p̣-əwəl-meʔ-t *q̣p̣-meʔ-əwəl-t

The ungrammaticality of these data is paradoxical because, as we have argued above, lexical suffixation detransitivizes the clause. These observations lead to the conclusion that the type of applicative is selected based on the underlying structure of the clause, not its structure after lexical suffixation.

- (17) Benefactive applicatives:
 a. Use -əlɕ- when the underlying predicate is 2-place.
 b. Use -meʔ- when the underlying predicate is 1-place.

Following our assumption that the lexical suffix is a core argument in underlying structure (name, the theme), the underlying predicate is transitive and forms benefactives as expected, with the transitive benefactive applicative *-ətc-*.

Lexical suffixes can in fact occur with *-meʔ-* but not in its use as a benefactive. The applicative suffix *-meʔ-* is also used for applicative objects with the semantics of causal, stimuli, or direction (Gerdt 1988):

- | | | | | |
|------|--------|-----------------------|------------|----------------------|
| (18) | łciws | 'tired' | łciwsmeʔt | 'tired of him/her' |
| | qel | 'believe' | qelmeʔt | 'believe him/her' |
| | siʔsiʔ | 'afraid' | siʔsiʔmeʔt | 'afraid of him/her' |
| | xiʔxeʔ | 'ashamed' | xiʔxeʔmeʔt | 'ashamed of him/her' |
| | ʔiy-əs | 'happy' (good + face) | ʔiyəsməʔt | 'happy for him/her' |

For example, we see a directional use of *-meʔ-* co-occurring with lexical suffixes in (19) and (20).

- (19) niʔ ct q̣t-aθən-meʔ-t.
 aux 1plsub walk-edge-appl-tr
 'We walked right by him as we walked along the shore.'
- (20) ʔi ʔə ce:p ʔəw xʷən səwq̣-iws-meʔ-t kʷθə niʔ s-ʔikʷ?
 aux int 2plsub comp still seek-body-appl-tr det aux nm-lost
 'Are you all still searching for that lost person?'

The example in (20) contrasts with the applicative in (21), which is benefactive (in this case delegative) rather than directional in meaning.

- (21) səwq̣-iws-ətc-θámš č ceʔ.
 seek-body-ben-tr+1obj 2obj fut
 'You will take my place in the search for the missing person.'

Note that *-ətc-*, the transitive benefactive, is used in (21). So we see that the blocking of the co-occurrence of lexical suffix and *-meʔ-*, as in the examples in (16), is not due to a morphological constraint.

To summarize, Halkomelem has two forms of benefactive: *-ətc-* is used for base transitives, while *-meʔ-* is used for base intransitives. In examples like (11)–(13), in which a lexical suffix and a benefactive co-occur, the transitive form of the benefactive is used. What these data show is that the lexical suffix satisfies the notion of transitivity required by the transitive benefactive suffix. This follows from an analysis that posits that the lexical suffix is the theme argument in these examples.

2. Lexical suffixes and causatives

A second type of evidence that the lexical suffix is a core argument in underlying structure comes from causative constructions. The interaction of causatives and noun incorporation has been noted for many languages, including

Alutor (Koptjevskaja-Tamm and Muravyova 1993). For example, we see in the Alutor causative in (22) that the caused event 'cutting the wood' appears inside the causative.

- (22) gəm-nan akək tə-n-u-svitku-və-tk-ən.
 I-erg son:abs 1sg.A-caus-wood-cut-suff.pres-3sg.p
 'I am making the son cut wood.'

We see parallel data in Halkomelem. The causative suffix *-st* only attaches to intransitive bases (Gerds 1988). Since lexical suffix constructions are morphosyntactically intransitive, it is not surprising that lexical suffixes can appear inside causatives:

- (23) sǫ-əlcəp-stəxʷ č.
 cut-wood-caus+3obj 2sub
 'You make him chop wood.'
- (24) niʔ cən ʔaʔ-éyəl-stəxʷ.
 aux 1sub comfort-child-caus
 'I had him comfort the child.'

Notice the mirror image morphological order in Alutor and Halkomelem. The incorporated noun and the causative are prefixal in Alutor while the lexical suffix and causative are suffixal in Halkomelem.

Alutor also has examples of noun incorporation outside the causative. For example in (25), the incorporated noun 'wife' is the causee.

- (25) gəmmə tə-ŋəvə-n-awəj-at-Ø-ək tərg-a.
 I:abs 1sg.s-wife-caus-eat-suff.aor-1sg.s meat-instr
 'I fed my wife with meat.'

Again, Halkomelem shows parallel data. The causee in Halkomelem must be animate (Gerds 1988). And the data in (26) show lexical suffixes referring to humans representing the causee. This appears outside the causative suffix.

- (26) a. niʔ ʔəmət-st-ənəq.
 aux sit-caus-people
 'He sat the people down.'
- b. niʔ ʔiməš-st-ənəq.
 aux walk-caus-people
 'He made the people walk.'
- c. niʔ ʔxiliš-st-ənəq.
 aux stand-caus-people
 'She made the people stand up.'

- d. niʔ qəqəmaʔ-st-eyəɫ.
 aux take breast-caus-child
 'She breast-fed a child.'

In addition, Alutor shows double causatives, where causative appears before and after noun incorporation:

- (27) gəm-nan akək tə-n-nalgə-n-kuww-at-avə-tk-ən.
 I-erg son:abs 1sg.s-caus-skin-caus-dry-suf-suf-pres-1sg.s
 'I am making my son dry a skin/skins.'

Halkomelem again has parallel data.

- (28) niʔ cən ɬxiliš-st-ənəq-stəxʷ.
 aux 1sub stand-caus-people-caus+3obj
 'I made him stand the people up.'
- (29) niʔ qəqəmaʔ-st-éyəɫ-stəxʷ-əs ɬə nas ɬə Mary.
 aux breast-caus-child-caus+3obj-3erg det nurse det Mary
 'The nurse had Mary breast-feed the child.'

We see causative morphology both before and after the lexical suffixes for 'people' (28) and 'child' (29). These lexical suffix are causees of the first causative.

Also in Halkomelem, lexical suffixes can appear both before and after causatives as in (30c) and (31c) and in the double causatives in (30d) and (31d).

- (30) a. sḡ-əlɕəp 'cut firewood'
 b. sḡ-əlɕəp-stəxʷ 'make him cut firewood'
 c. sḡ-əlɕəp-st-ənəq 'make people cut firewood'
 d. sḡ-əlɕəp-st-ənəq-stəxʷ 'make him make people cut firewood'
- (31) a. ʔe:-nəq 'give a potlatch' (invite + people)
 b. ʔe:-nəq-stəxʷ 'have her give a potlatch'
 c. ʔe:-nəq-st-ənəq 'have people give a potlatch'
 d. ʔe:-nəq-st-ənəq-stəxʷ 'have her have people give a potlatch'

The first lexical suffix is the theme (object) of the base verb. while the second lexical suffix represents the causee of the first causative.

The Halkomelem data thus mirror the interactions found between causatives and noun incorporation, for example in Alutor. Since the usual view of causatives is that the causee and the theme are core arguments in initial structure, these data provide evidence that the lexical suffix is a core argument.

3. Lexical suffixes and reflexives

A third type of evidence that the lexical suffix does not always originate as an adjunct comes from the interaction of external possession constructions and reflexives. As noted by Mithun (1984), Baker (1988), and others, many languages with noun incorporation also allow a construction in which the incorporated noun is the possessed head of a theme. This gives rise to an external possession construction, in which the semantic possessor appears as an argument of the verb, normally the object of a transitive verb or the subject of an intransitive verb. In the following example from Blackfoot (Frantz 1971), the underlying possessor 'man' is the surface object of the verb, while the possessed body part is an incorporated noun.

- (32) Nít-ssik-o'kakín-aw óma nínaawa.
 I-break-back-him that man
 'I broke the man's back.'

Halkomelem lexical suffixes similarly appear in an external possession construction. In (33), the possessed head of the theme 'head' appears as a lexical suffix, and the notional possessor *sqʷəméy* 'dog' is the syntactic object of the clause.

- (33) niʔ tši-ʔqʷ-t-əs lə sɬeniʔ kʷθə sqʷəméy.
 aux comb-head-tr-3erg det woman det dog
 'The woman combed the dog's hair.'

This construction is not limited to part-whole constructions, as seen in (34) where the possessed object is 'bed'.

- (34) niʔ ʔə č θəy-eʔl-θámšʔ
 aux int 2obj make-flexible.material-tr+1obj
 'Did you make my bed?'

Alternatively, it could be claimed that the 'possessor' is actually the theme argument of the clause, while the lexical suffix is an adverbial modifier. Under this account a more suitable translation for (33) would be 'The woman combed the dog on the head.' However, as I argued in Gerdts (1981), the possessor, though it inflects like a surface object, lacks the properties of a theme or underlying object.

For example, the underlying possessor cannot be reflexivized like a theme. In Halkomelem reflexives, the suffix *-θət* appears in the object position.

- (35) niʔ kʷələš-θət kʷθə swəýqeʔ.
 aux shoot-tr+ref det man
 'The man shot himself.'

Other examples of reflexive verb forms are given in (36):

- (36) qayθət 'kill self'
 cəy^wθət 'dry self'
 ləx^wəθət 'cover self'

But external possessor constructions with lexical suffixes cannot be reflexivized with *-θat*, as seen in (37a). Rather, the middle suffix *-əm* is used, as seen in (37b) (Gerds to appear, Gerds and Hukari 1998).

- (37) a. *ni[?] cən ʔəx̣ʷ-ʃé-θət.
aux 1sub wash-foot-tr+refl
'I washed my feet.'
- b. ni[?] cən ʔəx̣ʷ-ʃén-əm.
aux 1sub wash-foot-intr
'I washed my feet.'

I give examples of external possession, with and without coreference in (38) and further examples of reflexive cases of external possession in (39).

- | | | | | |
|------|--|--|--|---|
| (38) | ʔeʔ ^θ -ʂə-t
ʂk ^w -əyət-t
təmʂ-əñə-t
sewq̣-əwtx ^w -t

k ^w ax ^w -əwtx ^w -ət | ‘wiping his/her feet’
‘bathe his/her baby’
‘braid his/her hair’
‘looking for a house
for him/her’
‘knock on his house’ | ʔeʔ ^θ -ʂən-əm
ʂk ^w -əyɪ-əm
təmʂ-əñe:-m
sewq̣-əwtx ^w -əm

k ^w ax ^w -əwtx ^w -əm | ‘wiping one’s feet’
‘bathe one’s baby’
‘braid one’s hair’
‘looking for a house
for oneself’
‘knock on own house’ |
| (39) | seʔ-ʂén-əm
t ^θ x ^w -cs-əm
tš-iʔq ^w -əm
x ^w ʔət ^θ -əlqsən-əm
t ^θ x ^w -əlnəs-əm
ləẉ-t ^θ eʔəm
θq̣ ^w -it ^θ eʔ-əm
x ^w t ^θ ət-qín-əm
θəy-eʔl-əm
k ^w əñé-wəɫ-əm
θəy-əwtx ^w -əm | ‘raise one’s foot’
‘wash one’s hands’
‘comb one’s hair’
‘wipe one’s nose’
‘brush one’s teeth’
‘undress, take off one’s clothes’
‘put many layers of clothes on self’
‘quench one’s thirst’
‘make one’s own bed’
‘take one’s own car or boat’
‘build a house for oneself’ | | |

These data are easily accounted for given the condition on reflexives stated in Gerdts (1988). The reflexive suffix *-əat* is used only when the reflexive is the underlying object or theme. It is not used for derived objects like external possessors nor for the derived objects in applicative constructions. Gerdts (1988, to appear) gives the following generalization:

(40) Reflexives:

- a. Use *-θat* when the underlying object is coreferent with the subject.
- b. Use *-əm* when a derived object is coreferent with the subject.

Thus, the reflexive data provide support for the claim that the possessor is a derived object. This follows under an analysis that posits that the possessor modifies the lexical suffix in underlying structure. The lexical suffix occupies the position of head of the theme, an argument position.

4. Conclusion

We can conclude that lexical suffixes are not merely adverbial modifiers occupying non-argument positions. Lexical suffixation can internalize a core argument such as theme or causee and thus affects the argument structure of the clause. Lexical suffixation functions like compounding noun incorporation and can be ordered with other argument structure-altering rules. Moreover, we see on the basis of the reflexive data that the possessor in the external possessive construction is not the theme. This follows from an analysis that posits that the lexical suffix is the head of the theme in underlying structure.

Sapir (1911) claims that lexical suffixes cannot be regarded as incorporated nouns because they do not resemble free-standing nouns. But what we have seen here is that lexical suffixes function exactly like incorporated nouns. Lexical suffixes are simply historical nouns that have journeyed further down the grammaticization path than the incorporated nouns found in many languages. New free-standing nouns have been invented to serve as nominals as the old noun roots became bound forms. The lexical suffix still has the functional properties and the categorial status of noun, even though its ability to function as a free-standing noun is gone.

Notes

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The following abbreviations are used in glossing the Halkomelem examples: 1 = first person, 2 = second person, 3 = third person, appl = applicative, aux = auxiliary, ben = benefactive, comp = complementizer, caus = causative, det = determiner, erg = ergative, fut = future, int = interrogative, intr = intransitive, nm = nominalizer, obj = object, obl = oblique, pl = plural, sub = subject, ref = reflexive, tr = transitive.

² For a discussion of the origin of lexical suffixes and their relationship to free-standing nominals see Kinkade (1998) and references therein.

³ Gerds and Hinkson (1996) have noted the ability of the lexical suffix to head a N compound and have used this as evidence that the lexical suffix has the categorial status of a noun.

⁴ The relative order of the incorporated noun and applicative in Tuscarora is not transparent since one is prefixal and the other suffixal. In Halkomelem, however, the lexical suffix clearly precedes the benefactive suffix.

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Patterns of correspondence in the adaptation of Spanish borrowings in Basque

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1. Introduction

It has often been remarked that, when borrowings are adapted, foreign sounds tend to be replaced by their closest equivalent in the borrowing language (cf., for instance, Paul 1880, Holden 1976, Picard & Nicol 1982). However, the notion of 'closest equivalent' is not always well defined (Haugen 1950, Hyman 1970). This may give rise to a certain amount of variation in the adaptation in the early stages of borrowing from a given source-language. As the number of bilingual speakers increases or the influx of loanwords from a given language becomes steady, conventional ways of adapting borrowings will become established in the community (Haugen 1950). For instance, as both Picard & Nicol (1982) and Paradis & LaCharité (1997) note, whereas in European French the English voiceless interdental fricative /θ/ is replaced by /s/, in Quebec French this sound is systematically adapted as /t/ (see Hyman 1970 for similar examples). Since European French and Quebec French have essentially identical consonantal inventories, we are dealing here with an established pattern in each community, a conventionalized adaptation. In fact, as Paradis & LaCharité also point out, the closest sound to /θ/ in French would perhaps be /f/, at least from an acoustic point of view (cf. also Hock & Joseph 1996:259-270).

Haugen (1950:213) states that "the bilingual speakers who make the first substitutions are in a rough way carrying on an operation of comparative linguistics". Poplack & Sankoff (1984:130) also note that "the process of borrowing is carried out in a regular way on the community level and is not a series of random accidents". Once a pattern of adaptation becomes conventionalized, phonetic/phonological considerations no longer apply.

In a situation of prolonged, centuries-long, bilingualism, the result may be the existence of adaptation rules which lack any synchronic motivation at all, the original phonological reason for them having been obscured by subsequent changes in the two languages in contact. Speakers may still productively employ conventionalized patterns of adaptation even if these do not make any phonological or morphological sense from a synchronic point of view. That is, the adaptations that borrowings undergo may go beyond what is required by the phonology or morphology of the borrowing language.

The Basque-Romance case offers us one such case of prolonged and intense contact. Basque has been in contact first with Latin and then with Romance for over 2000 years. The impact of Latin and its daughter languages on the Basque lexicon has been massive and profound (see Michelena 1974). Concerning the topic of this paper, conventionalized patterns of loanword adaptation have persisted for many centuries. Some of these patterns or rules of adaptation, which originally were phonologically motivated, have become essentially arbitrary rules as the phonological structure of the borrowing and lender language has changed. For instance, as I discussed in Hualde (1993), Spanish words ending in *-ón* are systematically adapted into central and western Basque dialects (and standard Basque) as ending in *-oi* (e.g. Sp. *balón* → Bq. *baloi* 'ball' and other examples in

(1), which could be greatly multiplied (Other differences observable in the examples are purely orthographic):

(1) Sp. -ón —> Bq. -oi

<u>Spanish</u>	<u>Basque</u>	
camión	kamioi	'truck'
macarrón	makarroï	'macaroni'
avión	abioi	'airplane'
electrón	elektroi	'electron'

It is important to note that words in Basque may indeed end in *-on*, e.g.: *gizon* 'man', *azkon* 'dart', *on* 'good'. These loans would be perfectly well-formed in Basque without undergoing any adaptation.

The reason for this adaptation rule is only found in much earlier historical stages of the two languages involved. Basque adopted a large number of loanwords from Latin during the first centuries of contact. These loanwords were nativized and underwent the same subsequent sound changes as the native vocabulary. One of these sound changes was the loss of intervocalic *-n-*, which took place at least by the beginning of the 11th century, perhaps much earlier (Michelena 1977:301-310); e.g.: Lat. *catena* > Bq. *katea* 'chain', Lat. *ballena* > Bq. *balea* 'whale' (with nasalization of the vowels at an intermediate stage). In particular, in loanwords in *-one*, we have the evolution *-one* > *-oe* (still preserved in some dialects) > *-oi*. For example, if the Latin/Romance word *ratone* 'rat' was borrowed into Basque before the deletion of intervocalic *-n-*, it would have been adapted as **arratone* (since initial rhotics are disallowed in Basque). Subsequently, **arratone* > *arratoe* > *arratoi*. On the other hand, in Spanish final *-e* was lost after a single coronal consonant towards the end of the 11th century; e.g.: *amore* > *amor* 'love', *ratone* > *ratón*. These two changes (in Basque and in Spanish) created a pattern of correspondence, Sp. *-ón* : Bq. *-oi* which was seized upon by bilingual speakers and is still productively applied to new borrowings with complete consistency.

This correspondence rule turns out to have a set of systematic exceptions. Spanish words ending in *-ción* or *-sión* lose the final nasal but do not add a final vocoid, as can be seen in the examples in (2):

(2) More specific pattern: Sp. loanwords in *-ción*, *-sión*

Sp. *-ción* [-θjon] —> Bq. *-zio* [-ʃio]

Sp. *-sión* [-sjon] —> Bq. *-sio* [-ʃio]

<u>Spanish</u>	<u>Basque</u>	
edición	edizio	'edition'
información	informazio	'information'
institución	instituzio	'institution'
conclusión	konklusio	'conclusion'
versión	bertsio	'version'
tensión	tentsio	'tension'

The application of the more specific rule, which reflects a correspondence between suffixes, usually bleeds the more general one.

We see that when Basque/Spanish bilingual speakers adapt new borrowings (which is a common occurrence in the present situation of near universal bilingualism on the part of Basque speakers), they employ a number of internalized

and conventionalized analogical patterns of adaptation which reflect essentially arbitrary correspondences between the lexicons of the two languages. In this paper I will focus on a couple of phenomena reflecting the existence of patterns of correspondence which are restricted to very specific phonologically (and sometimes semantically) defined classes of words. First, I will consider the adaptation of Spanish words ending in *-o*, which constitute one of the major lexical classes of nouns and adjectives in this language (and thus a common source of borrowings). Secondly, I will examine the accentual adaptation of borrowings in some central and western dialects of Basque. Excluded from this study are more-or-less conscious adaptations used only in written and academic registers.¹

2. Adaptation of Spanish words in *-o* into Basque

A particularly striking phenomenon is found in the adaptation into Basque of Spanish words with the common *-o* ending. In many, old and recent, borrowings from Spanish, final *-o* is raised to *-u* in Basque (e.g.: Sp. *piso* → Bq. *pisu* 'apartment' and examples in (3)). This is surprising because many native Basque words end in *-o* (e.g.: *beso* 'arm', *baso* 'forest', *ardo* 'wine', *itsaso* 'sea'):

(3) Sp. *-o* → Bq. *-u*

<u>Spanish</u>	<u>Basque</u>	
soldado	soldadu	'soldier'
consenso	kontsentsu	'consensus'
congreso	kongresu	'congress'
artículo	artikulu	'article'
insecto	insektu	'insect'
dato	datu	'data'

Whereas many Spanish words ending in *-o* undergo the adaptation illustrated in (3), many others do not, as the examples in (4) show:

(4) Sp. *-o* → Bq. *-o*

<u>Spanish</u>	<u>Basque</u>	
comunismo	komunismo	'communism'
instintivo	instintibo	'instinctive'
público	publiko	'public'

Again, the reason for the change Sp. *-o* → Bq. *-u* in those items undergoing it is to be found in the history of the two languages in contact. Whereas final *-u* was preserved in the first borrowings that Basque adopted from Latin (e.g. Lat. *libru* > Bq. *liburu* 'book', Lat. *cirru* > Bq. *kirru* 'cleaned flax', Lat. *cattu* > Bq. *katu* ~ *gat(h)u* 'cat', Lat. *taratru* > Bq. *Daratulu* 'borer', Lat. *gypsu* > Bq. *kisu* ~ *gisu* 'gypsum'), in Spanish, unstressed final *-u* became *-o* by a regular sound change (e.g.: Lat. *libru* > Sp. *libro*, Lat. *cirru* > Sp. *cerro* 'hill', Lat. *cattu* > Sp. *gato*, Lat. *taratru* > Sp. *taladro*, Lat. *gypsu* > Sp. *yeso*). This change in Spanish gave rise to a correspondence Sp. *-o* / Bq. *-u* in cognates. Old borrowings from Romance (as opposed to Latin) such as *leku* 'place' < Rom. *luco* (< Lat. *locu*) and *ispillu* 'mirror' < Rom. *espiġo* (< Lat. *speculu*) appear to already show this adaptation, by which *-u* replaces final *-o* in borrowings. This correspondence, which never had a phonological or morphological motivation, is still used in the adaptation of borrowings, even though, as indicated, there are also numerous counterexamples.

When we try to determine what conditions the application of the Sp. *-o* → Bq. *-u* adaptation in the modern language, what becomes apparent is that speakers use very specific analogical patterns. Examination of current usage in standard Basque shows that in most cases there is widespread agreement on one solution or the other, but there are also instances of fluctuation. Consistent patterns of adaptation are found when the word ends in a common suffix or pseudosuffix:

(5)

a. Sp. *-ismo* → Bq. *ismo*

<u>Spanish</u>	<u>Basque</u>	
cinismo	zinismo	'cinicism'
comunismo	komunismo	'communism'
optimismo	optimismo	'optimism'
turismo	turismo	'tourism'

b. Sp. *-ivo* → Bq. *-ibo* (in both languages, [-iβo])

competitivo	konpetitibo	'competitive'
activo	aktibo	'active'
positivo	positibo	'positive'
informativo	informatibo	'informative'

c. Sp. *-ico* → Bq. *-iko*

público	publiko	'public'
político	politiko	'politic'
democrático	demokratiko	'democratic'
económico	ekonomiko	'economic'

d. Sp. *-mento* → Bq. *-mentu* ~ *-mendu*

elemento	elementu	'element'
funcionamiento	funtzionamentu ~ funtzionamendu	'functioning'
cargamento	kargamentu ~ kargamendu	'loading'

e. Verbal participles. Sp. *-do* → Bq. *-tu*

funcionado	funtzionatu	'function, work'
clasificado	klasifikatu	'classify'
coordinado	koordinatu	'coordinate'
invertido	inbertitu	'invest'
dimitido	dimititu	'resign'
deducido	deduzitu	'deduce'

In examples like these, what we have is a correspondence between suffixes in the two languages. Basque has in fact borrowed a number of derivational suffixes from Latin and Romance. The reason for a change in the final vowel from *-o* to *-u* in recent borrowings from Spanish in the simplest cases is that the Spanish suffix is being replaced by a cognate suffix in Basque which has final *-u* because it was borrowed from Latin in this manner, as it is the case with *-mentu* ~ *-mendu*.

Of particular interest among the cases is the adaptation of verbs, illustrated in (5e). In borrowed verbs, the *-do* ending of regular Spanish participles is replaced by

-tu to give rise to the Basque perfective participle, which is the basic form of the verb in Basque:

The participial suffix *-tu* was borrowed from Latin with the first borrowings from this language and has become the only productive way to form perfective participles in Basque from other categories (nouns and adjectives): *gorri* 'red' → *gorritu* 'reddened'; *garbi* 'clean' → *garbitu* 'clean' (V); *luze* 'long' → *luzatu* 'lengthen'.

After final *-u* became *-o* in Spanish and intervocalic *-t-* voiced, new borrowed participles would be adapted replacing their ending by what had in fact become a Basque suffix. This pattern of adaptation continues up to the present.²

There is also a strong tendency to replace final *-o* with *-u* in Spanish in nouns ending in *-to* or *-do*, which formally resemble participles. In the adaptation of some of these nouns we even find devoicing: Sp. *-do* → Bq. *-tu* by formal analogy with the participles:

(6) Adaptation of Spanish nouns in *-do*, *-to*

	<u>Spanish</u>	<u>Basque</u>	
a.	proyecto	proiektu	'project'
	instituto	institutu	'institute'
	objeto	objetu	'object'
	concepto	kontzeptu	'concept'
	ganado	ganadu	'cattle'
	segundo	segundu	'second'
	kurdo	kurdu	'Kurdish'
	contrato	kontratu	'contract'
	texto	testu	'text'
	contacto	kontaktu	'contact'
b.	estado	estatu	'state'
	privado	privatu	'private'
	diputado	diputatu	'deputy'

In general, in the adaptation of Spanish loanwords ending in *-o*, Basque speakers will try to establish analogies taking the final syllables of the word into account. If there is some partial identity between the last or two last syllables of the word and some recognizable suffix, there is a strong tendency to treat the borrowing as corresponds to words bearing that suffix. Thus, as mentioned, Spanish nouns ending in *-do* or *-to* will normally take final *-u* in Basque by analogy with the participles. A principle of analogy can also be applied with respect to older borrowings. Thus, for instance, the modern adaptation Sp. *peso* → Bq. *pisu* may be based on an analogy with the older borrowing *pisu* 'weight', from Spanish *peso*.

If no obvious analogy is available, some more general principle will apply. This more general principle may be the preservation of final *-o*. Nevertheless, especially in the written language, final *-o* may be changed to *-u* even in the absence of a specific analogy in this direction by a sort of "hypercorrection"; that is, so the word will look more different from its Spanish source and, consequently, more Basque. In local dialects, different patterns of adaptation have been established with different endings and the tendency to replace Spanish *-o* by *-u* may be weaker or stronger.³ We will consider the very specific adaption pattern of Spanish nouns in *-ero* which is employed in some Bizkaian dialects below, as it also involves interesting facts of accentuation.

To summarize this section, a peculiar fact in the adaption of Spanish borrowings in Basque is the fact that in some cases final *-o* is replaced by *-u*, a change for which there is no phonological motivation. We may explain this phenomenon in the following fashion: Basque borrowed a great number of Latin words ending in *-u*. When final *-u* became *-o* in Romance, Basque/Romance bilingual speakers could make the generalization that when a Romance word ending in *-o* has a Basque cognate, this cognate would end in *-u*. A correspondence rule was thus established for the adaptation of new borrowings. As more and more borrowings were taken from Spanish, this adaptation rule weakened and became increasingly restricted. The adaptation preserved its strength when a correspondence between foreign and nativized morphemes or even 'endings' could be established. Nowadays, local varieties differ in favoring *-o* or *-u* in new borrowings and in the analogical patterns that are operative. Very specific analogical patterns of adaptation are also observable in the behavior of speakers of Standard Basque. In the current situation of near-universal bilingualism on the part of Basque speakers, the spontaneous adaptation of Spanish borrowings in Basque discourse is a common phenomenon. A Basque speaker who uses a word such as *produktibo* 'productive' or *kontzeptu* 'concept' will not necessarily know whether s/he is repeating a Basque word which s/he has learned or whether s/he has in fact adapted it spontaneously from his/her Spanish lexicon.

3. Accentuation of loanwords in Gernika (western Basque)

The accentual adaptation of Spanish loanwords in Basque dialects offers further examples of arbitrary, conventionalized patterns of adaptation. There is substantial diversity regarding accentuation within the Basque territory (see Hualde to appear a, for an overview), and dialects also differ in the strategies that are used in the accentual adaptation of loanwords. In this and the next sections we will consider some especially interesting adaptation phenomena, respectively, in the western (or Bizkaian) dialect of Gernika and the central (or Gipuzkoan) dialect of Beasain.

Some western Basque dialects (the coastal Bizkaian varieties) possess a pitch-accent system with a basic distinction between accented and unaccented words. Whereas accented words have a fixed accent on a given (non-final) syllable, unaccented words are only subject to a rule of phrase-final accentuation. The word *esku* 'hand' and all other items in (7a) are unaccented. In (7b), in contrast, the word *léku* 'place' is accented:

(7) Gernika Basque: accented and unaccented words

- | | | |
|----|-------------|-----------------------|
| a. | lau eskú | 'four hands' |
| | eskué | 'the hand' |
| | eskue dá | '(it) is the hand' |
| | esku ederrá | 'the beautiful hand' |
| b. | lau léku | 'four places' |
| | lékue | 'the place' |
| | lékue da | '(it) is the place' |
| | léku ederrá | 'the beautiful place' |

Whether Spanish loanwords are assigned to one or the other class depends on established patterns. Spanish oxytones are treated as unaccented words (word final prominence is interpreted as phrase-final) and proparoxytones as accented. In the case of paroxytones we have a more complex situation. In general, Spanish paroxytones will be adapted as accented or unaccented depending on their specific

ending. Perhaps the most striking case is that of the adaptation of Spanish words ending in *-ero*. These are adapted with the unaccented ending *-eru* if the meaning of the word is 'profession, occupation', but with the accented ending *-éru* if the meaning is 'place, receptacle'. Thus, for instance, Spanish *frutero* 'fruit seller; fruit bowl' gives rise to two Basque words in the dialect of Gernika (and similarly in other local dialects of the northern Bizkaian area): unaccented *fruteru* 'fruit-seller' and accented *frutéru* 'fruit bowl'. The examples in (8) are given in the absolutive singular, which is the citation form in Basque (*-a* suffix, but *-e* if the preceding vowel is high):

(8) Adaptation of Spanish words in Gernika Basque

a.	<u>Spanish</u>	<u>Gernika Bq.</u>	
	frutero	fruterue	'fruit seller' (unaccented)
	basurero	basurerue	'garbage collector'
	barbero	barberue	'barber'
	cartero	karterue	'mailman'
	panadero	panaderue	'baker'
b.	frutero	frutéroa	'fruit bowl'
	basurero	basuréroa	'garbage can'
	azucarero	asukaréroa	'sugar bowl'
	gallinero	gallinéroa	'chicken pen'

The reason for this peculiar bifurcation could be the following. Some Spanish 'occupation' words in *-ero* were borrowed first. These had their final vowel analogically changed to *-u* and were regularized by adapting them to the major accentual class. A productive pattern was created for the adaptation of this specific group of words. Later, when other words in *-ero*, but with a different meaning, were also borrowed, they were not recognized as members of the same group, because of the semantic difference, and were left basically unadapted, with preservation of final *-o* and of the position of the accent as in Spanish.

Both patterns of adaptation in (8) apply in a completely productive manner to new borrowings. On purely phonological grounds, a Spanish word such as *autobusero* 'bus driver' should be left unchanged, resulting in the Gernika Basque word **autobuséroa*, with the definite. However, given the patterns of adaptation that have been established, this is not an option. By analogy with words with the same ending and similar meaning, this word must be adapted as *autobuserue*, and this is what speakers will do rather unconsciously.

4. **Accentuation of loanwords in Beasain (central Basque)**

In many central Basque varieties words are usually accented on the second syllable (provided that the second syllable is not also the last one), but some exceptional words present initial accent instead. Among the exceptional words, many of them are borrowings where the position of the accent has been preserved, including some very old borrowings, such as those in (9b). We will concentrate on the variety spoken in Beasain, in southern Gipuzkoa:

(9) Beasain Basque: accentual patterns

Regular accentual pattern [+2]:

zakúrre 'the dog', zakúrrekin 'with the dog'

alárgune 'the widow', alárgunentzat 'for the widow'

Marked accentual pattern [+1]:

dénporea 'the time' (< Lat. témpora)

líburue 'the book' (< Lat. líbru)

Spanish loanwords accented beyond the second syllable from the beginning of the word undergo accent retraction to the second syllable (Basque examples are given in citation form, i.e. with the definite article *-a* or, after a high vowel, *-e*):⁴

(10) Beasain Basque: accentual regularization of borrowings

<u>Spanish</u>	<u>Beasain Bq.</u>	
maratón	marátoia	'marathon'
ascensór	azénsorea	'elevator'
tentación	tentázioa	'temptation'
manifestación	manífestazioa	'demonstration'
pintalábios	pintálabiosa	'lipstick'
calendário	kaléndarioa	'calendar'
albaricóque	albárikokea	'apricot'
telegráma	telégramea	'telegram'
lavadora	labádorea	'washing machine'
bicicléta	bizíkletea	'bicycle'
matadéro	matáderoa	'slaughterhouse'
automático	autómatikoa	'automatic'

This unremarkable adaptation is required to make these loanwords conform to the accentual pattern of the dialect. Words cannot be accented beyond the second syllable.

There are, however, more remarkable adaptations. In particular, Spanish four-syllable proparoxytonic words are systematically adapted with initial accent, even when in the original form they bear the accent on the second syllable and therefore would conform to the unmarked accentual pattern of Beasain Basque :

(11) Beasain: Adaptation of Spanish proparoxytones

<u>Spanish</u>	<u>Beasain Bq</u>	
micrófono	míkrofonoa	'microphone'
semáforo	sémaforoa	'traffic light'
teléfono	télefonoa	'telephone'
bolígrafo	bóligrafoa	'ballpen'
artículo	ártikulue	'article'
católico	kátolikoa	'Catholic'
telégrafo	télegrafoa	'telegraph'
kilómetro	kílometroa	'kilometer'
eléctrico	életrikoa	'electric'
simpático	sínpatikoa	'nice'
mecánico	mékanikoa	'mechanic'
península	péninsulea	'peninsula'
matrícula	mátrikulea	'license'

There is no phonological reason why the loans in (11) should undergo asccent shift. Unlike the adaptation in (10), this is a phonologically unmotivated adaptation, a conventionalized arbitrary rule of correspondence. The questions is: How could this adaptation rule have become established? A possible scenario would

be the following. Trisyllabic proparoxytonic loanwords, which among proparoxytones are especially common, would be adapted with their original accentual pattern, which is one of the two possible accentual patterns in Beasain Basque: *plátano* → *plátanoa* 'banana', *lámpara* → *lámparea* 'lamp', *zócalo* → *zócaloa* 'platform', *plástico* → *plástikoa* 'plastic'. Originally, the pattern from which these forms arose was "Spanish proparoxytones are adapted as marked words with initial accent"; or, in other words, "the position of the accent is maintained in Spanish words with initial accent".

By abduction or reanalysis (Andersen 1973) the resulting interlingual correspondences were reinterpreted by some speakers as providing evidence for an adaptation rule of the form "Spanish proparoxytones are adapted in Basque with initial accent". From this reanalysis adaptations like those in (11) started to appear.

The thing to be noted is that loanwords like those in (11) would be perfectly well-formed in this Basque dialect with their original accentual pattern left intact. The shift of the accent to the initial syllable is the product of an essentially arbitrary convention for the adaptation of borrowings.

4. Conclusion

As others have argued (Hyman 1970, Danesi 1985, and many others), research on the adaptation of borrowings can offer important insights on the psychological aspects of phonology. I believe that the facts reviewed in this paper provide evidence bearing on the nature of morphophonological alternations. There is a school of thought in phonology which sees morphophonological alternations as synchronically motivated processes which need to be explained by means of postulated universal and innate phonological mechanisms (in Optimality Theory innate constraints). In an alternative view (e.g., among others, Bybee 1994, Hualde to appear b), morphophonological alternations are seen as learned correspondences among lexical items which may appear to be phonetically motivated only to the extent that the context for the sound change that originated them has been preserved. Crucially, the learnability of such correspondences does not depend on their phonological naturalness.

In situations of prolonged language contact, conventional patterns of adaptation of loanwords are adopted by all members of the community. With time, these conventional adaptations may become completely arbitrary from a phonological point of view. The interlingual correspondences that have been considered in this paper constitute evidence for arbitrary correspondences among lexical items in the two languages of the bilingual speaker which are applied in a productive manner as adaptation rules. Any search for phonological naturalness would be misguided, since their source, in many cases, is to be found in complex evolutions and analogies. Given that bilingual speakers employ such arbitrary patterns of correspondence between their two lexicons, it seems plausible that the same procedure is also applicable within the lexicon of a single language. What I am suggesting is that even productive phonological rules should be properly viewed as learned patterns of alternation whose relative 'naturalness' is irrelevant for the speaker.

Notes

* For help of various types, I am grateful to Inma Muñoa, Jennifer Cole and Daniel Silverman.

¹ The scope of this paper is restricted to the Basque/Spanish contact situation. For the adaptation of borrowings in the the French Basque area, see Haase (1992).

² In Bizkaian or western Basque, unlike in the other dialects, whereas very old borrowed verbs have the suffix *-tu*, more recent borrowings (beginning already in the Middle Ages) preserve the Spanish ending with only a change from final *-o* to *-u*; e.g. *cumplido* > *kunplidu* 'fulfill' (in other dialects, *kunplitu*). More recently, as the *-d-* has been lost in the ending *-ado* in the regional variety of Spanish, this has also affected the shape of these borrowings in Bizkaian; e.g. *conta(d)o* > *kontau* 'count; tell' (in other dialects, *kontatu*).

³ A complicating factor is the existence in many dialects of a rule raising mid vowels to high before another vowel. This rule has a pervasive effect in inflection and partially obliterates the distinction between stems ending in *-o* and stems ending in *-u*. In these dialects, the contrast between, for instance, *beso/besoa* 'arm/the arm' and *buru/burua* 'head/the head' has been replaced by *beso/besua*, *buru/burua*, where the inflected forms present the same sequence *-ua*. This has created some instability in the assignation of specific nominals to the *o*-final or the *u*-final class in some of these varieties. But also in dialects without this process, the assignment of Spanish borrowings to the *o*-final class or the *u*-final class may follow different patterns. To give only one example, in some Bizkaian varieties studied in Irigoyen (1984), Spanish nationality adjectives in *-ano* are adapted with final *-u*, unlike in standard Basque and most other dialects; e.g.: *amerikanu* 'American', *italianu* 'Italian'.

⁴ For the Beasain data I am grateful to Fidel Altuna.

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Loan word phonology: A case for a non-reductionist approach to grammar

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1. Introduction

German Syllable-Final Devoicing (SFD, hereafter) is a well-studied phenomenon, but accounting for the phenomenon in both native and loan words in a unified fashion is a challenging task. Therefore, the phenomenon can serve as a test to evaluate the viability of a given theory, provided that a phonological theory must be capable of accounting for both native and loan words equally well.

In this paper, I will demonstrate that a "reductionist" theory which regards the grammar as a mechanism for "top-down" imposition of minimal rules or constraints applying to underlying forms and generating surface forms from them is not capable of offering a coherent solution to German SFD, whether derivational as in SPE (Chomsky and Halle 1968) or non-derivational as in Optimality Theory (Prince and Smolensky 1993).

I will further demonstrate that a "non-reductionist" framework such as Cognitive Grammar (Langacker 1987, 1990, to appear; Rubba 1993; Kumashiro 1999), which regards the grammar as a structured inventory of actually-occurring expressions and schemas abstracted "bottom-up" from them, can account for the German data in a natural and elegant fashion.

2. Dialectal contrast in loan words

Loan words in German exhibit dialectal variations, as exemplified in (1).

(1) Dialectal variations in loan words

SOURCE	HIGH GERMAN	NORTHERN STANDARD GERMAN
<i>magnet</i> [g]	[magne:t]	[makne:t]
<i>fragment</i> [g]	[fragnet]	[frakment]

In High German, the words *magnet* and *fragment* are adopted as is without devoicing the obstruent, and [magne:t] and [fragnet] are obtained, respectively.¹ On the other hand, in Northern Standard German, *magnet* and *fragment* are adopted as [makne:t] and [frakment], respectively. That is, the word-medial [g] in the source language undergoes SFD.

In contrast to those in (1), the words in (2) show no such dialectal variations:

(2) No dialectal variations in loan words

SOURCE	HIGH GERMAN	NORTHERN STANDARD GERMAN
<i>charisma</i> [z]	[çarisma]	[çarisma]
<i>Marxism</i> [z]	[marksismus]	[marksismus]

The words *charisma* and *Marxism* are adopted as [çarisma] and [marksismus], respectively, in both dialects, with the word-medial [z] undergoing SFD.

The dialectal contrast between the words in (1) and those in (2) is summarized as follows: in High German, the obstruent [g] eschews SFD while the obstruent [z] is syllabified as a coda and undergoes SFD; in Northern Standard German, on the other hand, both [g] and [z] are syllabified as codas and undergo SFD.

3. Analyses

3.1. Previous reductionist analyses

Previous Generative Phonology analyses simply applied SFD, whether formulated as a rule or a constraint, to the forms in the source language (e.g. Hall 1992), and were unable to elegantly account for the contrasting facts without resorting to a stipulation, which is described in the table in (3):

(3) Stipulations on application of SFD in loan words

		High German	Northern Standard German
Source	[...gN...]	not apply	apply
	[...zN...]	apply	apply

It is necessary to have the proviso that in High German, SFD applies to word-medial [z], but not to [g] in the source. Notice that having such a stipulation is undesirable from a theory-internal perspective, since Generative Phonology seeks to employ minimum rules and/or constraints.

3.2. Proposed non-reductionist analysis

Contrastively, a non-reductionist framework such as Cognitive Grammar can account for the puzzling contrasts straightforwardly. The voiced obstruent [g] in the examples in (1) retains its voicing only in High German because only in the dialect does the word-medial sequence consisting of [g] and a nasal constitute an entrenched pattern among the native vocabulary. Observe the native words in (4), which exhibit dialectal variations parallel to the loan words in (1):

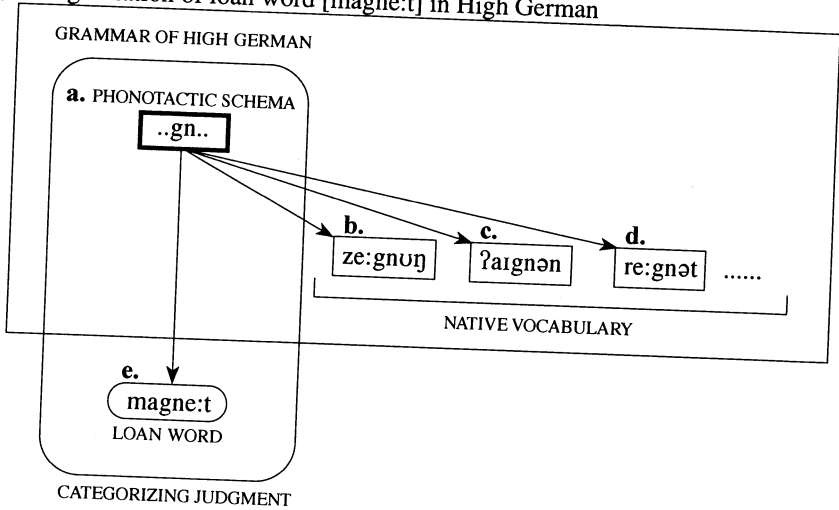
(4) Dialectal variations in native words

HIGH GERMAN	NORTHERN STANDARD GERMAN	
[ze:gnʊŋ]	[ze:knʊŋ]	'blessing'
[ʔaɪgnən]	[ʔaɪknən]	'to suit'

As can be observed in (4), the word-medial [g] does not undergo SFD in native words in High German, and [ze:gnʊŋ] and [ʔaɪgnən] are obtained. In the native vocabulary of Northern Standard German, the word-medial [g] undergoes SFD, and [ze:knʊŋ] and [ʔaɪknən] are obtained. That is, when a foreign word with the word-medial cluster [-gn-] is to be adopted, the cluster finds its counterpart in the native vocabulary of High German, but not in that of Northern Standard German.

This correspondence between the native and loan words is attributed to the presence of a phonotactic schema represented in (5) in the grammar of High German.

(5) Categorization of loan word [magne:t] in High German

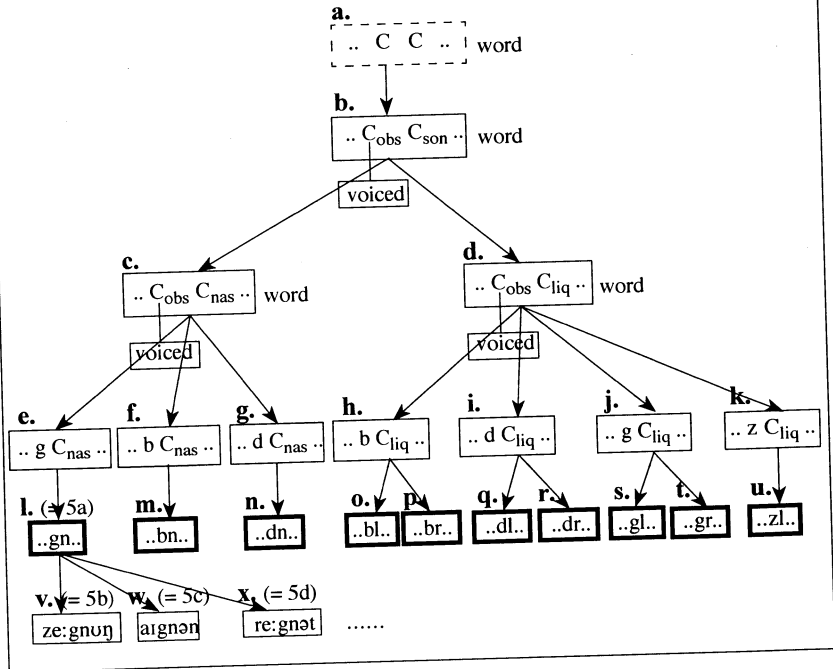


The phonotactic schema in (5)a is extracted from native words such as [ze:gnʊŋ] in (5)b, [ʔaɪgnən] in (5)c, and [re:gnət] 'to rain (3.sg.pres)' in (5)d, and represents the commonality among these words in a schematic fashion, i.e. the fact that words containing the cluster [-gn-] are conventional in the grammar of High German. The schema categorizes the loan word [magne:t] as an instantiation, i.e. judges the word as well-formed, and as a result, the word is included in the grammar as is, without devoicing the obstruent.²

The grammar of High German has other phonotactic schemas containing clusters that consist of a voiced obstruent and a sonorant, as described in (6).

(6) Word-medial clusters in High German

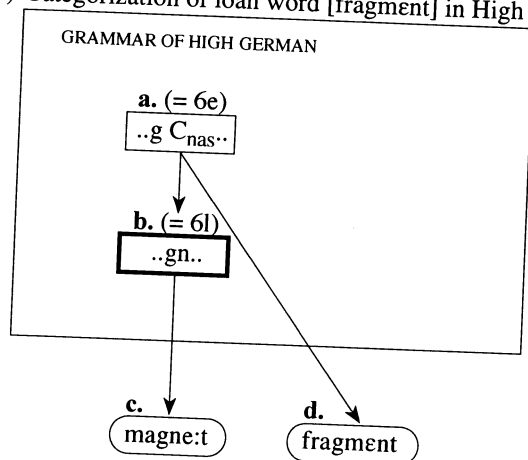
GRAMMAR OF HIGH GERMAN



The ten schemas in (6)l–(6)u constitute phonotactics of High German. Each of these ten schemas is extracted from actually-occurring native words in the dialect, and gives rise to a more-abstract higher-level schema, i.e. (6)a–(6)k, forming a complex network.

Notice that in contrast to [magne:t], which is categorized as an instantiation by the phonotactic schema in (6)l, [fragment] is categorized by none of the phonotactic schemas, (6)l–(6)u. That is to say, the word-medial cluster [-gm-] is not found among the native vocabulary of High German, yet [fragment] is adopted as is without devoicing the obstruent. This can be explained as follows. In the network in (6), the phonotactic schema [...gn...] in (6)l gives rise to a higher-level schema in (6)e, which represents an abstracted pattern containing a cluster that consists of the obstruent [g] and a nasal. This higher-level schema categorizes the loan word [fragment] as an instantiation, as illustrated in (7).

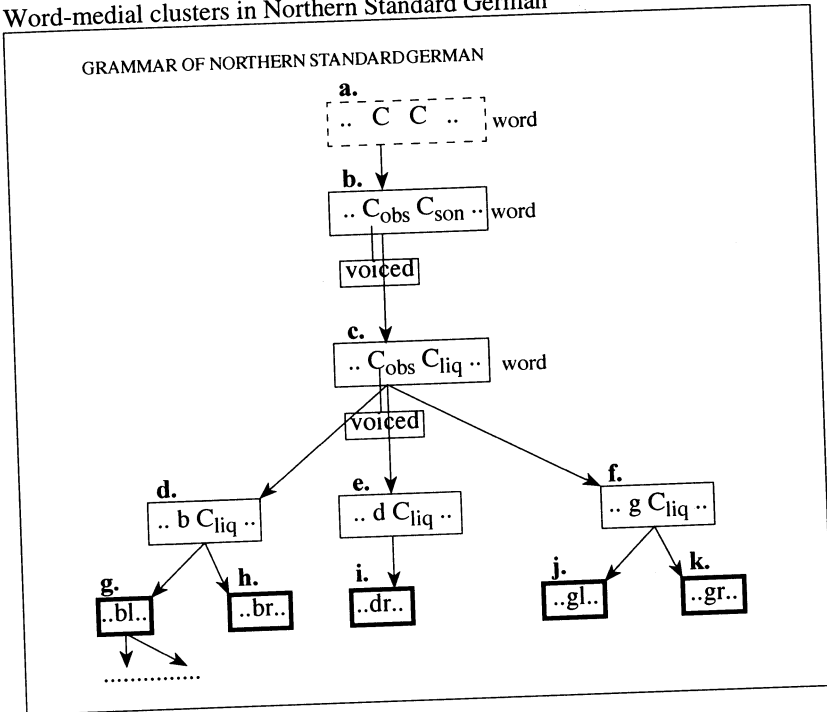
(7) Categorization of loan word [fragment] in High German



The schema in (7)a is relatively specific, although it is not as specific as the lower-level schema in (7)b. Therefore, the cognitive distance between the expression [fragment] and the categorizing schema in (7)a (i.e. how far the expression diverges from the schema by elaboration or extension) is relatively small, and the expression is judged well-formed.³ In other words, despite the lack of the corresponding cluster among the native vocabulary, [fragment] is adopted as is, without devoicing the obstruent, because its word-medial cluster [-gm-] is similar enough to the cluster [-gn-], which actually occurs in the native vocabulary.

On the other hand, the grammar of Northern Standard German does not have a phonotactic schema containing a cluster that consists of the obstruent [g] and a nasal, because such a cluster is not found among the native vocabulary. The dialect's network of phonotactic schemas containing clusters that consist of a voiced obstruent and a sonorant is illustrated in (8).

(8) Word-medial clusters in Northern Standard German



Northern Standard German has only five phonotactic schemas containing clusters that consist of a voiced obstruent and a sonorant, i.e. (8)g–k, and this is a result of the complete dominance of SFD; that is, all the clusters in (8)g–k occur tautosyllabically at syllable-onset position. More importantly, none of these five schemas have a nasal as the second segment of their clusters. Therefore, a foreign word with a cluster consisting of a voiced obstruent and a nasal is not categorized by any phonotactic schema in the grammar of the dialect, with the result that such a foreign word must have its obstruent devoiced in order to be admitted in the dialect. Therefore, the words *magnet* and *fragment* are adopted as [makne:t] and [frakment], with the word-medial obstruent devoiced.

Thus, dialectal variations in loan words are straightforwardly explained in Cognitive Grammar by treating them as resulting from categorization by accommodating phonotactic schemas, which vary from one dialect to another because they are extracted in a non-reductionist manner from the actually-occurring native vocabulary of each dialect.

Going back to the examples in (2), the reason why the obstruent [z] is devoiced in both dialects is that a word-medial cluster consisting of the obstruent [z] and a nasal is not found among the native vocabulary of either dialect. That is, accommodating phonotactic schemas such as (9)a–c do not exist in either dialect.

(9) Non-existent Schemas in either dialect

a.	b.	c.
..zn..	..zm..	..zŋ..

In other words, a cluster consisting of the obstruent [z] and a nasal is not an entrenched pattern in the native vocabulary of either dialect of German. Therefore, the words *charisma* and *Marxism* are adopted as [çarisma] and [marksismus], with a devoiced sibilant in both dialects.

Thus, the puzzling contrast between the loan words in (1) and those in (2) can be explained only by examining a structured inventory of actually-occurring native words and schemas abstracted from them, which are what Cognitive Grammar defines grammar as consisting of.

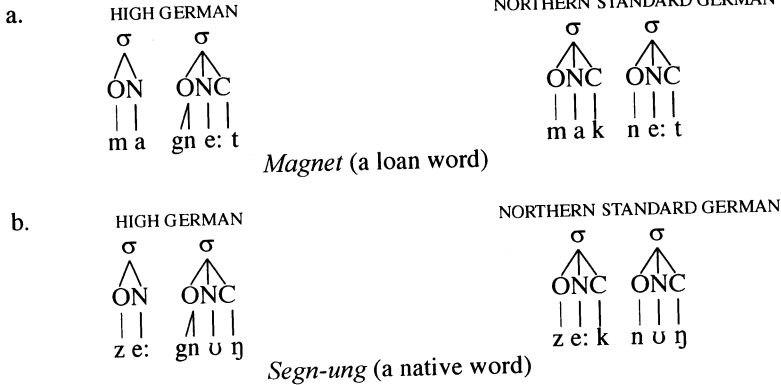
Contrastingly, Generative Phonology can explain the devoicing data by positing stipulations such as those in the table in (3). However, a different stipulation is required to deal with each type of loan word. The necessity to posit such stipulations incrementally and potentially infinitely points clearly to the fundamental flaw of the reductionist conceptualization of grammar.

4. Conceptual unification of grammar

4.1. Non-absoluteness of SFD

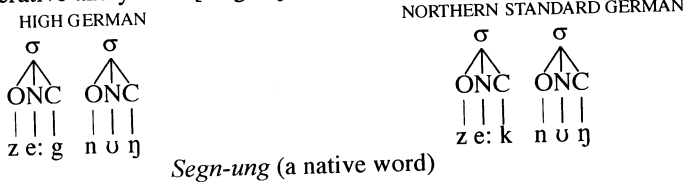
The advantages of the proposed non-reductionist analysis are not limited to the phonology of loan words, but extend to German phonology in general. Recall that in High German, SFD is not observed in the loan words given in (1) as well as the native words in (4). To the best of my knowledge, all the previous Generative analyses except Rubach (1990) claim that SFD is absolute in both High German and Northern Standard German. That is, they claim that the reason why SFD does not occur in the words given in (1) and (4) in High German is simply that the word-medial obstruents are syllabified as parts of the onsets of the following syllables, unlike Northern Standard German, where the obstruents are syllabified as codas, as illustrated in (10) (Vennemann 1972, 1978, 1982; Wurzel 1981a, 1981b; Wiese 1988, 1991, 1996; Hall 1989, 1992, 1993; Giegerich 1992; Ramers 1992; Yu 1992a, 1992b; Brockhaus 1995).

- (10) Generative analysis of [magne:t]/[makne:t] and [ze:gnun]/[ze:knun]



However, these syllabifications in (10) conflict with the syllabifications proposed by a pre-Generative descriptive analysis by Bithell (1952), illustrated in (11).

- (11) Pre-generative analysis of [ze:gnun]/[ze:knun] (Bithell 1952)



(11) shows that in High German, the word-medial obstruent [g] is syllabified as a coda without losing its voicing, defying SFD, while in Northern Standard German, it is devoiced at coda. Furthermore, this High German syllabification given in (11) conforms to the description of the 18th Century German (Voge 1978).

One might simply claim that the exceptional cases of Final Devoicing observed in the 18th century no longer hold true in Modern German. This seems the case at least with Northern Standard German: SFD has become absolute in the dialect. As for High German, however, the same claim cannot be sustained: it is possible that the same High German speaker syllabifies the voiced obstruent in question as a coda (e.g. [ze:g\$nuŋ] for *Segn-ung*) sometimes, but as an onset ([ze:\$gnuŋ]) at other times. Syllabification in German fluctuates, varying not only from one dialect to another, but also from one occasion to another with the same speaker (Brockhaus 1995:76). Nevertheless, it is undeniable that there are High German speakers who think [ze:g\$nuŋ] is what they pronounce, as can be observed in the following comment by Brockhaus (1995:75) on Rubach (1990), who bases his analysis on his recognition of the non-absoluteness of SFD in High German: "Rubach considers native speaker intuitions about syllable divisions important enough to feel the need for phonological representations to reflect them accurately (cf. *Hand.lung*, for example)".

Giegerich (1992:137) states that many speakers, including himself, never use

High German. Indeed, the High German forms with a syllable-final voiced obstruent ([ze:g\$nuŋ]) do not conform to the prevailing phonotactic pattern of the language, i.e. a voiceless obstruent at coda, and such forms are historically unstable (Hooper 1976). It is perhaps the case then that these non-obedient forms are now in the process of becoming obsolete. That is, it may be the case that SFD is in the process of becoming as entirely absolute as Word-Final Devoicing is now in the entire German language, prohibiting exceptional cases. Even if this is the case, the fact certainly calls for an explanation for why there still remain these High German speakers who think [ze:g\$nuŋ] is what they pronounce at the present time.

Therefore, I claim that the syllabifications in (11) are more truthful descriptions of the language than those in (10). That is, contrary to the claim made by previous Generative analyses, SFD is not an absolute constraint in High German: the word-medial obstruents in the loan words in (1) as well as in the native words in (4) are not devoiced, although they are syllabified as codas. I further claim that Generative reductionism, which places a high value on the generality of a rule or constraint, is responsible for this neglect of the native speakers' intuitions.

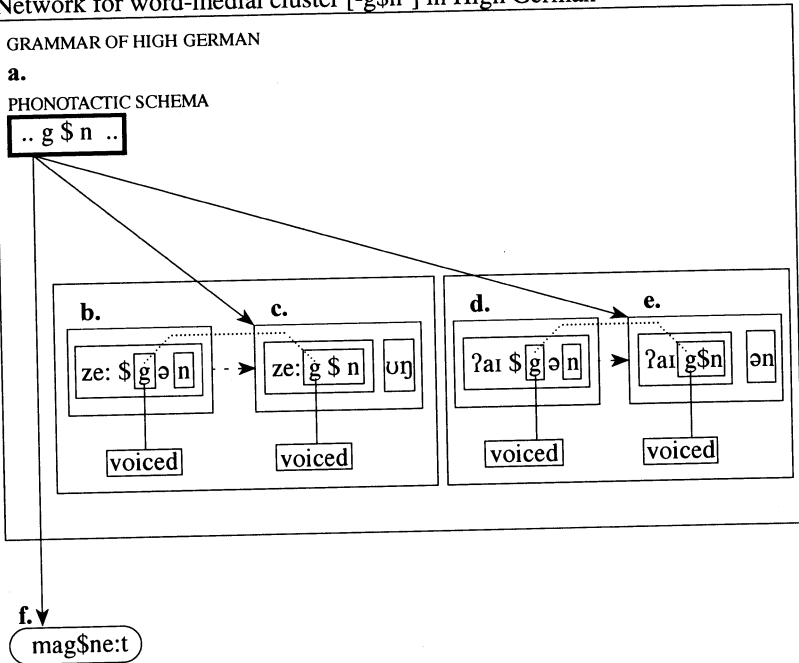
4.2. Interlexical relations

When the grammar is constructed in a non-reductionist manner, the non-occurrence of SFD in High German is not anomalous at all. Notice that for the native words *Segn-ung* [ze:g\$nuŋ] and *eign-en* [ʔaig\$ən], there exist lexically-related unsuffixed words, *Segen* [ze:gən] 'blessing' and *eigen* [ʔaigən] 'own', in which the obstruents are voiced, being at onset. Observe (12) and (13), where a dollar sign stands for a syllable boundary, and a dotted line for correspondence.

- (12) Interlexical relations among native words in High German

SUFFIXED		UNSUFFIXED	
ze:g\$nuŋ	'blessing'	ze:\$gən	'blessing'
ʔaig\$nuŋ	'to suit'	ʔa:\$gən	'own'

(13) Network for word-medial cluster [-g\$ŋ-] in High German



I claim that, as illustrated in the network in (13), the suffixed words [ze:gnuŋ] in (13)c and [ʔaɪgnən] in (13)e do not undergo SFD in High German so as to keep the Interlexical Relations with the unsuffixed words in (13)b and (13)d, respectively, as phonologically intact as possible. And, from these suffixed words, the phonotactic schema [-g\$ŋ-] is extracted and categorizes loan words such as [magne:t] in (13)f as instantiations. That is, in High German, the maintenance of Interlexical Relations has a higher priority than conformity to SFD.

Recently, Interlexical Relations have been intensively discussed in the Optimality Theory literature (Kenstowicz 1996, Benua 1997). However, note that Interlexical Relations are best viewed as a non-reductionist concept, because whether or not a certain word has a lexically-related word that would phonologically influence it can be determined only by examining the inventory of actually-occurring words in the language, a process that is non-reductionist. Since Optimality Theory is a reductionist theory, being one framework within Generative Grammar, Interlexical Relations are only opportunistically and arbitrarily utilized. In Cognitive Grammar, on the other hand, Interlexical Relations are a fundamental concept because the starting point for its approach to phonology is words as gestalt units (Rubba 1993), as can be observed in the formation of the networks in (6), (8), and (13). That is, only a non-reductionist framework such as Cognitive Grammar can account for German SFD in both native and loan words in a conceptually-unified manner.

5. Conclusion

This paper demonstrated that a non-reductionist approach such as Cognitive

Grammar can naturally and elegantly account for the puzzling phenomenon of German SFD involving loan words. The dialectal variations exhibited in the voicing of word-medial obstruents is attributed to the fact that each dialect has its own network of phonotactic schemas, which is conceivable only in a non-reductionist framework such as Cognitive Grammar, which views the grammar as a structured inventory of actually-occurring expressions and schemas abstracted from them. The proposed non-reductionist approach provides an insight into the phonology of the native vocabulary as well: SFD is not absolute in High German and yields to Interlexical Relations. It was argued that only a non-reductionist framework can accommodate Interlexical Relations in a conceptually-unified manner, as they are best viewed as a non-reductionist concept.

Notes

¹ For a discussion of the syllabification of the voiced obstruents, see Section 4.1.

² In (5), this categorizing relationship of instantiation is represented by an arrow. Also, The enclosure in a rectangular box as in (5)a–d represents the word's status as a "unit", i.e. an established and conventionalized expression, in grammar, whereas enclosure in a box with round corners symbolizes its status as a non-conventionalized novel expression.

³ For a detailed discussion of how a well-formedness judgement is made in Cognitive Grammar, see Principles of Uniqueness and Selection (Langacker 1990) and Well-Formedness Principles (Kumashiro 1999).

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Loan words and their implications for the categorial status of verbal nouns*

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1. Introduction

Japanese (J) and Korean (K) have a large class of lexical items borrowed from Chinese such as those given in (1). They typically appear in construction with the light verb *suru* (J)/*hata* (K) 'do' either as the complement of the light verb as in (2a) or as part of the verbal complex with 'do' taking a direct object as in (2b). The relevant terms are in boldface.

- (1) *untēn* (J)/*wuncen* (K) 'drive', *rensyūu* (J)/*yensup* (K) 'practice', *undoo* (J)/*wundong* (K) 'exercise', *tootyaku* (J)/*tochak* (K) 'arrive' . . .

- (2) a. kyoo-wa piano-no **rensyūu-o** sita. (J)
 onul-un phiano(-uy) **yensup-ul** hayssta. (K)
 today-TOP piano-GEN practice-ACC did
 'I practiced piano today.'
- b. kyoo-wa piano-o **rensyūu** sita. (J)
 onul-un phiano-lul **yensup** hayssta. (K)
 today-TOP piano-ACC practice did
 'I practiced piano today.'

These so-called 'Verbal Nouns' (VNs) exhibit properties of both nouns (e.g. taking a genitive modifier) and verbs (e.g. taking case-marked arguments) when they appear with an aspectual suffix *-tyuu* (J)/*-cwung* (K), as shown in (3).

- (3) a. (VN = N)
 [piano-no [_N **rensyūu**]]-tyuu-ni denwa-ga natta. (J)
 [phiano-uy [_N **yensup**]]-cwung-ey chenwa-ka ossta. (K)
 piano-GEN practice-during-at telephone-NOM rang.
 'The phone rang while (somebody was) practicing piano.'
- b. (VN = V)
 [piano-o [_V **rensyūu**]]-tyuu-ni denwa-ga natta. (J)
 [phiano-lul [_V **yensup**]]-cwung-ey chenwa-ka ossta. (K)
 piano-ACC practice-during-at telephone-NOM rang.
 'The phone rang while (somebody was) practicing piano.'

In (3a), the verbal noun *rensyūu/yensup* takes the genitive-marked modifier *piano-no/phiano-uy*. In (3b), on the other hand, the accusative marker on *piano* shows that it is the complement of *rensyūu/yensup*, presumably of category V. Thus the categorial status of verbal nouns has been the subject of debate as to

whether they are Ns (e.g. Miyagawa 1987), Vs (e.g. Shibatani and Kageyama 1988), or VNs (e.g. Miller 1967). Others such as Hasegawa (1991) and Manning (1993) have argued that these verbal nouns are either Vs or Ns.

One of the questions I address in this paper is whether the observed differences between Chinese origin VNs and native Vs (or Ns) should be attributed to grammatical category differences or some other properties. I argue that the correct analysis of VNs should be based on their morphophonological properties, not category membership: their ability to function like nominals is due to the fact that, like nouns, they are morphologically free forms and never take inflections such as tense suffixes, whereas native/canonical Vs are morphologically bound and must be inflected.

As evidence for this claim, I will draw on some facts about loan words and bilingual codeswitching from English to Japanese and Korean. I hope to show that borrowing neither imposes a categorial restriction specific to the phenomenon nor introduces a hybrid category such as VN that is unique to borrowed lexical items. The main question I want to try to answer is how borrowed lexical items are categorized in the host language, and what that might tell us about the categorial status of Verbal Nouns. Throughout, I will use the terms borrowing and loan word interchangeably, and treat codeswitching as part of the same phenomenon. (My use of these terms has no theoretical significance.)

2. Borrowing: Categorial restriction?

In the literature on borrowing, it is commonly assumed that verbs are typically borrowed as nouns. English loan words in (4a) and codeswitching in bilingual speech in (4b) (all attested examples from Japanese) typically appear with the light verb *suru* like the Chinese origin VNs, and are analyzed as Ns (or VNs) (e.g. Kageyama 1982, Nishimura 1985, Poser 1994, Azuma 1993, 1996; but see Romaine 1985 for her analysis of English verbs used in a Panjabi light verb construction).¹

- (4) a. Loan Words: *doraibu suru* 'to drive', *purinto suru* 'to print', *fakkusu suru* 'to fax', *oopun suru* 'to open', *rirakkusu suru* 'to relax', *nokku suru* 'to knock'
- b. Codeswitching: *push suru* 'to push', *entertain suru* 'to entertain', *stop suru* 'to stop', *help suru* 'to help'

Drawing on Miyagawa's (1987) feature system,² Azuma (1996) argues, for example, that the code-switched lexicon is limited to [+N] items. Poser (1994:3) likewise simply assumes without further discussion that "Japanese rarely borrows verbs directly, so virtually all loan verbs are borrowed as verbal nouns and used in the periphrastic construction".

However, closer examination of English loan words and codeswitching suggests otherwise: when verbs in English are borrowed into Japanese and Korean, they are used as verbs, and behave like verbs in the host language. One

piece of evidence for this claim is the fact that none of the loans or code-switched verbs in (4) admit case marking *-o* (J)/-*(l)ul* (K), as shown in (5).

- (5) a. Loan Words: **doraibu-o suru* 'to drive', **purinto-o suru* 'to print', **fakkusu-o suru* 'to fax', **oopun-o suru* 'to open', **rirakkusu-o suru* 'to relax', **nokku-o suru* 'to knock' (J)
 b. Codeswitching: **push-o suru* 'to push', **entertain-o suru* 'to entertain', **stop-o suru* 'to stop', **help-o suru* 'to help' (J); *respect(*lul) hata* 'to respect', *give-up(*ul) hata* 'to give up', *suggest(*lul) hata* 'to suggest', *communicate(*lul) hata* 'to communicate', *negotiate(*lul) hata* 'to negotiate', *compromise(*ul) hata* 'to compromise' (K)

This contrasts with Chinese origin verbal nouns in that, roughly speaking, all transitive unergative Chinese origin verbal nouns admit case-marking in the light verb construction (also see (2)):

- (6) *uten-o suru* (J)/*wuncen-ul hata* (K) 'to drive', *rensyuu-o suru* (J)/*yensup-ul hata* (K) 'to practice', *undoo-o suru* (J)/ *wundong-ul hata* (K) 'to exercise', *honyaku-o suru* (J)/*penyek-ul hata* (K) 'to translate', *ryokoo-o suru* (J)/*yeheyng-ul hata* (K) 'to travel, ...

This suggests that perhaps these Chinese origin verbal nouns have come to be used as nouns, much like English deverbal nominals such as *drive*, *practice*, and *exercise*, whereas verbs borrowed from English are (still) fully verbal in this construction. This effectively shows that borrowing is not limited to a particular lexical category such as N, as has been assumed at least for Japanese and Korean. More generally, I take the view that borrowing involves taking meaning and sounds and adapting them to fit the grammar of the host language, including phonotactics and morphological well-formedness. Now the questions that arise are: (i) What motivated the analysis that English verbs are borrowed as nouns—that is, in what sense are they like nouns, or different from native verbs? (ii) How are borrowed phonological materials categorized in the host language? I will deal with these questions in turn.

3 Morphological constraints

In a paper discussing constraints on so-called word-internal codeswitching—that is, combinations of morphemes from two languages to form a word (Morimoto 1999), I argued that such use of two languages is subject to one constraint: a borrowed item must minimally be a well-formed phonological word. The examples of word-internal codeswitching involving a variety of language pairs in (7)–(13) illustrate this point. In the examples, the matrix language (the language of the whole utterance) is in italics, and the borrowed/code-switched items are in small caps. (Examples (7)–(11) are taken from Myers-Scotton 1993 (M-S), all cited in Morimoto [1999].)

- (7) *Ellaam* CONFUSED -aa *irundadu*.
 everything -ADV COP.PAST
 "Everything was confused." (Tamil/English; M-S p.33)
- (8) *I'm LAV-ing PANDEKAGE-s*.
 "I'm making pancakes." (English/Danish; M-S p.33)
- (9) *El agua está* BOIL-ando.
 "The water is boiling." (Spanish/English; M-S p.34)
- (10) *Hapa* FLAME *hiyo inaenda juu-haiwezi ku-ku*-BURN.
 INFIN-2SOBJ
 "The flame is going upwards, it can't burn you."
 (Swahili/English; M-S p.30)
- (11) *Ja mä* KOKA-sin *kahvin*.
 and I cook-PAST coffee
 "And I made coffee." (Finnish/Swedish; M-S p.108)
- (12) *Ba-GARÇON-s wans ba-zo-mi-DEFENDRE kata pamba*.
 PL-boy-PL there they-be-?-defend just for.nothing
 "Those boys are arguing (in self-defense) just to save face."
 (Lingala/French; Choi 1991:893)
- (13) *I want one of those* KOKI-s
 meat
 "I want one of those pieces of meat." (Korean/English; Choi 1991:885)

On the other hand, examples in which a borrowed item is not a well-formed phonological constituent (i.e. free-standing element) in the borrowing language are unacceptable, as shown in (14).

- (14) a. **They're* YOM-ing.
 "They're reading." (borrowing a Japanese verb root yom-)
- b. **They're* MEK-ing.
 "They're eating." (borrowing a Korean verb root mek-)
- c. **The water is* HERV-ing.
 "The water is boiling." (borrowing a Spanish verb root herv-)

Now, having seen that only a well-formed phonological word can be borrowed, we need to recognize one other fact about borrowings. As illustrated in (15), we

see that borrowed verbs can never take verbal inflections in Japanese and Korean.³

- (15) **doraibu-ta* (drive-PAST), **purinto-ta* (print-PAST) (J); **communicate-ss-ta* (communicate-PAST-DECL), **negotiate-ss-ta* (negotiate-PAST-DECL) (K)

I suggest that this is due to a constraint on morphological combination independently motivated for Japanese and Korean: verbal and adjectival inflections select only for a bound host (cf. Cho and Sells 1995, Yoon 1995). And this is key to the proper distinction between Chinese origin verbal nouns and native Vs: as a necessary consequence of the borrowing process, all borrowed words are morphologically free forms, and thus they can never take native inflections.

These facts about borrowings and how they are integrated into the syntax of the host language also shed light on the categorial status of Chinese origin verbal nouns, which have exactly the same properties of morphology and syntax: like English loan words and codeswitches, they are uninflectable phonological words, as shown in (16).

- (16) **uten-ru* (J)/**wuncen-ta* (K) 'to drive', **rensyuu-ru* (J)/**yensup-ta* (K) 'to practice', **undoo-ru* (J)/ **wundong-ta* (K) 'to exercise', **tootyaku-ru* (J)/**tochak-ta* (K) 'to arrive' ...

The morpho-phonological and morpho-syntactic properties of native verbs, English borrowings and Chinese origin verbal nouns are summarized in (3).

(17)

	Native verbs	English verbs	Chinese origin verbs
Take Inflection	√	—	—
Combine w/ Light V	—	√	√
Morphological Property	Bound	Free	Free

Coming back to the first question we raised earlier, we now see how borrowed verbs and Chinese origin verbal nouns are different from native Vs: they are distinct in terms of their morpho-phonological and morpho-syntactic properties, not in terms of category membership. To function as verbs in the syntax, borrowed verbs and Chinese origin Vs are combined with the light verb ('do') rather than native inflection.

As mentioned earlier, if we take the view that borrowing involves taking a concept and phonological material that represents the concept, whatever the

syntactic category of that material might be in the original language, then we need to come to the second question—how borrowed words are categorized in the host language. In the following section, I propose that in the borrowing process, lexical items are assigned a category in the host language based on the conceptual prototypes discussed in the typological literature (e.g. Croft 1991) and categorial distinctions available in the host language. This will also explain the dual behavior of Chinese origin verbal nouns.

4 Category assignment

One of the fairly robust generalizations about syntactic categorization in the typological literature is that cross-linguistically, there is a strong correlation between ontological category and word class. As shown in (18) (Croft 1991:55), prototypically, the category Noun represents the semantic class of object and serves the pragmatic function of reference; the category Adjective represents the semantic class of property and functions as modification; the category Verb correlates with the semantic class of action, and its unmarked function is predication.

(18) Prototypical correlations of syntactic categories

	Syntactic Category		
	<i>Noun</i>	<i>Adjective</i>	<i>Verb</i>
Semantic class	Object	Property	Action
Pragmatic function	Reference	Modification	Predication

The notion of markedness used here is based on structural criteria (Greenberg 1966), one of which is that the unmarked value is indicated by the absence of an additional morpheme, and the marked value is indicated by the presence of an additional morpheme.⁴ So the marked correlation of category, semantic class, and pragmatic function is generally indicated by overt marking such as derivational morphology, or by a marked construction. Such morphosyntactic expression of the unmarked and marked correlations along these dimensions is shown in (19) (Croft 1991:67). So for example, when nouns and adjectives function as predicates, they appear with a copula, whereas verbs can function as predicates without an auxiliary element; other non-prototypical correlations are marked by various kinds of morphology.

(19) Function-indicating morphosyntax

	Reference	Modification	Predication
Objects	UNMARKED NOUNS	genitive, adjectivalizations, PPs on nouns	predicate nominals
Properties	deadjectival nouns	UNMARKED ADJECTIVES	predicate adjectives
Actions	action nominals, complements, infinitives, gerunds	participles, relative clauses	UNMARKED VERBS

Drawing on these typological generalizations, I propose that the category assignment of borrowed vocabulary items follows these prototypical correlations of ontological category and word class, given in (20).

(20) **Prototypical Lexical Category Assignments:**

- a. If referential then the unmarked category is N.
- b. If descriptive/stative then the unmarked category is A.
- c. If eventive then the unmarked category is V.

Code-switched items like *consider* in (21) denote an event and hence are categorized as V in the host language as well. As such, they do not admit case marking.

- (21) nay-ka ceney malhayss-ten kes **consider(*-lul)** hay-pwa. (K)
 I-NOM before said-NML fact consider(-ACC) please.do
 'Please consider what I said before.'

Likewise, loan words like *purinto* 'to print' in (22a) refer to an event and thus are used as V and do not allow case marking. As (22b) shows, *purinto* is also borrowed as N to refer to a result.

- (22) a. ima **purinto(*-o)** simasita. (J)
 now print(*-ACC) did.
 '(I) just printed (it) out.' (lit. '(I) just did the printing (of it)')
- b. ima-kara purinto-o kubarimasu.
 now-from handout-ACC distribute
 '(I'll) distribute a handout now.'

Another more striking example from Japanese that illustrates the category assignments in (20) is *sando suru* 'to press something in between two objects like a sandwich' in (23), which shows that the English word *sandwich* has been

borrowed as N to refer to an object *sandoitti* (conforming to the Japanese phonotactics), but part of that word *sando* has been reanalyzed as V to refer to an action of making something into a sandwich. This illustrates that a unit which has no category can be categorized as V if speakers use it to denote an action.⁵

(23) *sando suru* 'to sandwich'

English	Japanese N	Japanese V
sandwich →	[_N <i>sandoitti</i>] →	[_N [_V sando] <i>itti</i>]

These data also offer some insight to the use of Chinese origin verbal nouns. Their dual properties as Ns and Vs can be explained if we take the view that in a given construction, if a VN denotes an event, then it is used as a verb and behaves like a verb; if, on the other hand, it is referential, it is used as N and exhibits nominal properties.

All these data show, more generally, that the typological generalizations about the prototypical correlation between the conceptual class and grammatical category are most clearly observed when new vocabulary items are added to the existing lexicon. This view of categorization is also illustrated by the ways in which Japanese and Korean adopt adjectives borrowed from English. Illustrating this point further with adjectives, I will also show that the data on adjective borrowings help us reexamine the categorial status of another hybrid category, Adjectival Nouns (ANs) in Japanese.

5. Adjectives and Adjectival Nouns

Like verbs and verbal nouns, in Japanese two classes of adjectives are recognized: regular Adjectives which are morphologically bound forms and inflect for tense, as in (24), and Adjectival Nouns which are free forms and appear with the copula *-da* when used predicatively and *-na* prenominally, as in (25).

- (24) *kawai-i/katta* 'pretty-NPAST/PAST', *huru-i/katta* 'old-NPAST/PAST',
kitana-i/katta 'dirty-NPAST/PAST', *utukusi-i/katta* 'beautiful-
 NPAST/PAST', *samu-i/katta* 'cold-NPAST/PAST', *kata-i/katta* 'hard-
 NPAST/PAST', ...

- (25) *sizuka-da* 'quiet', *genki-da* 'healthy', *teinei-da* 'polite', *kappatu-da*
 'energetic', *odayaka-da* 'calm', ...

When English adjectives are borrowed into Japanese, they are borrowed as As; however, as English adjectives are free forms, they cannot be inflected like canonical As in Japanese—the same combinatorial restriction as the verbal morphology holds here for adjectives. So they combine with the copula *-da* as in (26a). Korean lacks category A, and so borrowed As are categorized as stative Vs and combine with the light verb *hata*, rather than the copula, which is generally reserved for non-verbal predication (26b).

- (26) a. *kuuru-da* 'cool', *riizunaburu-da* 'reasonable', *kyuuto-da* 'cute', *syai-da* 'shy', *sinpuru-da* 'simple' (J)
 b. *khwul hata* 'cool', *simphul hata* 'simple', *miin hata* 'mean', *haynsem hata* 'handsome', *naisu hata* 'nice' (K)

These data show that in terms of category assignment, borrowing simply involves fitting borrowed items into the existing category system of the host language, again, according to their conceptual prototypes. This point is further illustrated by the use of English *now* and *shock* in Japanese, shown in (27). The adjectival use of *now* in *nau-na kakko* in (27a) describes the state of being cool, modern, or trendy. The use of *shock* in *shokku-na dekgoto* in (27b) describes an event that is shocking/surprising.

- (27) a. *nau-na kakko* (now-cop fashion) 'fashionable'
 English Japanese
 [Adv now] → [A nau] cf. **nau-ni* (now-ADV)
 b. *shokku-na dekgoto* (shock-cop event) 'shocking event'
 English Japanese
 [N/V shock] → [A shokku] cf. **shokku suru* 'to shock'

Note that an adverbial use of *now* as in *nau-ni* or the verbal use of *shock* in *shokku suru* is not possible, indicating that *now* and *shock* are not borrowed as Adverb and Verb respectively in Japanese, precisely because they are both used to describe a state/property, not a referent, action, or manner.⁶ These examples thus show that regardless of the syntactic category in the original language, words can be categorized as A in the host language when used to denote a state/property. The data on borrowing of English adjectives into Japanese and Korean illuminate a striking parallelism between what have been categorized as VNs and Adjectival Nouns (ANs) in (5). These ANs have been claimed to constitute a genuine lexical category AN because they exhibit combinatorial properties of both adjectives and nouns (e.g. Miyagawa 1987). However, just as we saw with borrowed Vs and Chinese origin VNs (see (17)), the proper distinction seems to be in terms of the morphological property—the free-bound distinction: ANs as well as English adjectives such as those in (26) are morphologically free forms, and as such, they never take Japanese adjectival inflection and instead combine with the copula (also see Kubo (1992)). These observations are summarized in (28).

(28)

	Canonical As in Jp	English As	Japanese ANs
Take Inflection	√	—	—
Combine w/ copula	—	√	√
Morphological Property	Bound	Free	Free

6. Conclusion

In this paper, I have argued for the following points:

- Borrowing imposes no categorial restriction, nor does it create a new hybrid category such as VN or AN.
- Categorization of borrowed items follows the prototypical correlations between ontological category and word class in the borrowing language.
- All borrowed words are morphologically free forms, and hence they never take native inflections. Chinese origin verbs have the same property, so even as Vs, they must combine with the light verb *suru* or *hata* to function in the syntax.

Once these morpho-phonological and morpho-syntactic aspects of words from English or Chinese are properly sorted out, we see that Verbal Nouns (and Adjectival Nouns) fall into the regular category system of the language, and do not require any special treatment.

Notes

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¹In her discussion of English-Panjabi codeswitching, Romaine (1985) claims that English lexical items such as *involve*, *depend*, and *cut off* that are borrowed into Panjabi form "mixed V-V compounds" with the Panjabi light verb *hona* 'do', and provides evidence that these are not N-V sequences.

²Building on Chomsky's (1970) binary feature decomposition for major lexical categories (V:[+V, -N], N:[-V, +N], A:[+V, +N], P:[-V, -N]), Miyagawa (1987) argues for the following feature system for Japanese lexical categories:

- | | |
|--------------------|----------|
| (i) Verb: | [+V, -N] |
| Noun & Verbal Noun | [-V, +N] |
| Adjective | [+V] |
| Adjectival Noun | [+V, +N] |
| Postposition | [-V, -N] |

³There are exceptions, however, where we get borrowed verbs taking native inflections. Some examples are given below, by Eleanor Batchelder (email communication, March 25, 1999). The (a) examples are generally considered relatively well-established and wide-spread in the language, whereas the (b) examples seem to be relatively new and age-specific.

- | | | | |
|--------|---------|-----------------|------------------------------|
| (i) a. | hamo-ru | harmonize-NPAST | 'to harmonize' |
| | dabu-ru | double-NPAST | 'to double, make double' |
| | misu-ru | mistake-NPAST | 'to make a mistake' |
| | memo-ru | memo-NPAST | 'to write a memo' |
| | sabo-ru | sabotage-NPAST | 'to neglect work' |
| | ziko-ru | accident-NPAST | 'to have/cause an accident' |
| b. | azi-ru | agitate-NPAST | 'to agitate' |
| | pato-ru | patrol-NPAST | 'to patrol' |
| | nagu-ru | neglect-NPAST | 'to neglect' |
| | taku-ru | taxi-NPAST | 'to take a taxi, go by taxi' |

⁴ More precisely, markedness here should be interpreted as implicational in that in no case is the marked member of the category expressed by zero marking and unmarked member by overt marking (Greenberg, 1966:26-28)

⁵ Alternatively, *sandwich* could have been borrowed both as N and V, and the verb use of the word has been shortened, though it is not clear why only the verb form is shortened and the noun form is not. In any case, my point remains the same, namely that *sando*, which has no category of its own in English, can be used as a verb in the host language when used to denote an action.

⁶ There is also a noun use of *shock* in Japanese, *shokku-o ukeru* '(lit.) to receive a shock (to be shocked)', but the crucial point here is that the word is never an Adjective in English.

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Perception, representation and correspondence relations in loanword phonology

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1. Introduction*

Systematic patterns of segmental deletion are found in French loanwords in Fula and Kinyarwanda (e.g. Rose 1995, Paradis and LaCharité 1997). These deletion patterns are restricted to two specific contexts: rising diphthongs and nasal vowels. In this paper, I will show that both rising diphthongs and nasal vowels are represented in the loan input as two Root nodes licensed by a unique timing position, following the representations in (1). I will also discuss important issues relative to input interpretation and representation in loanword phonology. An analysis will follow, couched within Correspondence Theory (McCarthy and Prince 1995).

- (1) Rising diphthongs and nasal vowels: two Root nodes under one timing unit

a) Rising diphthong



b) Nasal vowel



Timing tier

Segmental tier

1.1 Description of the languages studied

As we can see by comparing the brief description of French, Fula and Kinyarwanda in (2), (3) and (4), these languages differ in many respects.

- (2) French phonological system (Casagrande 1984)

a) Phoneme inventory

p/b	t/d	k/g			
f/v	s/z	ʃ/ʒ		i	y
m	n	ɲ		e	ø
	l		ʁ	ɛ/ɛ̃	œ/œ̃
w		ɥ/j			(ə)
					ɔ/ɔ̃
					a/ɑ̃

b) Syllable structure

- Branching onsets are allowed (e.g. *bras* [br̥ga] 'arm')
- Codas are allowed (e.g. *patte* [pat̥] 'paw')
- Onsets followed by empty nuclei are allowed (e.g. *arbre* [aʁ̥b̥g̥] 'tree')

- (3) Fula phonological system (Paradis 1986)

a) Phoneme inventory

p/b	t/d	k/g			
f	s		h		
		tʃ/dʒ			
β	ɗ	c			
m	n	ɲ	ŋ	i	u
	r/l			ɛ	ɔ
w		j			a

b) Syllable structure

- Branching onsets are disallowed (*σ[CCV])
- Codas are allowed (CV[C]σ)
- Onsets followed by empty nuclei are disallowed (*CVCC#)

(4) Kinyarwanda phonological system

a) Phoneme inventory (Jouannet 1983)

p	t/d	k/g	
β/f/v	s/z	ʃ/ʒ/ç	h
pf	ts	tʃ	
m	n	ɲ	i/i: u/u:
	r		e/e: o/o:
w	j		a/a:

b) Syllable structure

Maximal syllable: CV(:) (no branching onsets, no codas)

Nasal contours (ⁿC) are allowed

As already mentioned, the languages presented above differ in many respects. For example, even though the features Labial, Coronal and [nasal] are contrastive in Fula and Kinyarwanda (see inventories in (3) and (4) respectively), neither of the two languages combine these features in their native inventory. The French Labial-Coronal and nasal vocoids will have to be adapted in Fula and Kinyarwanda.

2. Data

2.1 Preservation contexts: an example

I will now turn to the data to be discussed. First, we can find contexts of full preservation in word-initial consonant-liquid-vowel (CLV) clusters. In (5), we can see that French loanwords containing a word-initial CLV sequence are adapted in both Fula and Kinyarwanda with preservation of all of the input segments.

(5) a) French CLV sequence adapted in Fula (Lebel 1994)

<i>classe</i>	[klas]	→	[kala:s]	'class'
<i>drap</i>	[dra]	→	[dara]	'bed sheet'
<i>frais</i>	[fɛɛ]	→	[fere]	'fresh'

b) French CLV sequence adapted in Kinyarwanda (Rose 1995)

<i>plume</i>	[plym]	→	[purimi]	'feather'
<i>drapeau</i>	[draɔpɔ]	→	[darapo]	'flag'
<i>frommage</i>	[fɛɔmaʒ]	→	[foromaʒi]	'cheese'

2.2 Deletion contexts

2.2.1 CGV sequences containing an ill-formed glide in Fula¹

The CLV context contrasts with the consonant-glide-vowel (CGV) context. Fula disallows Labial-Coronal vocoids (see (3a)). In (6a), we see that when the Labial-Coronal segment appears in a CV sequence, it is preserved. The *[y] is adapted into [i]. However, we observe in (6b) that when the Labial-Coronal vocoid *[ɥ] appears in a CGV sequence deletion is observed in the adapted form.

- (6) *Labial-Coronal segments adapted in Fula (Paradis and LaCharité 1997)

- a) *Lab-Cor in a CV sequence: preservation

<i>autobus</i>	[ɔtɔbys]	→	[ɔtɔbɪs]	'bus'
<i>budget</i>	[bydʒe]	→	[bɪdʒe:]	'budget'
<i>bureau</i>	[byʁo]	→	[bɪʁo]	'desk / office'

- b) *Lab-Cor in a CGV sequence: deletion

<i>biscuit</i>	[biskui]	→	[biskɪ]	'biscuit'
<i>tuyau</i>	[tɥijo]	→	[tɪjo]	'pipe'
<i>circuit</i>	[sɪrkui]	→	[sɪrkɪ]	'circuit'

2.2.2 Nasal vowels in a CVC language: Fula

Turning now to nasal vowels, we see in (7a) that in French loanwords in Fula, when nasal vowels appear in an open syllable, they are adapted into a VN sequence, i.e. with preservation of the nasal part of the vowel. However, when nasal vowels appear in a closed syllable, nasality is lost, as we can see in (7b).

- (7) French nasal vowels adapted in Fula (Paradis and LaCharité 1997)

- a) Nasal vowel in open syllable: full preservation

<i>canton</i>	[kã.tã]	→	[kantɔn]	'township'
<i>ciment</i>	[si.mã]	→	[siman]	'cement'
<i>consulat</i>	[kõ.sy.la]	→	[kɔnsula]	'consulate'

- b) Nasal vowel in closed syllable: loss of nasality

<i>balance</i>	[ba.lãs]	→	[balas]	'scale'
<i>dimanche</i>	[di.mãf]	→	[dimas]	'Sunday'
<i>essence</i>	[e.sãs]	→	[esais]	'gasoline'

2.2.3 Nasal vowels in a CV language: Kinyarwanda

Regarding the nasal vowels found in French loanwords in Kinyarwanda, we can see in (8a) that the nasal portion of a word-internal nasal vowel is preserved and creates a nasal contour onto the following consonant. However, when the nasal vowel is word-final, as in the examples in (8b), nasality is lost.

- (8) French nasal vowels adapted in Kinyarwanda (Rose 1995)

- a) Word-internal nasal vowel: full preservation

<i>bandit</i>	[bãdi]	→	[βa: ⁿ di]	'bandit'
<i>fanfare</i>	[fãfã]	→	[fa: ⁿ fa:ri]	'fanfare'
<i>vidange</i>	[vidã]	→	[vida: ⁿ zi]	'garbage'

- b) Word-final nasal vowel: loss of nasality

<i>camp</i>	[kã]	→	[ka]	'camp'
<i>avion</i>	[avjã]	→	[avijo]	'plane'
<i>maçon</i>	[masã]	→	[maso]	'mason'

Keeping these data in mind, I will now discuss how the French inputs should be perceived, interpreted and finally adapted in the borrowing languages.

3. On the nature of the input

Concerning the phonological status of the loanwords studied in this paper, I follow Paradis and LaCharité (1997), who argue that these loanwords are phonological inputs to the borrowing language. In order to discuss the representation of these loanwords, three important questions will be addressed regarding 1) the prosodic shape of the loan input, 2) how this input is perceived by the borrower, and 3) how it is represented in the borrower's phonology.

3.1 Loan and native inputs have identical prosodic shapes

Regarding the prosodic shape of the loan inputs, Silverman (1992) adopts a strong phonetic position, claiming that the input is merely acoustic and is devoid of any phonological representation. Paradis and LaCharité (1997) provide arguments against a strictly phonetic treatment of the loan input. They claim that the phonological output of the source language phonology is directly incorporated into the host lexicon. Their position, however, poses problems. If the input to the borrowing language were the output of the source language's phonology, this would logically entail that the input is incorporated into the borrowing language with its segmental *and* prosodic representations. Consequently, we should expect syllable and stress patterns from the source language to show up with some consistency in the studied forms. However, there is no empirical evidence in the loanwords studied here that borrowers access prosodic levels of representation such as the syllabic tier. I argue that prosodic elements such as syllable constituents are not represented in the loan input for three reasons. First, as I just mentioned, syllable constituency found in the foreign (non-adapted) form does not affect the way that loanwords are adapted. Second, access to higher levels of representation (e.g. syllabic or metrical) cannot characterize the loanwords studied in this paper. (Other loanword situations such as the ones studied in Paradis and Lebel (1994, 1997) and Itô and Mester (1995) do require access to these levels of representation.) Third, if the input to phonological adaptation contained its full foreign prosodic structure, its formal representation would not look like that of native inputs, as prosodic structure is standardly assumed not to be present in input representations. Therefore, I claim that the loan inputs studied in this paper have the same prosodic shape as any native input in the language, as illustrated in (9).

- (9) Current proposal: native and loan inputs have the same prosodic shape²

a) Native input

X	X	X
R	R	R

b) Loan input

X	X	X
R	R	R

(R = Root node)

These representations relate directly to the next point to be discussed, namely, perception of the loan input.

3.2 Loan input is perceived through L1 contrastive features

When a loan segment is not present in the L1 inventory, the way the borrowing language can cope with this segment has consequences on how it will be adapted. On this, Silverman (1992) and Yip (1993), in their respective studies of English loanwords in Cantonese, hypothesize that the segmental deletion cases observed in these loanwords are caused by a lack of salience at the perceptual level. According to their hypothesis, the deletions observed are not phonological. However, Jacobs and Gussenhoven (1998) object, in line with Paradis and LaCharité (1997), that the deletions found in loanwords must be the result of the borrowing language's grammar constraints. They propose that the borrower has full access to the loan's phonological representations, through the UG. I agree with Jacobs and Gussenhoven (1998) that the UG plays a determining role in the perception and interpretation of loan inputs. However, I adopt a more restrictive view concerning what the borrower can access. The position I defend follows from Brown (1997), who demonstrates, with a series of experiments on perception of non-native contrasts in L2 learners, that new segments can be represented only when the

contrastive features are present in the native (L1) phonology. With regards to this, Brown predicts that 1) L1 features can be combined in new ways (to yield new segments), but that 2) new features cannot be added to the system. This entails, for example, that the Fula or Kinyarwanda speaker, who has no front rounded vocoids but has both coronal and labial vocoids in his L1, should be able to combine these two features to build a new representation for the vowel [y], as illustrated in (10).

- (10) Current proposal: L2 representations can combine L1 contrastive features
- | L1 contrasts | Contrastive features | Possible new representations |
|----------------|----------------------|--|
| a) /i/ ~ /u/ | Lab, Cor | Lab-Cor vocoids (e.g. [y]) |
| b) /t/ ~ /n/ | [nasal] | Nasal vowels ([nasal] added to vowels) |
| c) * /e/ ~ /ε/ | (No [ATR]) | ATR contrast cannot be represented |

3.3 Non-native representations are interpreted through the UG

In addition to building new contrasts, the borrower needs to interpret the way segments are anchored to the timing tier. When foreign strings of segments are not present in the borrowing language, I propose that interpretation should be driven by the UG. In the case of a CLV sequence, the default interpretation is arguably that three distinct segments are licensed by their own timing position, as we see in (11).

- (11) Default interpretation of CLV sequences (cf. Vata, Kaye 1985)
- | | | | |
|---|---|---|-----------------------|
| X | X | X | <i>Timing tier</i> |
| | | | |
| C | L | V | <i>Segmental tier</i> |

The situation, however, is more complex in the case of a CGV sequence. In theory, the speaker can interpret it in three different ways, as presented in (12).

- (12) Possible interpretations of CGV sequences
- | | | | | | | | |
|------|---|---|------|-----|------|---|-----------------------|
| a) X | X | X | b) X | X | c) X | X | <i>Timing tier</i> |
| | | | | └─┘ | └─┘ | | |
| C | G | V | C | G | V | C | G |
| | | | | | | | <i>Segmental tier</i> |

As more than one option for the interpretation of a CGV sequence is available across languages, in order to determine what the default option offered by the UG is, it is necessary to investigate the typological tendencies found cross-linguistically.

To tease apart (12a) and (12b), I examined the syllabification of CGV clusters across languages. On one hand, (12a) must lead to a C.G.V syllabification, since, according to Schane (1987), only falling diphthongs count as two positions in languages that treat long vowels and diphthongs as quantitatively equal. On the other hand, (12b) can only be syllabified as C.G.V, since the only two positions available in this configuration must be syllabified as an onset-nucleus sequence. We can see from the survey in (13) that, in languages that have CGV clusters, the C.G.V syllabification appears to be favored. The monopositional rising diphthong option in (12b) is thus less marked than (12a).

(13) Syllabification of CGV clusters across languages

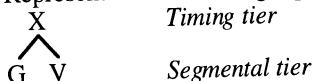
<u>Language</u>	<u>Family</u>	<u>C.GV</u>	<u>CG.V</u>
Frisian	West Germanic		✓
Dutch	West Germanic		✓
American English ³	West Germanic	✓	✓
Old English	West Germanic	✓	
Slovak	Slavic	✓	
French	Romance	✓	
Spanish	Romance	✓	
Italian	Romance	✓	
Imyan Tehit	Indo-Pacific	✓	

A more complex task resides in teasing apart (12b) and (12c). However, this last option, which represents secondarily-articulated consonants, is subject to several distributional restrictions (e.g. Maddieson (1984) and Ladefoged and Maddieson (1996)). For example, of the four existing secondary articulations, Labial is the most attested, but C^w is largely confined to velars and uvulars, and it is only attested in a minority of languages. Also, the possible set of secondarily-articulated consonants is very restricted. Given all of these restrictions, it seems unlikely that (12c) constitutes an unmarked option. I therefore conclude that (12b) is the UG default interpretation available to the borrower.

3.4 Representation of input rising diphthongs and nasal vowels

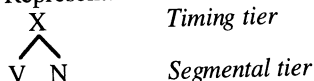
Following this conclusion, I assume the representation for rising diphthongs given in (14).

(14) Representation of a rising diphthong



There is thus, in loan input representations, a crucial difference between CLV and CGV sequences. The sharing of one timing position by two Root nodes in rising diphthongs illustrated in (14) is in fact parallel to that for nasal vowels, whose representation is given in (15). Nasal vowels contain a combination of two Root nodes, an oral and a nasal one, anchored to a single timing position. This representation, which is in line with Dell (1970) and Prunet (1986), is argued for by Paradis and Prunet (1997) and supported by Piggott (1997).

(15) Representation of a nasal vowel (e.g. Paradis and Prunet 1997)



We will see in the next section that the sharing of a timing position in rising diphthongs and nasal vowels constitutes the structural cause for the Root node deletions observed earlier in the data. This complexity will also have consequences on how segments are adapted in loanwords. As we will see, in all of the deletion contexts, at least one of the input Root nodes, as well as the timing position that dominates it, will be preserved in the output.

4. Analysis

The analysis is couched within Correspondence Theory. The first two constraints in (16a) are Max constraints that refer to two distinct units: the segment and the Root node. Max(Seg) is violated when an input combination of both a Root node and the timing unit it is attached to is completely deleted in the output. If either the timing position or the Root node is preserved in the output, no violation of Max(Seg) occurs. Thus, a violation of Max(Seg) necessarily implies a violation of Max(Root), while a violation of Max(Root) does not entail a violation of Max(Seg). The third constraint in (16a) prevents insertion of segments in output forms. I will also refer to the syllabic constraints in (16b). The first constraint, the OCP, will prevent candidates containing tautosyllabic identical segments. The second constraint in (16b) ensures that the syllabic constraints of the borrowing language are satisfied in the output. In the same way, the OK(Seg) constraint in (16c) requires loanwords to satisfy the borrowing language's segmental constraints. I propose the constraint ranking in (16d). Following this ranking, priority is given to the OCP, seen here as an undominated constraint, then to the syllabic and segmental constraints of the borrowing language.

- (16) The constraints and their ranking
- a) Faithfulness constraints (e.g., McCarthy and Prince 1995):
 - i) Max(Seg): Every input segment has an output correspondent.
 - ii) Max(Root): Every input Root node has an output correspondent.
 - iii) Dep(Seg): Every output segment has a correspondent in the input.
 - b) Syllabic constraints:
 - i) OCP: Adjacent tautosyllabic segments cannot be identical (inspired by, e.g., Leben 1973).
 - ii) OK(σ) (porte-manteau syllabic constraint; Yip 1993).
 - c) Segmental constraint: OK(Seg) (porte-manteau segmental constraint).
 - d) Constraint ranking:
 OCP >> OK(σ), OK(Seg) >> Max(Seg) >> Dep(Seg) >> Max(Root)

4.1 Segmental sequences

We can observe in the tableau in (17) that the constraint ranking proposed correctly predicts vowel epenthesis in inputs where each segment hosts its own timing position.

- (17) CLV \rightarrow CVLV⁴

		X	X	X		
Input: <i>drap</i> [dʁa]		d	ʁ	a		
	OCP	OK(σ)	OK(Seg)	Max(Seg)	Dep(Seg)	Max(Root)
[dra]		*!				
[da]				*!		
[da.ra]					*	

The situation is different in inputs where two Root nodes share a unique timing position, as we can see with the tableau in (18). In this case, preservation of all of the input Root nodes (e.g. in the last two candidates) would violate the OCP. The candidate showing Root node deletion is thus optimal, as it only violates the low-ranked constraint Max(Root).

(18) $CqV \rightarrow CV$

			X	X	X	X	X	
							^	
Input: <i>biscuit</i> [biskɥi]			b	i	s	k	ɥ	i
	OCP	OK(σ)	OK(Seg)	Max(Seg)	Dep(Seg)	Max(Root)		
[bis.kɥi]			*!					
[bis.ki]						*		
[bis.kij]	*!							
[bis.ki.ji]	*!							

I will now turn to the adaptation of nasal vowels. I will show that the constraint ranking proposed in (16d) predicts the right adaptation patterns in both Fula and Kinyarwanda.

4.2 Nasal vowels

4.2.1 Nasal vowels adapted in a CVC language: Fula

Starting with the adaptation of nasal vowels in Fula, we can see in (19a) that the possibility of syllabifying the input nasal Root node in the coda when there is no other segment in this position is optimal. However, as we can see in (19b), when another input segment must be syllabified in coda position, deletion of the nasal Root node is preferred over insertion of an epenthetic vowel (Dep(Seg) >> Max(Root)).

(19) Adaptation of nasal vowels in Fula

a) In open syllables

a) In open syllables

			X	X	X	X	
						^	
Input: <i>ciment</i> [simã]			s	i	m	a	N

	OCP	OK(σ)	OK(Seg)	Max(Seg)	Dep(Seg)	Max(Root)
[si.mã]			*!			
[si.ma]						*
[si.man]						
[si.ma.ni]					*!	

b) In closed syllables

			X	X	X	X	X	
						^		
Input: <i>balance</i> [balãs]			b	a	l	a	N	s
	OCP	OK(σ)	OK(Seg)	Max(Seg)	Dep(Seg)	Max(Root)		
[ba.lãs]			*!					
[ba.las]						*		
[ba.lans]		*!						
[ba.lan.sa]					*!			

4.2.2 Nasal vowels adapted in a CV language: Kinyarwanda

The analysis proceeds in the same fashion in Kinyarwanda, a CV language allowing for nasal contours. We can see in (20a) that a word-internal input nasal

Root node can be licensed by the following consonant in the optimal candidate. As this option is not available to word-final input nasal Root nodes, and since codas are not possible in Kinyarwanda, there is no potential licenser available to the nasal Root node, which is deleted in the optimal form, as we can see in (20b). As it was the case for Fula above, Root node deletion is preferred over segmental epenthesis.

- (20) Adaptation of nasal vowels in Kinyarwanda
a) Word-internally

Input: *bandit* [bãdi] $\begin{array}{cccc} & X & X & X & X \\ & | & \wedge & | & | \\ b & a & N & d & i \end{array}$

	OCP	OK(σ)	OK(Seg)	Max(Seg)	Dep(Seg)	Max(Root)
[βã.di]			*!			
[βa.ni.di]					*!	
[βa.ɐ̃.di]						
[βa.di]						*!

- b) Word-finally

Input: *cousin* [kusɛ̃] $\begin{array}{cccc} & X & X & X & X \\ & | & | & | & \wedge \\ k & u & s & \epsilon & N \end{array}$

	OCP	OK(σ)	OK(Seg)	Max(Seg)	Dep(Seg)	Max(Root)
[k ^w usɛ̃]			*!			
[k ^w u.sen]		*!				
[k ^w u.se]						*
[k ^w u.se.ni]					*!	

4.3 Additional evidence

4.3.1 Adaptation of rising diphthongs

I will now briefly discuss examples of French loanwords in Japanese, which provide additional evidence supporting the current proposal. First, we must observe, in the examples in (21), that French [y] is adapted into [ju] in Japanese.

- (21) French [y] → [ju] in Japanese (Shinohara 1997)

<i>crudité</i>	[krydite]	→	[kurjɯdite]	'raw vegetables'
<i>allumer</i>	[alyɛ]	→	[arjɯme]	'to light'
<i>calcul</i>	[kalkyl]	→	[karukjɯru]	'calculation'

In (22), we can see that the front rounded glide [ɥ] is also adapted into [ju], and that the vowel following the input glide is preserved in the adapted form; it is adapted as a CGVV sequence which does not violate the Japanese syllable structure.

- (22) French C[ɥ]V → C[ju]V in Japanese (Shinohara 1997)

<i>cuisiner</i>	[kɥizine]	→	[kjuizine]	'to cook'
<i>nuage</i>	[nɥaʒ]	→	[njuazju]	'cloud'
<i>suivi</i>	[sɥivi]	→	[sjuivi]	'follow-up'

I attribute this preservation pattern to the fact that the segmental adaptations in (21) and (22) never create contexts violating either the syllabification constraints of

Japanese or the OCP. Thus, full preservation of all of the input Root nodes can be observed, as analyzed in (23). The optimal form does not require segmental insertion *per se*, as the output diphthong [ju] and the vowel [i] have an input correspondent: the [u] and the [i] of the input diphthong [ɥi], respectively. Thus, only insertion of a timing position is required in the selected candidate.

(23) $C\mathfrak{u}V \rightarrow CjuV$ in Japanese

$\begin{array}{cccccc} & & X & X & X & X & X & X \\ & & | & \wedge & | & | & | & | \\ \text{Input: cuisiner [kɥizine]} & k & \mathfrak{u} & i & z & i & n & e \end{array}$

	OCP	OK(σ)	OK(Seg)	Max(Seg)	Dep(Seg)	Max(Root)
[kɥi.zi.ne]			*!			
[kjui.zi.ne]						*!
[ki.zi.ne]						*!
[ku.zi.ne]						

4.3.2 Against a perceptual approach to nasal vowel adaptation

One could object that the adaptations of nasal vowels observed earlier could be analyzed on perceptual grounds only. The hypothesis, under this view, would be that nasal vowels are unpacked at the perceptual level, and that these vowels are interpreted in the loan input as true VN sequences. The examples in (24) enable us to falsify such a hypothesis. We see that word-final French true VN sequences are adapted with full preservation of both Root nodes in Kinyarwanda.

- (24) French word-final VN sequences adapted in Kinyarwanda (Rose 1995)
- | | | | | |
|----------------|-----------|---|-------------|--------------|
| <i>bottine</i> | [bɔ̃tin] | → | [βotini] | 'ankle boot' |
| <i>douane</i> | [dwan] | → | [duwani] | 'customs' |
| <i>carbone</i> | [kaʁbɔ̃n] | → | [karuβɔine] | 'carbon' |

The word-final VN context contrasts with the one of word-final nasal vowels, which always shows nasal deletion. This contrast is easily accounted for in the analysis proposed here, from the structural difference that exists between a nasal vowel and a VN sequence. In the former, both Root nodes share a unique timing unit while, in the latter, each segment hosts its own timing position. The analysis is presented in tableau (25).

(25) $VN\# \rightarrow VNV\#$ in Kinyarwanda

$\begin{array}{cccccc} & & X & X & X & X & X \\ & & | & | & | & | & | \\ \text{Input: bottine [bɔ̃tin]} & b & ɔ & t & i & n \end{array}$

	OCP	OK(σ)	OK(Seg)	Max(Seg)	Dep(Seg)	Max(Root)
[bo.tin]		*!				
[bo.ti.ni]					*	
[bo.ti]				*!		

Thus, an approach based on perception or salience for explaining segmental deletion in loanwords (e.g. Silverman 1992, Yip 1993) cannot account for the adaptation contrast in nasal vowels. This contrast strongly supports the view defended here that the loanwords studied in this paper are best accounted for on

structural grounds. It also provides additional empirical evidence in favor of the analysis proposed in this paper that Root node deletion can only occur in contexts where two Root nodes share a unique timing position in the input.

5. Discussion

In this paper, I have discussed central questions in loanword phonology: first, how the loan input is perceived and represented by the borrower's phonology; and second, which constraints govern the adaptation of the loan input. Finally, I have argued against a perceptual approach to segmental deletion in loanword phonology.

Recall that rising diphthongs and nasal vowels are the only contexts where deletion of a Root node is consistently found in the data. I have established a correlation between this observation and the parallelism between the representation of a rising diphthong and that of a nasal vowel. In both of these structures, two Root nodes are anchored to a unique timing position. This two-tier representation is necessary in order to account for the alternations observed in the data. In all contexts where one of the Root nodes cannot be licensed in the borrowing language, it gets deleted.

Finally, the constraint ranking proposed in (16d) holds for all of the languages discussed here. The question as to whether this ranking should be considered to be a fixed (universal) hierarchy is left open for further research.

Notes

- * I am deeply grateful to Heather Goad for thorough readings of this paper, challenging questions and very helpful suggestions. I am also indebted to Éliane Lebel, Evan Mellander, and Glyne Piggott for their useful comments on earlier versions of this paper. A preliminary version of this paper was presented at the *Fourth Mid-Continental Workshop on Phonology*. Thanks to the participants of this workshop for their comments, especially Stuart Davis, Jose Hualde, Charles Kisseberth, and Daniel Silverman. I would also like to thank the participants of *BLS* 25, especially Ellen Broselow, Larry Hyman, and Charles Ulrich, for discussions on various issues addressed in this paper. Of course, all errors or omissions are mine. This research was supported by a SSHRCC doctoral fellowship #752-95-1415.

- ¹ To explain the absence of such a pattern in Kinyarwanda, we need to mention that French loanwords in Kinyarwanda were borrowed from Belgian French (BF), a dialect of French which does not have the front rounded glide [ɥ] in its inventory. BF only has the glides [w] and [j]. Words that are pronounced with [ɥ] in Standard French are pronounced with [w] in BF (e.g. Standard French *biscuit* [biskɥi] is pronounced [biskwi] 'cookie' in BF).
- ² The timing tier is represented here with skeletal positions. Note that equivalent predictions can be made in other frameworks (e.g. Moraic Theory).
- ³ Davis and Hammond (1995) demonstrate that in English CGV sequences, the glide [w] is part of the onset (Cw.V) whereas the glide [j] is the first member of a rising diphthong (C.jV).
- ⁴ Because of space constraints, only the candidates directly relevant to the alternations observed in the data will be given in the tableaux.

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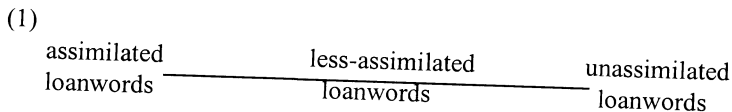
Loanwords and contact-induced phonological change in Lachixío Zapotec¹

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0. LACHIXÍO ZAPOTEC is a dialect of the Solteco branch of the Zapotec language family. It is spoken by about 4000 people in two communities in the mountainous Sola de Vega district of Oaxaca, Mexico. Solteco is spoken by about 7500 people in Sola de Vega and Southwest Zimatlán, Oaxaca. Some communities have up to 20% monolingual Zapotec speakers with the rest of the population bilingual between Zapotec and Spanish. Other communities have nearly completely shifted to Spanish with a few bilingual elders remaining. The speech of all speakers contains a large number of Spanish loanwords that illustrate various degrees of assimilation and change to the Zapotec phonological system.

1. Issues in the comparative study of loanwords

When speakers of a language have had an extended history of social contact with speakers of another language, there are often loanwords in the borrowing speaker's lexicons which show several patterns of adaptation that lie between fully assimilated loanwords and fully unassimilated loanwords.



The differences between the extremes are most pronounced when the two languages have substantially different phonological systems. With assimilated loanwords the borrower substitutes with similar elements from his/her language. The loanword may differ from the source model in terms of syllable structure, stress, and segments. These words show low or no interference from the foreign patterns of the source language. Example (2) shows an assimilated loanword with a simplified liquid obstruent sequence. All the examples in this paper are ordered with the Lachixío orthography on the left, followed by the Lachixío phonetic form. The borrowing arrow (<b--) separates the Zapotec from the Spanish phonetic model and the gloss in Spanish and English. I use the borrowing arrow to avoid confusion with sound change arrows (>) and synchronic rule arrows (→).

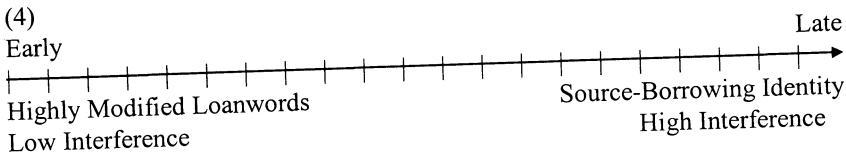
- (2) ka'lo ['ka'l:ó] <b-- ['kaldó] 'caldo // broth'

With unassimilated loanwords the borrower will adopt foreign features of the source phonological system along with the loan. Non-native phones, phonemes, or phone sequences can be utilized by the borrowing speaker. Borrowed phone sequences may conflict with the native phonology, which can be determined by analysis of native vocabulary. Stress on some loanwords may not follow from otherwise predictable rules. These words show high transfer of phonological patterns from the source language. Example (3) shows the preservation of a liquid-obstruent sequence, a syllable (and word) final nasal, and final syllable stress. All of these features violate the system of phonological constraints that were operational in the precontact Lachixío phonological system.

- (3) kolcho'n [kol'tʃoŋ] <b-- [kol'tʃoŋ] 'colchón // mattress'

1.1 Changing levels of bilingualism in a changing community

Several previous studies have classified loan strata chronologically (see Boas 1930, Law 1961, Berlin and Kaufman 1962ms, Kaufman 1988ms). These researchers place loans that show less interference (those which deviate greatest from the model and create the least disruption in the native phonological system) as earlier borrowings and words showing more interference as later.



The relative chronology is developed on the basis of a general assumption that in early contact the level of bilingualism in the borrowing community is so low as to prevent the adoption of foreign elements that would otherwise disrupt the phonological system of the borrowing language; the loanwords are modified in ways to make them fit with the pre-contact linguistic system (Thomason & Kaufman 1976). Later, as more speakers become familiar (actively and passively) with the phones, phonemes and phone sequences of the source language, words which contain non-native patterns are taken more easily with less modification. These assumptions are illustrated in (5).

(5)

High Interference = Higher Level of Bilingualism = More Intensive Contact

No/Low Interference = Lower Level of Bilingualism = Less Intensive Contact

The relationships in (5) should not be assumed without independent verification. Although high levels of phonological interference in a borrowing system entails intensive contact and a higher general level of bilingualism in the borrowing community, low interference does not entail a lower level of bilingualism. Speaker attitudes and other cultural factors could prevent the adoption of phonological features from the source language. I modify (5) in (6) to represent this by replacing the equivalency symbol (=) with a symbol (\approx) that can be read "can correlate with".

(6)

High Interference = Higher Level of Bilingualism = More Intensive Contact

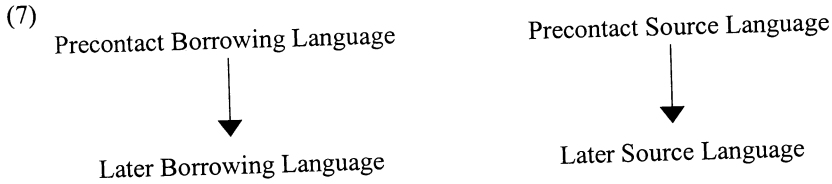
No/Low Interference \approx Lower Level of Bilingualism \approx Less Intensive Contact

Because there is no necessary relationship between low interference and the intensity of contact, it can not be assumed that loanwords can be chronologically stratified solely on the basis of the level of modification (the deviation from the source model). However, another measure is available when the history of sound change in the source language is documented or recoverable.

2. The relative and absolute dating of loanwords

When dates for the completion of sound changes are known from the source language, and these older pronunciations have served as model sounds for loanwords, several points of reference exist that allow for the absolute dating of these loans. Comparison with the replacement phones in the borrowing language will answer the question of whether more assimilated loans actually represent earlier borrowings. If this pattern is present the loans can be further stratified into relative chronologies within the periods defined by the absolute dates of the source language sound changes. Of the previously cited works that chronologically categorize loanwords, only Berlin and Kaufman (1962ms) appeal to the dating of loans by source language sound change.

Haugen (1950) states that loanwords are a problem to be analyzed diachronically. We do not find and identify loanwords by synchronic analysis but through identification of structural irregularities (229). His analysis of linguistic borrowing involves the comparison of the precontact linguistic systems when possible and the later states of each of the linguistic systems in a contact situation. Loanwords are identified and analyzed by a parallel comparison of all languages currently, or previously, in contact. The structural irregularities (exceptions and contradictions of more general phonological constraints) are signs of a changed and changing phonological system with a source in the particular sociocultural history of the communities in the multilingual situation. The parallel comparison can be represented as in (7) and is the approach that I take in analyzing the Zapotec data.



3. The changing source language: Spanish sound changes in colonial and post-colonial Mexico.

The model of Spanish I am assuming is based on Spaulding (1943) and Canfield (1981). In the history of the Spanish language since the conquest of Mexico, the phoneme represented in Spanish orthography as <j> before back vowels and <g> before front vowels changed from a voiced palatal fricative to merge with the voiceless palatal fricative written <x> by about 1600. The articulation of this phoneme then shifted back to become a velar by about 1750. The phoneme represented by orthographic <s> was slightly retracted [ʂ] before about 1650, when its merger with the dental fricative [s] was complete. This was also voiced before 1600, contrasting with the voiceless <ss>. There was a phoneme /h/ that dropped out of the system by the early 17th century. Orthographic <ll> was pronounced as a palatal lateral [ʎ] until just before the turn of the 18th century. These sound changes are represented in (8).

(8) Spanish Sound Changes during the Contact Period.

			1600		1750
(a) <j>/<g>	[ʒ]	>	[ʃ]	>	[x]
(b) <x>	[ʃ]				
			1600	1650	
(c) <s>	[z]	>	[s]	>	[s]
(d) <ss>	[ʂ]				
				1650	
(e) <h>	[h]	>	∅		
					1690
(f) <ll>	[ʎ]	>			[j]

4. Diagnostic sounds

A subset of the sound changes of the source language may be useful in stratifying the loans of the borrowing language. For example, Lachixío neutralizes the distinction between voiced and voiceless obstruents in some

positions within the phonological word. In native words, only voiceless obstruents are permitted medially (after a stressed syllable) and only voiceless obstruents are permitted word-initially in monosyllables: CVTV and TV (*CVDV, *DV), where <T> represents any voiceless obstruent and <D> any voiced obstruent. Because voicing is neutralized, the voicing merger of the Spanish fricatives, (8a-d), are of no use in classifying Lachixío loans. There is only one Period defined before 1650 and not two, as the Spanish voicing merger would allow for a language which did not neutralize the distinction between voiced and voiceless fricatives.

5. The changing borrowing language

The Lachixío loanwords show two regular replacements for Spanish <s>. The first is a voiceless palatal fricative [ʃ]. This is seen in examples (a-c) of Table (9). The second replacement is a voiceless alveolar fricative [s], as seen in (d-f) of Table (9). I suggest that the replacements differ because the Spanish models differed in pronunciation; the palatal substitution corresponds with <s> [ʃ] before the sound change and the alveolar corresponds with <s> [s] after the merger was complete by about 1650.

(9) Diagnostic <s>

Lachixío		Spanish	Diagnostic
(a)	xombetoh [ʃo'mbet:ò]	[ʃam'peðro] 'San Pedro'	<s> = [ʃ]
(b)	béxo ['véʃ:o]	['peʃo] 'peso // measure'	
(c)	xomboílo [ʃo'mbol:ó]	[ʃom'brero] 'sombrero // hat'	
			ca.1650
(d)	serembíyo [sere'mbí:yo]	[saram'pyon] 'sarampion // measles'	<s> = [s]
(e)	sobrino [so'vriɲ:ó]	[ʃo'βrino] 'sobrino // nephew'	
(f)	sonaja [so'nax:a]	[so'naxa] 'sonaja // rattle'	

The Lachixío loanwords also show two regular replacements for Spanish <j>/<g>. The first is a voiceless palatal fricative [ʃ]. This is seen in examples (g-k) of Table (10). The second replacement is a voiceless velar fricative [x], as seen in (l-o). I suggest that the palatal substitution corresponds with <j> [ʃ] or [ç] before the articulation shift and that the velar corresponds with <j> [x] after the shift was complete by about 1750. The velar fricative is a new phoneme in the Lachixío phonological system.

(10) Diagnostic <j>/<g>

Lachixío		Spanish		Diagnostic
(g) laxo	['laʃ:ó]	[na'ranʒo]	'naranjo // orange tree'	<j> = [ʒ]
(h) xzoah	['ʒoà:]	['ʒoan]	'Juan // John'	
(i) lobísho	[lo'víʃ:ó]	[kla'βiʒa]	'clavija // peg'	
(j) téxa	['teʃ:a]	['teʒa]	'teja // tile'	
(k) menóxo	[me'noʃ:ó]	[ma'noʒo]	'manejo // handful'	
				ca.1750
(l) mejora	[me'xo:ra]	[me'xor]	'mejor // better'	<j> = [x]
(m) táje	['táx:é]	['traxe]	'traje // suit'	
(n) jémplo	['xémplo]	[e'xemplo]	'ejemplo // example'	
(o) jardín	[xa'rðin]	[xa'rðin]	'jardin // garden'	

In both Tables (9) and (10) the loans which show correspondences with later Spanish pronunciation also show less nativization, whereas the earlier loans show the greatest nativization. In the case of Lachixío Zapotec, the loans follow the common pattern, where greatly modified loans represent earlier borrowings and less modified loans represent later borrowings. We can then further stratify the loanwords of any given period into several sub-Periods on the basis of phonological interference.

6. Phonological interference as a basis for relative stratification.

Unambiguously early forms like (c) *xomboílo* 'sombbrero // hat' show that obstruent-liquid clusters were simplified to be borrowed without the liquid. A form like (m) *táje* 'traje // suit' shows that this simplification continued beyond about 1750 (the completion of the velar shift in Spanish). Example word (e) *sobrino* 'sobrino // nephew' shows that obstruent-liquid clusters were finally accepted during this period. Forms which simplify the clusters are placed earlier within the post-1750 Period than those which preserve them, dividing the Period into two relative strata: one before the acceptance of the clusters and the other after.

Another modification found in loans containing early diagnostic sounds is the voicing of obstruents after nasals (see (a) and (d)). The Zapotec word *próndo* <b-- Spanish 'pronto' shows that at a time after obstruent-liquid clusters were accepted, obstruents continued to be voiced after nasals. Since obstruent-liquid clusters were still being simplified after 1750, I claim that the acceptance of voiceless obstruents after nasals began after obstruent-liquid clusters were already being

adopted by native Lachixío speakers. The relative ordering is worked out on the familiar basis of internal reconstruction. I can further divide the post-1750 Period into three relative strata. In example (11) I present a chronology of several of the loans discussed in this paper.

(11) Early Contact

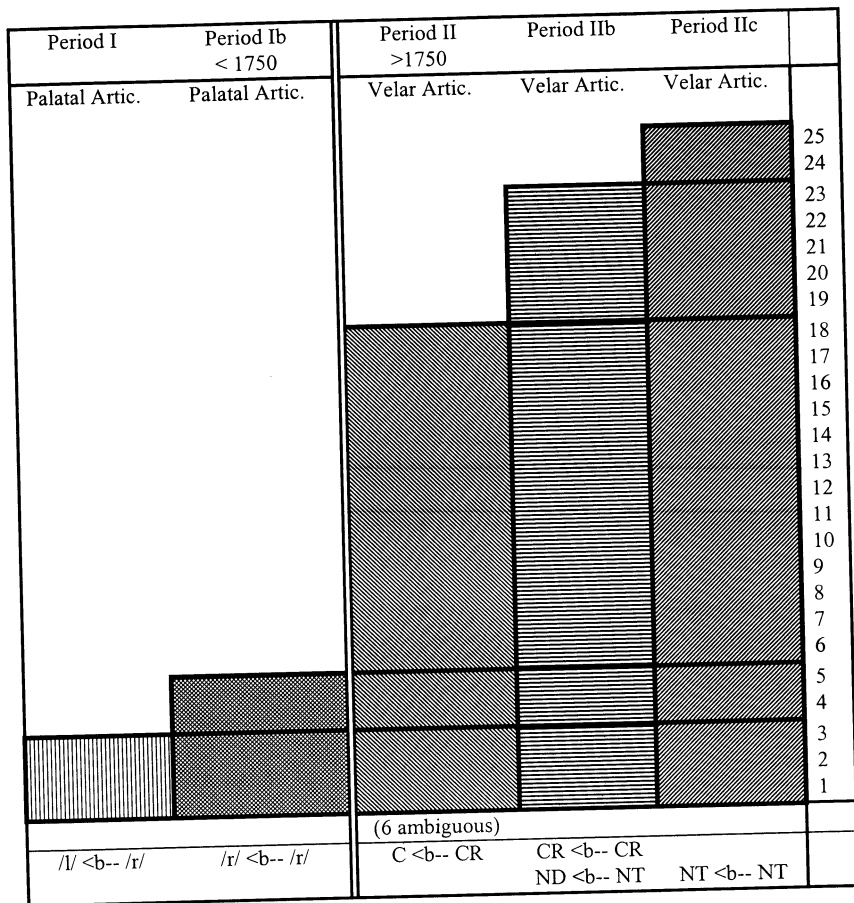
↓	xombo'lo	[ʃo'mbol:ó]	'sombrero // hat' (<1650)
	lobísho	[lo'víʃ:ó]	'clavijo // peg' (< 1750)
	táje	['táx:é]	'traje // suit, outfit' (>1750a)
	próndo	[próndo]	'pronto // soon' (>1750b)
	jémplo	[xémplo]	'ejemplo // example' (>1750c)

Late Contact

The relative and absolute periods defined by diagnostic sounds of the source language and the nativization of the loans are summarized in the charts that follow. Periods defined by the absolute dates listed in the top bar are divided by double lines. Relative sub-Periods defined by the structural irregularities listed in the bottom bar are divided by dotted lines. Some loanwords in Lachixío show only the diagnostic sound, but the source did not contain any patterns that underwent modification at any time. These words cannot be assigned to any relative stratum but only to a Period. The numbers of these ambiguous loans are given within the charts.

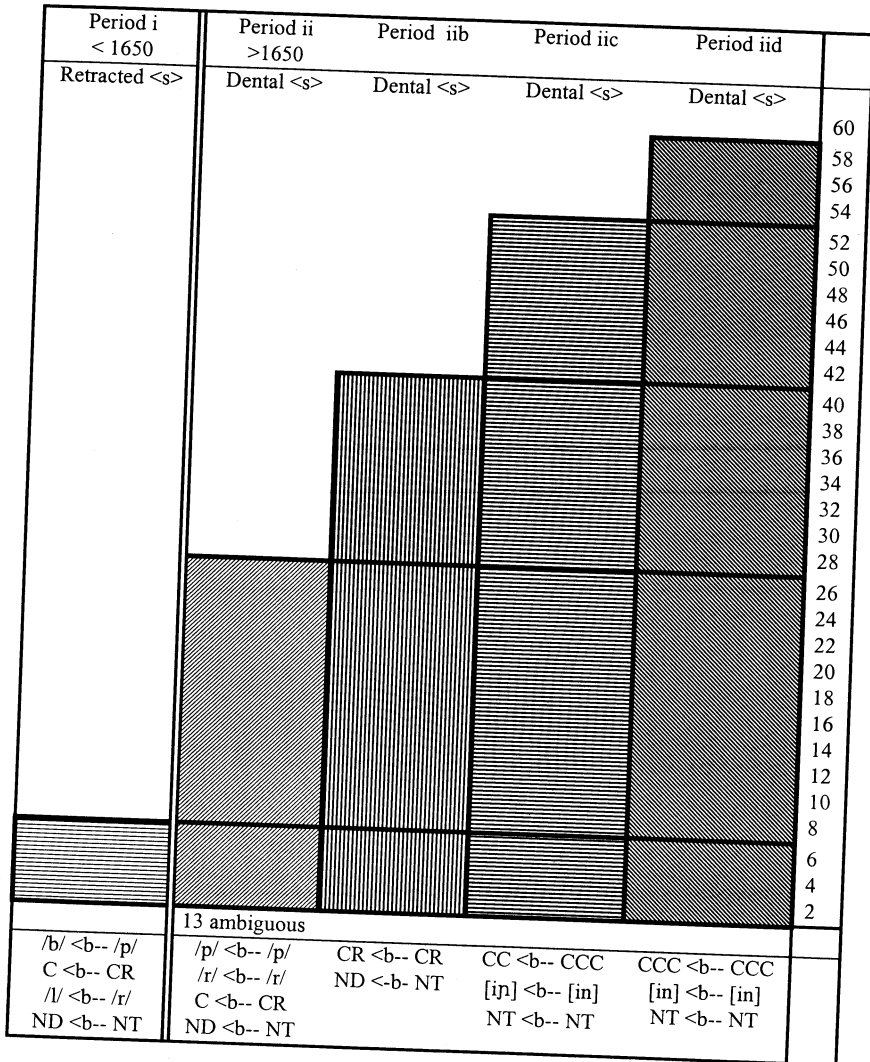
The chart in (12) plots loanwords modeled on Spanish words written with <j> before back vowels and <g> before front vowels. Here we find a significant rise in the number of loans showing the post-1750 velar articulation. This corresponds with the ethnohistoric record from the region, which suggests an increase in the intensity of contact at this time. In the later half of the 18th century, Lachixío became the subject of correspondence between the resident friar and the Spanish Viceroyalty. The town's trade in a red dye produced from the cochineal insect had been escaping the Spanish system of tribute, and the Viceroyalty wanted figures on production and sales so the Indians could be taxed accordingly (Porrua 1963).

(12) Lachixío Zapotec: Words containing Spanish /j/



The following chart (13) plots the loanwords based on Spanish models written with <s>. There is a significant rise in loans after 1650. I divide the post-1650 period into four strata based on segmental replacement and phonotactical simplification. Where the data permit, these two charts can be synchronized, allowing for a more detailed stratification.

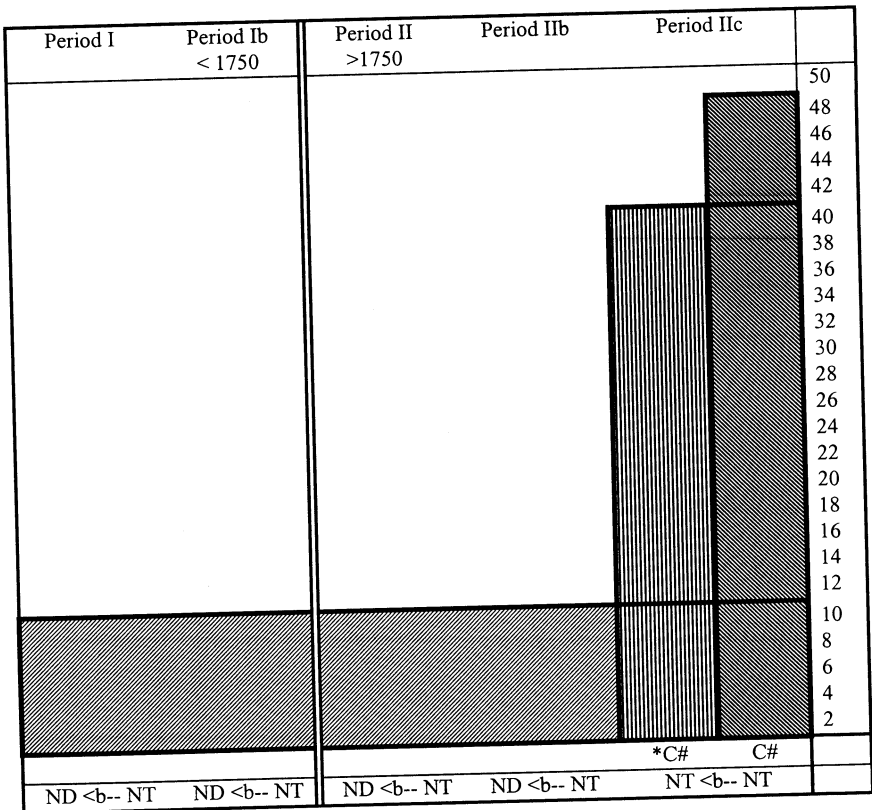
(13) Lachixío Zapotec: Words containing Spanish /s/



The following chart (14) is the most significant. It plots a particular phonological interference feature: loans modeled on Spanish words containing a nasal-obstruent cluster. These words are plotted on the scale developed for chart (12), which shows that voiceless obstruents are permitted after nasals only in the most recent stratum. Most of the occurrences of words containing nasal-obstruent clusters follow the pattern [NT] rather than being modified to [ND]. This large

grouping of loans has been borrowed most recently. The significant increase seen at the right end of the chart suggests a rapid increase in sociocultural contact with Spanish speakers in the most recent sub-Period. This parallels the oral histories that I have recorded from speakers who place the entrance of roads, the logging industry, primary and secondary schools all in the latter half of the current century.

(14) Lachixío Zapotec: Words containing Spanish [NT] plotted on same chronological scale as words containing Spanish /j/.



7. Implications

This work utilizes methods of comparative historical linguistics and the interplay of language and culture to make statements about the intensity of social contact during the history of a multilingual contact situation. The application of such a study is historical. By first comparing the sound changes of the source language, loans containing diagnostic sounds can be dated to before or after a

particular sound change was complete. If the loans assigned to these Periods show patterns where greater modification indicates an earlier borrowing, many loans can be assigned to relative strata within Periods defined by absolute dates. With the establishment of a detailed chronology of the loanwords in a language, the content of the loans of a Period or sub-Period can be scrutinized to determine the range of semantic domains borrowed within a particular stratum and possibly characterize the changing functions of the interactions between the groups in contact. The results of such analysis can be compared to typologies of language borrowing, such as that forwarded by Thomason and Kaufman (1988) or with ethnohistoric or archaeological records. By casting the study of loanwords in a historical framework, a study of sociocultural change can have a linguistic foundation.

Notes

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