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A Cross-Dialectal Study of the Syllabic Nasal in Yorùbá*

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1 Introduction

Two types of syllabic nasals have been identified in Standard Yorùbá (SY). One is derived through the loss of a vowel in a CV syllable whose consonant is a nasal (la), and the second derives through the loss of an obstruent also in a CV syllable (lb).

(I) a. abímbọ́lá < abímibọ́lá 'personal name'
b. òŋkọ < òkìkọ 'the one that makes heaps'

One common thing to both cases is that the V of the syllable is always a high vowel.

This paper examines different contexts where the syllabic nasal of the type in (la) emanates from those dialects in (2a) native words as well as borrowed words, and based on evidence from the other two dialects in (2b) claims that the syllabic nasal is derived through deletion of the high vowel and some other phonological processes. In this way, it corroborates the existing literature that syllabic nasal in SY is derived from CV, drawing facts from some dialects' of Yorùbá. Beyond this. I also show that, there is cases that derive syllabic nasal from a CV syllable whose vowel is a back high vowel.

(2) Dialects for this study.
a. Ọ̀yọ́, SY, Yàgbà & Ìbọ̀lọ́
b. Ìjẹ̀ṣà & Mobh

Though the choice of these dialects is random[2], there is no doubt, the five dialects chosen are going to reveal to a large extent the facts relating to the focus of this paper. One observation that Cannot be ignored is that there is variation among dialect groups, but such will not be discussed in this paper except if

found crucial to the analysis being proposed. Giving the analysis in the Optimality theoretical framework (Prince and Smolensky 1993). I claim that the different ranking of the faithfulness and syllable based constraints accounts for the retaining of the CV syllable in Ìjẹ̀ṣà and Mọ̀bà and the loss of the vowel of the syllable in Ọ̀yọ́, SY, Yàgbà & Ìbọ̀lọ́ which gives rise to syllabic nasal (SN). Further, with ample data from all the dialects chosen, we show that contrary to existing literature (Oyelaran 1990). there are cases of syllabic nasal deriving from /mu/ as underlying sequence.

2 Facts about the Syllabic Nasal (SN) Cross-Linguistically

Two crucial points have been made about how syllabic nasals are realized across languages. One involves the loss of high vowels and reduced vowels which gives rise to syllabic nasal (Bell 1971). The other point is that only sonorant segments may be vocalized to generate consonants constituting syllable nucleus. (Bell 1971). While the facts from Yorùbá and its dialects lend support to these two facts, there is also an additional source that derives syllabic nasal from a CV syllable whose consonant is non-nasal (Oyelaran 1990).

2.1 Yorùbá syllables

Every scholar that has worked on the aspects of phonology of Yorùbá relating to its syllable structure agrees that in the SY, there exist three types of syllables:

(3) a. CV
b.V
c. N[3] (Bamgbose 1990, Owolabi 1989, Oyelaran1991, Pulleyblank 1998 etc.)

From what we have in (3), one can deduce at least two things about the Yorùbá syllable structures. First, that Yorùbá does not have syllable with consonant clusters and second, that the language exhibits open syllable. since there is no coda. The concern of this paper is the third pattern in (3c). As will be shown there is indeed only two basic syllable types as appeared in (3a & b), the third is derived through re-syllabification process after the original syllable has lost its vowel.

2.1.1 Breakdown of words into syllables

Following the syllable theory proposed in the various work of Clements and Keyser (1983) and Pulleyblank (1998). the example in (1a) can be syllabified as in (4b) and (4c). As we can see, there are four possible syllable structures for the

example cited. However, only one of the possibilities represented in **(4c)** is attested in this Language.

(4) a. abíḿbọ́lá[4] 'personal name'

b. **(i) *σ[a] σ[bím]** σ[bọ́]σ[lá] (σVσCVCσCVσCV)

(ii) *σ[a] σ[bí]σ[mbọ́] σ[lá] **(σVσCVσCCVσCV)**

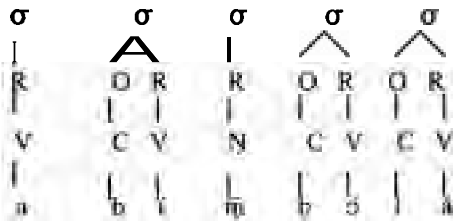
(iii) *σ[ab] σ[ím] σ[bọ́]σ[lá] **(σVCσVCσCVσCV)**

c. σ[a]σ[bí]σ[ḿ]σ[bọ́]σ[lá] **(σVσCVσNσCVσCV)**

2.1.2 Tree diagram of syllabic constituents

Keyser (1983) notes that syllabicity is not an intrinsic characteristic of segments but rather involves the relationship between a segment and its neighbours on either side. The choice of **(4c)** by the Language enforces the tree diagram that in **(5)**.

(5)



First to note is that there are four tiers. The syllable node can immediately dominate the onset and the rhyme, which in turn dominate the consonant or vowel slots. The segments occupy the last tier. In the representation, the third syllable, which loses its vowel, cannot merge with the preceding syllable, as that will create a coda that does not exist in the language. On the other hand, it cannot merge with the following syllable. Doing so will also lead to a complex onset which the language does not tolerate.

One thing of note about the correct structure in **(4c)** is the third syllable, which consists of only a consonant. Under Derivative Phonology, the underlying representation for (4) will be /abímibọ́lá/, and a rule of V-deletion will be implored to derive the output. However in Syllable theory approach (Pulleyblank **1998),** whenever there is segment deletion or insertion, one consequence of that is re-syllabification. After the deletion of the front high vowel. the stranded nasal consonant can only assume the syllabic nucleus, thus becoming an independent syllable through vocalization process (Bell 1970, 1972 and Oyelaran 1990). Vocalization as it applies to SY and its allies involves realization of a pitch on a **sonorant** consonant. This is manifested through the shift of the tone of the deleted vowel onto the stranded consonant. Indeed one

way a syllabic nasal can be differentiated from a non-syllabic nasal consonant is the realization of a tone on the former and the absence on the latter.

3 Sources of SN in Yorùbá

There are two sources readily available to seek for facts in respect of the syllabic nasal. We have evidence within the language as well as in borrowed words from other languages.

3.1 Language internal evidence

One incontrovertible structure that derives syllabic nasal from a CV in SY is the one arising from loss of a front high vowel when the consonant is a nasal. The vowel that deletes may bear high or mid tone.

(6) Òyọ~SY~Yàgbà~Ibọ̀lọ́	Mọ̀bà~Ìjẹ̀ṣà	Gloss
a. onírú/oníru	olúrú	'seller of locust beans'
b. bámidélé/báṁidélé	ibámidélé	'personal name'

What I show in (7) is the underlying form for (6a).

(7) o + ní + igi
agent + have + wood
'owner/seller of wood'

On the other hand, most Yorùbá names are sentential. The example in (6b) falls into that category, which is why it is also considered as derived.

(8) bándélé[5] < ọmọ́ bá mi d t ilé
Child accomplish me reach house

The example in (6a) shows instance of word formation involving the verb ní, 'to have' combining with the agentive morpheme 'o'.

3.1.1 *Back vowel in nominals*

It has been argued that the syllabic nasal in Yorùbá does not derive from the sequence Mu or ŋu contrary to Bell (1970, 1971). One example in Oyelaran (1990) is *òmùwẹ̀* 'swimmer', which has *ònwẹ̀* as its allomorph. Oyelaran, calling such as back formation, rejects out rightly the idea of thinking that the latter is derived from the former. Drawing facts from other examples such as *ọ̀mùtí* 'drunkard' and *ọ̀mùnú* 'young leaf which have no syllabic nasal counterparts,

Oyelaran concludes that *ònwẹ̀* could only have *òwìwẹ̀* as its underlying form. While one agrees with Oyelaran on the two counter examples: *ọ̀mùtí* and *ọ̀mùnú*, there are many other words in the dialects under study that lend support to the fact that, syllabic nasal can be derived from mu sequence.

(9) Ọ̀yọ́~SY~Ibọ̀lọ́~Yàgbà	Mọ̀bà~Ìjẹ̀ṣà	Gloss
a. àǹmkpìtàn	àmukpìtàn	'personal name'
b. àńdìkpẹ̀	àmúdìkpẹ̀	'personal name'
c. òǹrorò	òmùrorò/òkúrorò	'churlish'
e. kaiidi	kamudi	'stumpy'
d. òǹgọ́/òmùgọ̀	òmùgọ̀	'a dunce' (Abraham 1958:474)

The examples in (9) and many others which due to lack of space, we cannot include cannot be accidental. Indeed, just as we have exception to /...mu.../ that cannot derive SN, so we also have /…mi.. ./ that do not lead to the realization of SN. See 3.3.

3.2 Syllabic nasal from **non-derived formatives**

It has been observed that certain basic words/grammatical items that are monosyllabic are capable of losing their high tone front/back vowel through deletion, and when this happens, the stranded consonant, which is always a nasal becomes an independent syllable and the tone of the deleted vowel shifts on to it.

(10) Progressive marker/1sg

Ọ̀yọ́~SY~Ibọ̀lọ́~Yàgbà	Mọ̀bà~Ìjẹ̀ṣà
a. Adé 6 lo	Adé í/mi lọ
prog. go	prog. go
'Ade is going'	'Ade is going'
b. n kò lọ	mi ke lọ
1sg neg. lo	1sg neg. go
'I did not go	'I did not go

In (10a), the progressive marker is [n] in Ọ̀yọ́, SY, Ibọ̀lọ́ and Yàgbà, in Mọ̀bà, it is realized as [í] whereas in Ìjẹ̀ṣà, it is [mĩ]. The same observation can be made of (10b), but this time, with both Mọ̀bà and Ìjẹ̀ṣà retaining the full forms of the Isg. It is not difficult therefore to set the forms in Mọ̀bà and Ìjẹ̀ṣà as the underlying from which [n] is derived through Vdeletion in the speech forms of

other four dialects whereas in **Mọ̀bà,** the nasal consonant gets deleted. The same phenomenon is realized with the preposition.

(11) Preposition ni

Òyó–SY–Ibọ̀ló–Yàgbà	Mọ̀bà–Ìjẹ̀ṣà
a. 6 **wà ní** ilé	**í yà ní** ulé
b.6 **wà** A **'lé**	i **yà** I **úlé**
'He is at home'	'He is at home'

What we have shown so far establish the fact that the phenomenon of SN is very productive in four dialects. On the other hand, the other two dialects are consistent in resisting SN derivation. However, this is not to say that all contexts where we have sequence of $C_{[+Nas]}V_{[+High]}$ lead to SN. The exception to that is what we discuss in 3.3.

3.3 Contexts where SN is not realized

The impression that one is likely going to have about the sets of data so far presented is that SN can always be realized in those dialects that feature it in a CV context where a high vowel follows a nasal consonant. The examples in (12) invalidate such claim.

(12) a. omi	***omĩ**	'water'	g. mi	***m**	'swallow'
b. bni	*bn	'today'	h. hmu	*hm	'water pot'
c. **èmi**	***èmĩ**	'Isg'	j. **ọmu**	*om	'breast'
d. **àmi**	***àmĩ**	'sign'	k. emu	***ẹmĩ**	'palm wine'
e. enu	*en	'mouth'	l. emi	***ẹm**	'shea-butter'
f. **ọmũtí**	***ọntí**	'drunkard'	m. **ọmunu**	***ọnn**	'young leaf

The present paper will not be able to account for the above exceptions due to lack of space.

3.4 Loan words

It is not unusual for a Language to borrow words from other Languages. However every Language has its own rules that such loan words must obey. Any borrowed word into **Yorùbá** whose syllable has coda must be re-syllabified through V-epenthesis otherwise it gets deleted. A word that has consonant clusters undergoes the same phonological process as above. Yorhbti being tonal enforces that all loan words bear the appropriate tones. Finally, a C or V that does not exist in **Yorùbá** is substituted with the appropriate one **e.g.** [∂] is

substituted with [o] or [ɛ], [ts] is substituted with [ʃ] in SY and [s] in Ìjẹ̀ṣà etc. The examples that follow are from English.

(13) Òyó~SY~Ìbọ̀lọ́~Yàgbà	Mọ̀bà~Ìjẹ̀ṣà	UR	Gloss
a. **àǹtónì**	**àũtónì**	/æntɔ̃nɪ/	'Anthony'
b. **àǹtí**	hitti	/ɑ:nt/	'aunt'
c. **áńdérù**	**áĩdérù**	/ændru:/	'Andrew'
d. **áǹjgɛ́lì**	**áĩgɛ́li**	/eindʒəl/	'angel'

4 OT Analysis

From the data presented in section 3, we observe one clear distinction among the dialects of study, namely, that while SY and its allies consistently feature the occurrence of syllabic nasal, Ìjẹ̀ṣà and **Mọ̀bà** are also consistent in featuring a CV of a nasal consonant followed by a high vowel. One descriptive generalization that we can make is that SY and its allies derive the syllabic nasal from the basic forms in **Mọ̀bà** and Ìjẹ̀ṣà. Using the Optimality Theoretical framework (McCarthy and Prince 1993 and Pulleyblank 1997, 1999), I adopt the Faithfulness constraints in (14) and the Syllable constraints in (15) to account for the realization of SN in **Òyó, SY,** Ìbọ̀lọ́ and **Yàgbà** as well as the absence of SN in Ìjẹ̀ṣà and **Mọ̀bà.** This is achieved through different ranking of the constraints.

(14) Faithfulness constraints:
MAX: Every segment of the input has an identical correspondent in the output
DEP: Every segment of the input has an identical correspondent in the output

(15) Syllable based constraints[6]:
***NC:** Bar sequence of nasal and obstruent in a word.
ICC[PL]: A sequence of consonants must be identical in place of articulation.
*[NṼ$_{+HIGH}$]σ: Bar a sequence of a nasal consonant followed by a high nasal vowel within the syllable.
TONESHIFT: No floating tone.
NO CODA: **A** Syllable must end with a vowel.

(16) **NOHIATUS:** Ban the sequence of two non-identical vowels.

4.1 CV versus N

Essentially, what this paper aims at achieving is how to account for the case of syllabic nasal in Òyó, SY, Ìbọ̀lọ́ and Yàgbà and its absence in Ìjẹ̀ṣà and Mọ̀bà. The claim already made is that a word like ***kandi*** in SY is derived from ***kumiidi.*** Having the same input for the two groups means the set of constraints that are available to them must be ranked differently to get the correct output. While Mọ̀bà and Ìjẹ̀ṣà retain the input in the output thus obeying FAITH constraints as represented in MAX and DEP, the other group satisfies the syllable constraints at the expense of MAX and DEP.

(17) ***Ranking:***

a. Ìjẹ̀ṣà – Mọ̀bà:

MAX, DEP>> *NC >> T-SHIFT >>ICC[PL]>>*[NV $_{+HIGH}$]σ

b. Òyó-SY~Yàgbà - Ìbọ̀lọ́:

*[NṼ$_{+HIGH}$]σ >>ICC[PL]>> T-SHIFT >> MAX, DEP>> *NC

With the rankings in (17), we can proceed to see how each group selects the optimal candidate. In tableau (18), three candidates are presented for evaluation. The worst of them is candidate (18a) having violated the two Faithfulness constraints in addition to the *NC. Of particular note is the satisfaction of ICC[PL], a low ranked constraint at the expense of a more highly ranked DEP. Next to this is candidate (18c), which violates two Faithfulness constraints. What makes it fair better than (18a), even though not an optimal candidate, is its satisfaction of DEP, which respects input-output correspondence.

(18) Ìjẹ̀ṣà-Mọ̀bà

/kamudi/	MAX	DEP	*NC	ICC[PL]	T-SHIFT	*[NṼ$_{+HIGH}$]σ
a. kaⁿdi	!*	*	*			
b☞kamudi						*
c. kaⁿdi	!*		*	*		

The situation in SY and its allies is just the opposite of what operates in Mọ̀bà and Ìjẹ̀ṣà. First, as expected, from the different ranking of the constraints in (17), we do not expect the same optimal candidates for the two groups. This is why the optimal candidate. (19a) is the worst candidate in Mọ̀bà and Ìjẹ̀ṣà. This candidate satisfies all the highly ranked constraints. Candidate (19b), which ironically would have been the optimal candidate in Mọ̀bà and Ìjẹ̀ṣà is the worst candidate in SY and its allies for violating a constraint which forbids a syllable

whose structure is a nasal consonant followed by a nasal high vowel. Candidates (19c) and (19d) are similar in terms of how they fair in the evaluation. The only difference between the two is that candidate (19d) fails to associate the floating tone with the nasal consonant, thus in addition, it violates T-SHIFT constraint.

(19) Òyó-SV-Yàgbà – Ìbọ̀lọ

/kamudi/	*[NṼ$_{+HIGH}$]σ	ICC[PL]	T-SHIFT	*NC	MAX	DEP
a☞ kañdi				*	*	
b. kamudi	*!					
c. kañdi		*!		*	*	
d. kam˜di		*!	*	*	*	

Before moving to the next section, we must point to one fact, namely the importance of *[NṼ$_{+HIGH}$]σ and **ICC[PL]** constraints. The constraint that bans only a syllable with a high vowel following a nasal consonant makes it impossible for a word like ***amọ́dẹ*** 'personal name' to be an input that will generate an optimal candidate like ***amdẹ***. The reason being that, such a word cannot delete the second vowel since it is not a high vowel. The importance of **ICC[PL]** cannot be noticed in an example like **abímibọ́lá**, simply because **after** the deletion of the front high vowel, the syllabic nasal and the following **obstruent** already agree with respect to the place of articulation. But consider the case of ***bamidélé***. As usual, the constraint that bans the sequence of NV will delete the vowel. What we have as left over is ***bamdélé***. The consonant cluster does not agree with respect to the place of articulation. This is where the role of **ICC[PL]** comes in.

The analysis of loan word follows the same process. Note that in section 3.4. we have briefly stated some of the rules that guide loan words to the language. To this effect, the word for 'aunt' which I will use as an illustration will have **/ant/** as its input. This input does not satisfy the syllable structure of the language. We must among other things, insert vowel **/i/** to break the consonant cluster as well as to ensure that there is no syllable that ends with a consonant. The assumption here is that, the epenthetic vowel comes with its tone; hence, we do not need a T-SHIFT constraint. In order to get the correct output in all the dialects, there is therefore the need for the involvement of **NoCoda**, which is redundant in the native words. That constraint rules out candidates (20d) and (21d). In addition, **Mọ̀bà** and **Ìjẹ̀ṣà** have to rank the constraint that bans sequence of CV with a nasal vowel relatively high to rule out candidate **(20a),** which could have been the optimal candidate in the native words. This disparity between the native and the loan words cannot be addressed here due to lack of

space. The same optimal candidate (20b) in these two dialects has to be ruled out by NOHIATUS constraint in other dialects (21b).

(20) Ìjèṣà~Mọ̀bà

/ ànt /	*NC	NO CODA	*[NṼ+HIGH]σ	MAX	DEP	NO HIATUS
a. ànìtí			*!		**	
b. ☞àìtí				*	**	*
c. àǹtí	!*				*	
d. ànt	!*	*				

(21) Ọ́yọ́-SY~Ìbọ̀lọ̀-Yùgbà

/ànt /	*[NṼ+HIGH]σ	NO CODA	NO HIATUS	DEP	*NC
a. ànìtí	*			**	
b. àìtí			!*	* *	
c. ☞àǹtí				*	*
d. ànt		*!			*

5 Conclusion

There have been clarion calls to scholars of **Yorùbá** studies to start paying more attention to the dialects of the language for what new things they may teach us about the language (Bamgbose 1986, Awobuluyi 1988.). Indeed in his concluding remarks, Awobuluyi (1988) asserts that 'the many new ways which old data have had to be interpreted…would confirm the usefulness of dialectological studies…they have the further potential of helping to clarify issues or points that are likely otherwise to remain obscure in the standard variety of the language…(pp123). A hid to that call has been instrumental to this study. Two things have been accomplished in this paper. First we have shown that in the underlying representation, all the dialects have only two syllable types: (CV and V). the third (N) is derived through the different ranking of the sets of constraints that are available to all these dialects. We have been able to show that, any syllable that contains either the front or the back high vowel deletes the vowel to yield a syllabic nasal. I hope to be able to account for other forms that give rise to syllabic nasal in SY in the full paper. Apart from this, I also hope to give further explanation on why lexical items such as found in (12)

fail to yield syllabic nasal despite the fact that they 'meet its structural description.

End Notes

[*] Thanks to participants at the **WECOL 2001** who offered comments and suggestions when the paper was first presented. Some of their observations and comments are effected in this version. However. any **errors** in this paper are entirely mine. This research has received full financial support from the **SSHRC** grant to Dr. Rose-Marie **Déchaine.**

[1] Existing literature reveal that there are numerous dialects of **Yorùbá.** Among such dialects are **Àkókó, Awọ̀rí, Àyẹ̀rẹ̀, Èkìtì, Ẹ̀gbá, Ìbọ̀lọ́, Igbómìnà, Ìjẹ̀bú, Ìjẹ̀ṣà, Ìjùmú, Ìkálẹ̀, Ìlàjẹ,** Kétu, **Mọ̀bà, Owé, Ọ̀wọ̀, Òwọ̀rọ̀, Ọ̀yọ́, Yàgbà,** etc. (Adetugbo 1967. Ajiboye 1991. Awobuluyi 1988, **Bamgbose** 1986, Bamisile 1986, Fresco 1970 etc).

[2] This research first starts with **Mọ̀bà.** Thanks to the following informants who reside in Canada: Mr. **Adébọ́la Adésanmí (Yàgbà)** and Mr. **Báyọ́ Arẹ́gbẹ́ṣọlá (Ìjẹ̀ṣà).** Examples from Ọ̀yọ́ dialects are drawn from Abimbola and Oyelaran (1975) and Oyelaran (19990). The researcher himself speaks Mọ̀bà dialect and Standard **Yorùbá.**

[3] N is an archi-phoneme adopted to represent the syllabic nasal that emanates after the deletion of a vowel. This phoneme can have different allophones with each agreeing in the place of articulation of the following consonant. The process has been described as **homorganic** nasal assimilation in the literature **(Owolabi** 1989 and **Pulleyblank 1999).**

[4] **Yorùbá** has three contrastive tones. These are High [´], Low[` } and Mid, which is usually left unmarked except on syllabic nasal where it is realized as [¯ }. Also, it is assumed in this paper that any vowel that follows a nasal consonant in a CV syllable is itself nasalized.

[5] **Bándélé** is a personal name given to a child that is bom to the **parents** living outside their hometown.

[6] Most **of** the constraints though universally are syllable based, but in **Yorùbá** and its dialects, they are not syllable bound. For example, the ***NC, ICC[PL}** apply across syllable boundary in all the dialects since consonant cluster could only occur **across** syllable boundary.

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Prosodic and Linear Licensing in English Acquisition

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1 Introduction

A common trait of the speech of young children is the replacement of dorsal stops (k, g) with coronal stops (t, d) word-initially (Vihmann & Hochberg 1986). In this paper we examine the phonology of a young girl, Sine, whose speech shows just this pattern and does so in a highly consistent way. Since we began studying her a year ago, Sine has gone through two stages in terms of initial dorsals. First she produced all initial dorsals as coronal (tuki 'cookie', tæk 'quack'); later she produced dorsals before parental [w, r, f] as dorsal but singleton dorsals as coronal (tuki 'cookie', kɥæk 'quack'). [Since the conference she has begun to produce initial dorsals correctly, regardless of position, but we won't report on this stage as it is not yet complete.]

We argue here that Sine's production of dorsal consonants supports a mixed view of featural licensing rather than an exclusively linear one (Steriade 1997, 2000). That is, the distribution of her dorsals is not easily described in terms of what precedes or follows them unless one also factors in information about the prosodic domain within which the dorsals occur. We claim that our data requires ***linear licensing within a prosodic domain*** (cf. Gerfen 2001), which we take to be the standard view in phonology at least since Kiparsky 1982.

2 Data

We began our study of Sine when she was 2;6 and are still studying her as this paper goes to print. Here we report on the first 10 months of our study. Sine is a monolingual English speaker acquiring central California English. Her mother speaks a standard 10-vowel California dialect and her father speaks a somewhat midwesternized dialect of English with an an extra vowel [ɔ]; both parents have velarized ('dark') lateral [ɫ].

We look at two stages of her acquisition here: the first (2:9-3;2) from a time when she had no onset clusters (ˈdedʌ 'skater'), the second (3;2-3;6) from the time when she began to produce onset clusters ('stet 'skate'). Our general finding is that Sine can produce a dorsal stop ***next to another dorsal within the same onset or rhyme.*** Crucially, a dorsal stop is licensed by a following dorsal glide (ɰ) or liquid (ɬ) but not by a following vowel, however dorsal.

We note before going on that there is a single but amazingly robust counterexample to the generalizations sketched here: from as far back as we have records Sine has consistently produced the word 'green' with a dorsal, first as [gin], later as [gɰin] once complex onsets come in. Sine's parents have a friend named Ondine [ˌɑnˈdin] whose name (with loss of the initial syllable) forms a minimal pair with 'green' in Sine's speech: [din]. We doubt that avoidance of homophony is enough to force the dorsal into the color term, but have no better solution to the problem at present. We note that Sine changes all other such onset dorsals to coronals before high front vowels, so that the quality of the following vowel cannot be the conditioning factor.

Throughout our study we assume that Sine's lexical representations are the same as her adults output forms (Smith 1973; Pater & Paradis 1995; Pater 1996; Tesar 1996; Curtin 2001). That is, we assume that she perceives the distinctions her parents make but fails to ***produce*** them in her speech: when asked to choose between ***tea*** (bag) and ***key,*** she consistently chose correctly, despite the fact that she neutralized both ***tea*** and ***key*** to [ti]. If Sine is like other children and chinchillas, she has been able to perceive all speech differences her parents perceive since she was born; she probably lost the ability to perceive differences not found in English sometime in her second year of life, but this plays no role in our study as we look only at native contrasts here.

2.1 Before onset clusters (2;9-3;2)

Before Sine begins to produce onset clusters (at 3;2), the distribution of her dorsal stops is fairly straightforward. Dorsals are changed to coronal foot-initially (1) and retained as dorsal elsewhere (2). Note that foot-initial covers a multitude of sins: word-intial syllables with primary stress (tæks 'cracks'; ˈtɑɬʌ 'collar'); word-initial syllables with secondary stress (ˌdʊˈbaɪ 'good-bye'); word-intial syllables with no stress (ta'wadi 'karate'); word-medial syllables with primary stress (ˌoˈte 'O.K.'), word-medial syllables with secondary stress (ˈpænˌteks 'pancakes').

(1) dorsal -> coronal foot-initially

tæks	'cracks'	ˈtaɬʌ	'collar'
tɪs	'kiss'	ˈtæbiz	'crabbies'
tɪdz	'kids'	ˈtafi	'coffee'
tek	'cake'	ˈtæmɯʌ	'camera'
taz	'cars'	taun	'clown'
tau	'cow'	ˈtɪdi tæt	'kitty cat'
ten	'cane'	ˈtɛɯɪt	'carrot'
ˈtɪkɪt	'cricket'	ˈtʌmɪŋ	'coming'
ˈtændi	'candy'	ˈtakˌɯotʃ	'cockroach'
ˈtʌɬʌ	'color'	ˈtæso	'castle' .
'tek	'cake'	ˈtɪdz	'kids'
ˌoˈte	'O.K.'	ˈpænˌteks	'pancakes'
pəˈtʌz	'because'	ˈtʌpˌteks	'cupcakes'
təˈwɑdi	'karate'	jaka təˈwækə	'yacka-kawacka'
dɑɪz	'guys'	dɛt	'get'
do	'go'	dʊʌ	'girl'
dots	'goats'	ˈdudʌ	'scooter'
dud	'good'	ˈdedʌ	'skater'
de	'grey'	ˈdɑɪ	'guy'
əˈdɛn	'again'	ˌduˈbaɪ	'good-bye'
ˈpeˌdaʊn	'playground'	ˌduˈnaɪt	'good-night'

The elsewhere case includes foot-medial cases (ˈdakɪŋ 'stocking'; ˈtɪŋko 'twinkle')as well as foot-final cases (łʊk 'look'; nek 'snake'):

(2) dorsal -> dorsal elsewhere

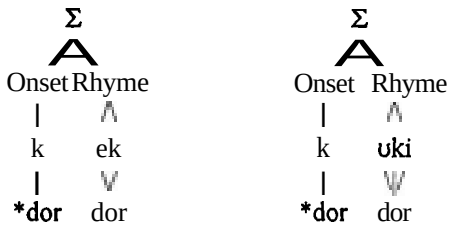
ˈtɪŋko	'twinkle'	łʊk	'look'
ˈmɪki	'Mickey'	ˈmɪɯk	'milk'
ˈbæŋki	'Spanky '	nek	'snake'
ˈdɑkɪŋ	'stocking'	ˈɑłɪk	'Alec'
ˈtʃɪkn	'chicken'	'pantek	'pancake'
ˈtʊki	'cookie'	sɑk	'sock'
ˈtʃɑkɪt	'chocolate'	dɪks	'sticks'

bak	'black'	takɯɯotʃ	'cockroach'
bɪg	'big'	dɔg	'dog'
dɪg	'dig'	bʌg	'bug'
ˈpɪgi	'piggy'	ˈfɯɑgi	'froggy'
ˈfɪŋgɯ	'finger'	ˈtɑɪgʌ	'tiger'
ˈtsaɪˌæŋgogogo	'triangle'	ˈpɛŋgwɪn	'tiger'
ˈɬʌgə	'mom's reflection'	ˈbɪgʌ	'bigger'
ˈbɪgi	'Sine's reflection'	eg	'egg'

The distribution of Sine's dorsal stops thus mirrors exactly the distribution of her parent's dorsal nasal. Like most speakers of English, Sine's parents do not produce [ŋ] foot-intially (*ŋæks, *ˌŋʊˈbɑɪ, *gaˈwadi, *ˌoˈŋe, *ˈpænˌŋeks) , but they do produce it foot-medially (ˈhæŋɪ 'hangar', dɪŋi 'dinghy') and foot-finally (hæŋ 'hang'; θɪŋ 'thing').

We assume the following quantity-insenstitive foot, where Onset means 'foot-intial onset' and Rhyme means 'last stressed syllable and all that follows':

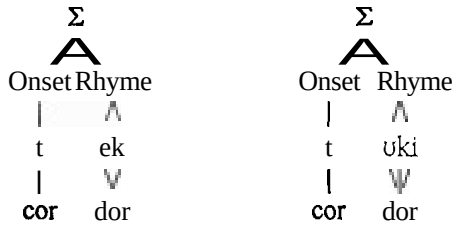
(3) English foot



This is not the same foot that seems to be used in English stress assignment (Hayes 1982; Kager 1989), but it is the same foot used for most segmental phenomena (Kiparsky 1982; Jensen 2000) and in English poetry since 1400 AD.

We have yet to ask why Sine would only produce dorsal stops in the rhyme at this stage. Like most phonologists we do not resort to a purely prosodic analysis here ('the rhyme licenses dorsal stops while the onset does not') in part because the rhyme is thought to be a poor licenser of features in the first place. Rather, we assume that something ***within the rhyme*** licenses the dorsal feature on the stops. Specifically, we claim that it is the inherent **dorsality** of vowels '(Sagey 1986; Golston & Wiese 1995) that supports the dorsal closure of stops within the rhyme. Thus it is the vowels of kek 'cake' and kuki 'cookie' that support the final and medial [k], while the initial [k]s surface as [t]:

(4) fate of unlicensed dorsals ('cake' and 'cookie')



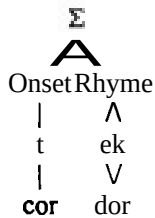
Our claim is then that dorsal stops are licensed within the rhyme because they are there always next to another dorsal, specifically a vowel. Dorsal stops are not allowed in onsets because onsets are (at this stage) always simplex and thus never have another dorsal to support the place of [k, g].

A prediction follows from this, namely that dorsal stops will be allowed in complex onsets that contain another dorsal, once complex onsets are found in her speech. The analysis in fact makes the peculiar prediction that [k, **g]** will not be licensed in simplex onsets or onsets like [sk] that lack another dorsal, but will be licensed in complex onsets which contain dorsals like [ɯ] and [ɨ]. And this is precisely what we find once complex onsets come in.

2.2 After complex onsets (3;2-3;6)

Sine begins to produce complex onsets at the age of 3;2, including clusters that obey sonority sequencing like **ˈkɯɑk** 'quack' and those that do not like 'stet 'skate' and ˈskɯɪʃ 'squish'. Dorsal stops in simplex onsets continue to be produced with coronal articulation, as before:

(5) Dorsals in simplex onsets -> coronal



As before, this occurs in foot initial positions that are word-initial (6) as well as word-medial (7):

(6) foot-initial and word-initial

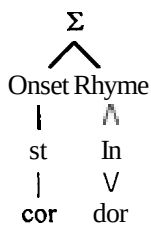
'tep	'cape'	'tɑfi	'coffee'
'tɪɬə ˌwɛɬ	'killer whale'	'dud ˌtæts	'good cats'
'tʌp	'cup'	'tapɪt	'carpet'
ðə 'tɪdz ˌtæn	'the kids can'	'tʊkiz	'cookies'
'tod	'cold'	'tɪsɪŋ	'kissing'
'tʌɬə	'color'	'tʌm	'come'
'tɔədz	'cards'	'taunt	'count'
'tiz	'keys'	'taso	'castle'
'tuˌɬed	'Kool-Aid'	'tʌvʊ	'cover'
'dɑɪ	'guy'	'doɬd	'gold'
'dem	'game'	'dʌo	'girl'
'dos	'ghost'	dɛt	'get'
'dʌm	'gum'	'dat	'got'
'dud	'good'	'do	'go*
'dʊdˌde 'sʌnˌʂaɪn	'good-day sunshine'	ˌdo 'dɛt hɪm	'go get him'

(7) foot-initial and word-medial

'babo ˌdʌm	'bubble gum'	ˌo'te	'O.K.'
'dabɪdʒ ˌtæn	'garbage can'	pə'tʌz	'because'
'tʊkʌ ˌdʊə	'cooker girl'	'pænˌtek	'pancake'
fɔ'dat	'forgot'	'dabɪtʃˌtæn	'garbage can'

Dorsals in complex onsets that contain no other dorsal are also pronounced with coronal articulation, as predicted:

(8) Dorsals in complex onsets -> coronal if there's no dorsal sister ('skin')



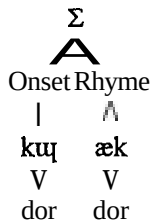
The only such cases involve [sk] clusters, as all other clusters with [k] or [g] involve another dorsal. For the [sk] clusters note that the [k] is indeed in the onset, but not foot-initial since the preceding [s] holds that position:

(9) in the onset but not foot-initial

'stet	'skate'	'studʌ	'scooter'
'stuɬ	'school'	'stɪdoz	'skittles'
ˌmædʒɪk 'stuɬ bʌs	'magic school-bus'	'stup	'scoop'
'stɪn	'skin'	'stutʃ	'scooch'

The data in (9) is not suprising given the data in (8), but the date in (10) is. Here we see that although Sine **isnot** able to produce dorsalsin simplex onsets or in **sC** onsets, she is able to produce them in complex onsets that contain a dorsal approximant:

(10) Dorsals in complex onsets remain *if* **there** is a dorsal sister



Crucially, the [k] is retained both when it is foot-initial (I 1) and when it is not foot-initial but foot-medial (12):

(11) in the onset and foot-initial

'kɬo ,tau	'Clo the cow'	'gɬæsɪz	'glasses'
'aɪs ˌkɰɪm	'ice cream'	'gɬæs	'glass'
'kɰæk	'quack'	'gɰon ʌps	'grown-ups'
'kɰaɪət	'quiet'	'skɰɪʃ	'squish'
'kɰɪs	'Chris	'skɰæps	'scraps'
'kɰækə	'crackers'	'skɰəɰəɬ	'squirrel'
'dæns ˌkɬæs	'dance class'	a 'kɬu	'a clue'

Note the lovely example **'Clo** the cow', where the first [k] is retained because of the following dorsal [] but the second is changed to a coronal because there is no other dorsal consonant within the onset.

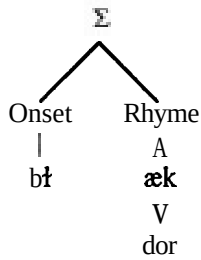
The foot-medial cases are equally instructive. They clearly show that it is not being foot-initial that licenses the **dorsality** but being next to another dorsal (ɰ or f) within the onset.

(12) in the onset and foot-medial

ˈskɰɪʃ	'squish'
ˈskɰæps	'scraps'

Finally, dorsals within the rhyme remain dorsal (13), as before and as predicted:

(13) Dorsal within the rhyme remain dorsal



This applies to all dorsal in the rhyme, whether foot-medial or foot-final:

(14) in the rhyme and foot-medial

ˌmɑɪ ˈɛgi	**'my egg-y'**	**ˈɰɪksəz**	'whiskers'
ˈspæŋki	**'Spanky'**	**ˈbɬæŋkɪts**	'blankets'
ˌspɛʃo ˈtɑɪgʌ	'special tiger'	**ˈtɰɪŋko**	'twinkle'
ˈɬʌgə	'Lugga'	**ˈfɪŋgʊ**	'finger'
ˈbɪgi	'Biggey'	**ˈtsɰɑɪaŋgo**	'triangle'

(15) in the rhyme and foot-final

ˈbɬɑk	'block'	**ˈbɪg**	'big'
ˈɬʊk	'look'	**ˈdɔg**	'dog'
'nek	'snake'	ˈɑɬk	**'Alec'**

To recapitulate: Sine produces dorsal stops within an onset or rhyme only if there is another dorsal within that onset or rhyme. We turn now to two current proposals for featural licensing and show that neither adequately captures the pattern Sine's dorsals exhibit.

3 Alternative accounts

We have shown that an analysis of these data requires reference both to other sounds (dorsals) and to prosodic domains (onset, rhyme). In this section we'll show the inadequacy of limiting oneself to one type of environment or the other. First we show that neighboring sounds alone do not account for the data (3.1) and then we show that prosodic environment alone does not account for the data. The first of these claims is controversial since Steriade has recently claimed that phonotactics can indeed be described without reference to prosody. The second claim is less controversial and probably the consensus view among phonologists, most of whom use both prosody and segmental environment.

3.1 Linear licensing (Steriade 1997,2000)

Steriade has argued in recent work that features are licensed not hierarchically by onset and rhyme, but linearly by preceding and following sounds. Laryngeal contrasts, she claims, are not licensed by onsets but by following vowels and/or sonorants.

Of concern presently is the licensing of major place contrasts like dorsal. Steriade claims that these are licensed by following vowels and/or sonorants, like laryngeal contrasts, which she calls 'right-anchoring' because the place contrast is anchored in the vowel or sonorant to its right:

(16) Major place contrasts (b ≈ d ≈ g) are 'right anchored'

> 'right-anchored place contrasts...typically neutralize in the absence of a following vowel or sonorant' (Steriade 2000, 20)

Right-anchored licensing of this sort predicts that the dorsal/coronal contrast will be neutralized in the absence of a following vowel or sonorant and maintained in the presence of a following vowel or sonorant. But this is the opposite of what we find in Sine's data (17).

Specifically, the contrast is often neutralized in the presence of a following vowel ('tus 'kiss') and maintained in the absence of a following vowel ('tuk 'look'). Checked (√) rows indicate data that is consistent with linear licensing of dorsal, while starred (*) rows indicate data that is inconsistent with linear licensing of dorsal:

(17) mispredictions if dorsal is right-anchored

ˈtɪs	'kiss'	* (shouldn't neutralize but does)
pəˈtʌz	'because'	* (shouldn't neutralize but does)
təˈwɑdi	'karate'	* (shouldn't neutralize but does)
ˌdʊˈbɑɪ	'good-bye'	* (shouldn't neutralize but does)
ˈM	'look'	* (should neutralize but doesn't)
ˈbɪg	'big'	* (should neutralize but doesn't)
ˈpɪgi	'piggy'	√
ˈbæŋki	'Spanky'	√
ˈkɯæk	'quack'	√
'stet	'skate'	* (shouldn't neutralize but does)

The problem does not lie with the choice of *right-* vs. *left-*anchoring. If we try a left-anchored analysis (going against Steriade's actual claims) the predictions are significantly better but still wrong:

(18) mispredictions if dorsal is *left-*anchored

ˈtɪs	'kiss'	√
pəˈtʌz	'because'	* (shouldn't neutralize but does)
təˈwadi	'karate'	√
ˌdʊˈbɑɪ	'good-bye'	√
ˈtʊk	'look'	√
ˈbɪg	'big'	√
ˈpɪgi	'piggy'	√
ˈbæŋki	'Spanky'	√
ˈkɯæk	'quack'	* (should neutralize but doesn't)
'stet	'skate'	√

There are really two problems here. The first lies with the dorsals that appear to be left-anchored (19) and serve as a simple counterexample to (16):

(19) 'left-anchored' dorsals

ˈbʊk	'book'	ˈbɪg	'big'

The second problem lies with dorsals that appear to be licensed by a following sonorant consonant but ***not*** by a following vowel:

(20) licensing by sonorant but not by vowel

ˈkɥæk	'quack'	right-anchored by following sonorant
ˈtɪs	'kiss'	not right-anchored by following vowel

The logic of Steriade's proposal demands that vowels be better licensers for things like laryngeal and place features than sonorant consonants, which are better licensers than obstruents. Here we find the opposite of what the theory leads us to expect: a major place contrast is maintained before a sonorant consonant but neutralized before a vowel.

If our analysis of the data is correct, dorsals are both left- and right-anchored in Sine's speech. They are left-anchored in the rhyme (ˈbʊk 'book') and right-anchored in the onset (ˈkɥæk 'quack'). What matters is that there be another dorsal within the onset or within the rhyme in which the dorsal stop occurs. Some prosodic conditioning is necessary here because ***being in the same onset or rhyme*** as another dorsal is crucial.

[Edward Fleming suggested at the conference that applying developmental data like this to a model designed for adult phonology is inappropriate. We disagree fundamentally, but point out that even if this developmental data is ruled out, linear licensing theory must still contend with parallel data in adult speech, specifically the phonotactics of the dorsal nasal in English. As pointed out by Bruce Hayes at the conference, the velar nasal patterns the same way in adult speech as the dorsal stops do in Sine's speech.]

3.2 Prosodic licensing (especially Jensen **2000)**

Kiparsky (1979) shows that fortition is generally a foot-initial process while lenition tends to occur foot-medially and foot-finally. Drawing on this observation, Jensen 2000 provides an elegant analysis of a number of segmental phenomena central to the phonology of English. We show here that such an analysis fails to account for our data because Sine neutralizes the dorsal/coronal distinction foot-initially and retains it medially and finally.

If the place of maximal contrast is the foot-onset (Jensen 2000), we get the following mispredictions for the data at hand:

(21) mispredictions if foot-initial position ***licenses*** contrasts

ˈɪɪs	'kiss'	* (shouldn't neutralize but does)
pəˈtʌz	'because'	* (shouldn't neutralize but does)

taˈwadi	'karate'	* (shouldn't neutralize but does)
ˌduˈbaɪ	'good-bye'	* (shouldn't neutralize but does)
ˈɬuk	'look'	* (should neutralize but doesn't)
ˈbɪg	'big'	* (should neutralize but doesn't)
ˈpɪgi	**'piggy'**	* (should neutralize but doesn't)
ˈbæŋki	'Spanky'	* (should neutralize but doesn't)
ˈkɯæk	'quack'	√
'stet	'skate'	√

If we turn Jensen's analysis on its head we get a better set of predictions, but still the wrong set:

(22) mispredictions if foot-initial position ***fails to license*** contrasts

ˈtɪs	'kiss'	√
pəˈtʌz	'because'	√
təˈwadi	'karate'	√
ˌduˈbaɪ	'good-bye'	√
ˈɬuk	'look'	√
ˈbɪg	'big'	√
ˈpɪgi	**'piggy'**	√
ˈbæŋki	'Spanky'	√
ˈkɯæk	'quack'	* (should neutralize but doesn't)
'stet	'skate'	* (shouldn't neutralize but does)

The problem is with the last two types of word: foot-initial dorsals are allowed but only if there is another dorsal in the onset. In words like 'quack' or 'cookie', we expect the foot-initial dorsals to neutralize, just **as** the foot-initial dorsals in 'kiss' and 'because' neutralize, but they don't. In words like 'skate' and 'skittles' we expect the foot-medial dorsals to remain, just **as** the foot-internal dorsals in 'piggy' and 'Spanky' remain, but they don't.

This type of purely prosodic account fails to work when a neighboring sound is required: the dorsal stops in 'quack', 'cookie', 'skate' and 'skittles' are retained if they're next to another dorsal within the onset or rhyme in which they occur, and changed to coronal otherwise. Some linear licensing is necessary here because ***being next to another dorsal*** within a given prosodic domain is crucial.

4 Conclusion

Sine's later data follows a simple pattern. Dorsals are licensed by

(i) a dorsal in the same onset, or
(ii) a dorsal in the same rhyme

These are both hybrid environments, using elements of both linear and prosodic licensing. We suspect this is what most proponents of prosodic licensing assume anyway, that prosodic domains define the domains within which (across which, at the edge of which) phonotactic restrictions hold (Selkirk 1980; It6 1986; Nespor & Vogel 1986). To our knowledge, nobody has ever seriously suggested that licensing is ***exclusively*** prosodic, but we provided evidence against such a claim just in case. Steriade has recently claimed that licensing is ***exclusively*** linear with no prosodic conditioning and we have **provied** evidence against this claim as well.

Note

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Towards a Lexical-Constructional Account of the Locative Alternation

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1 Introduction

This paper investigates the factors determining a verb's ability to participate in what has come to be known as a sub-type of the locative alternation, namely the ***spray-load*** alternation as in the following examples.'

(1) a. Joe loaded boxes onto the truck. b. Joe loaded the truck with boxes.

(2) a. Lila sprayed paint onto the wall. b. Lila sprayed the wall with paint.

Following Fillmore's (1968) discussion of verbs exhibiting different argument realization patterns, a number of syntactic studies have analyzed the ***spray-load*** alternation (e.g., Pinker 1989, Levin 1993, Dowty 2000) in different ways. One account that differs from primarily syntactically oriented analyses is Goldberg's (1995) Construction Grammar approach. It proposes that multiple argument realization patterns are best accounted for in terms of independently existing argument structure constructions that specify how a verb's arguments may be expressed. On this view, the locative variants in (1a) and (2a) and the with-variants in (1b) and (2b) are licensed by different types of argument structure constructions in combination with lexical entries representing the meanings of ***load*** and ***spray.***

This paper offers a critical review of Goldberg's constructional account of the locative alternation in order to see whether it is capable of accounting for the full range of argument realization patterns of verbs participating in the ***spray-load*** alternation. The remainder of the paper is structured as follows. Section two gives an overview of Goldberg's analysis of sentences such as in (1) and (2). Section three discusses data that are problematic for Goldberg's constructional analysis of the locative alternation. Section four outlines an alternative approach towards the locative alternation. It suggests a less prominent role for

independently existing constructions in determining a verb's ability to participate in the locative alternation.

2 Profiling as a Determiner for Argument Realization

Goldberg (1995) assumes that the interaction of verbal semantics with constructional semantics accounts for different argument realization patterns.[2] In her view, grammatical constructions are "taken to be the basic units of language" (1995: 4) that "can be viewed as free-standing entities, stored within the lexicon alongside lexical items, idioms, and other constructions that may or may not be partially filled." (1995: 221) Constructions are "pairings of syntax and semantics that can impose particular interpretations on expressions containing verbs which do not themselves lexically entail the given interpretation" (1995: 220).[3]

Following Pinker's (1989) classification of verbs that participate in the locative alternation into five classes, Goldberg (1995) proposes that the members of each class differ with respect to whether they are compatible with different types of argument structure constructions which map the verb's semantics to the syntactic level. According to this analysis, verbs lexically determine which of their argument roles are profiled (cf. Langacker 1987).[4] The difference in profiling determines whether a verb's semantics is compatible with the semantics of a construction and how its roles are mapped to the syntactic level.

The first verb class discussed by Goldberg is Pinker's (1989) slather-class which includes verbs describing simultaneous forceful contact and motion of a mass against a surface, such as slather, smear, brush, dab, daub, and smear. Citing the data in (3), Goldberg points out that members of this verb class exhibit a particular distribution of their arguments.

(3) a. Sam slathered shaving cream onto his face.
b. Sam slathered his face with shaving cream.
c.*Sam slathered shaving cream.
d.*Sam slathered his face.
e.*Shaving cream slathered onto his face. (Goldberg 1995: 176)

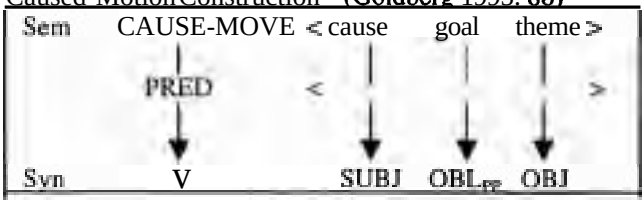
(4) slather < **slatherer**, thick-mass, **target** > (Goldberg 1995: 176)

Goldberg explains the acceptability of (3a) and (3b) and the unacceptability of (3c) – (3e) with the interaction of the lexical entry of slather in (4) with different grammatical constructions. The entry in (4) lists the participant roles of slather. Bold print of the three participant roles illustrate that they are profiled and thus need to be expressed at the syntactic level. Goldberg points out that slather

"is compatible with both the caused-motion construction and the causative-plus-*with*-adjunct constructions in the following way. Both constructions allow all three roles to be expressed, so there is no problem satisfying the constraint that profiled roles are obligatory. Since there are three profiled participants, one may be fused with a non-profiled argument role [...]" (Goldberg 1995: 176-77)

The following diagram illustrates how the verbal semantics of slather in (4) interact with Goldberg's caused-motion construction.

(5) Caused-Motion Construction (Goldberg 1995: 88)



According to Goldberg, the caused-motion construction is an independently existing construction which associates a specific syntactic configuration with a specific semantics. The top line of the box in (5) represents the construction's semantics. It contains the construction's semantic arguments (constructional roles) and represents their semantic relation to each other ('X CAUSES Y TO MOVE Z'). Solid lines between the semantic roles and roles in the array of the predicate (PRED, in the middle line) indicate that the constructional roles must fuse with an independently existing participant role provided by the verb. Dotted lines indicate that the construction is capable of providing additional participant roles, if needed. The line headed by PRED in (5) contains the construction's open slots into which the verb's participant roles fuse.' Once the verb's participant roles are fused with the constructional roles, the semantic roles are mapped to syntax as indicated by the arrows leading from the middle line to the bottom line in (5). When the verb's semantics in (4) interact with the caused-motion construction in (5), the verb's participant roles get inserted into the construction's predicate role array and subsequently mapped to syntax. According to Goldberg, this is because the verb's participant roles are compatible with the construction's 'X CAUSES Y TO MOVE Z' semantics and can thus fuse with the construction.

Verbs belonging to the heap- and cram-class in (6) and (7) exhibit a similar distribution of arguments as those of the slather-class in (3).[6] This similarity leads Goldberg to posit similarly structured lexical entries in (8) and (9).

(6) a. Pat heaped mash potatoes onto her plate.
b. Pat heaped her plate with mash potatoes.
c. *Pat heaped mash potatoes.
d. *Pat heaped her plate.
e. *The mash potatoes heaped onto her plate. (Goldberg 1995: 177)

(7) crammed the pennies into the jar.
b. Pat crammed the jar with pennies.
c. *Pat crammed the pennies.
d. *Pat crammed the jar.
e. *The pennies crammed into the jar. (Goldberg 1995: 177)

(8) heap < **heaper, location, heaped-goods** >

(9) cram < **crammer, location, crammed-goods** > (Goldberg 1995: 177)

The fourth class of verbs discussed by Goldberg are so-called load-verbs which describe situations in which "a mass of a size, shape, or type defined by the intended use of a container (and not purely by its geometry) is put into the container, enabling it to accomplish its function." (1995: 176) Load-verbs differ from verbs belonging to other classes participating in the locative alternation in that they may occur "without an overtly expressed theme role" (Goldberg 1995: 178) as in (10e).

(10) a She loaded the wagon with the hay.
b. She loaded the hay onto the wagon.
c. *The hay loaded onto the truck.
d.??Sam loaded the hay.
e. Sam loaded the truck.
(Goldberg 1995: 178)

Goldberg captures the argument distribution of load-verbs by defining lexical entries such as in (11) which specifies that the theme role "is allowed to be a definite null complement" (Goldberg 1995: 178). That is, although the verb specifies that all three participant roles need to be profiled, it allows the theme role to be omitted in cases in which context provides sufficient information to license the omission (cf. Fillmore 1986). The square brackets in (11) indicate that although load profiles the theme argument it may be omitted.

(11) load < **loader, container, [loaded-theme]** > (Goldberg 1995: 178)

The last class of locative verbs discussed by Goldberg includes verbs of the spray-class (e.g., spray, splash, splatter, and sprinkle). These verbs differ from members of the other four classes in that some verbs belonging to this class, such as splash in (12) – (13), require overt expression of both the liquid and the target roles. Furthermore, (14) illustrates that splash does not require its agent role to be overtly expressed.

(12) a. Chris splashed the water onto the floor.
b. Chris splashed the floor with water. (Goldberg 1995: 178)

(13) a.*Chris splashed the water.
b.*Chris splashed the floor. (Goldberg 1995: 178)

(14) Water splashed onto the lawn. (Goldberg 1995: 178)

The distribution of arguments of splash leads Goldberg to postulate the lexical entry in (15). It captures the fact that splash does not require its agent role to be overtly expressed (it is not profiled which is indicated by non-bold print) and that it requires both the target and the liquid roles to be overtly realized (they are profiled, which is indicated by bold print).

(15) splash ⟨ splasher, **target,** liquid ⟩

A second subclass of ***spray*-class** verbs includes verbs such as spray which generally exhibit a distribution of arguments similar to verbs belonging to the splash-subclass with one exception illustrated in (16).

(16) The skunk sprayed the car [ ]. (Goldberg 1995: 178)

This example shows that spray does not require its profiled liquid role to be overtly realized in cases in which it is deducible from context. In other words, the liquid role may be a definite null complement in cases in which both the speaker and hearer have knowledge about the types of liquids that are being sprayed onto the target. Goldberg captures the special null complementation status of the liquid role of spray with the following lexical entry.

(17) spray ⟨ sprayer, **target,** [liquid] > (Goldberg 1995: 178)

This section has shown that Goldberg (1995) typically encodes verbal semantics in terms of a single verb meaning listing the types of semantic roles associated with a verb. For each role, a lexical entry specifies whether it is profiled or non-profiled and whether it is allowed to be a definite null complement. Different grammatical constructions fuse with a verb's meaning to license argument structure alternations such as the locative alternation.

3 The Role of Grammatical Constructions in Determining Argument Realization Patterns

In analyzing the locative alternation, Goldberg repeatedly stresses the importance of grammatical constructions in determining a verb's argument realization patterns. This section turns to a critical discussion of the role of grammatical constructions in accounting for the locative alternation.

3.1 Licensing with-variants

Goldberg attributes the licensing of locative variants (e.g., (1a). (2a)) to the fusion of verbal semantics with the caused-motion construction. However. Goldberg does not go into details when it comes to analyzing the with-variants associated with the same verbs (e.g., (I b), (2b)). She briefly points out that

> "Slather is compatible with the causative-plus-with-adjunct since the target can be construed as a type of patient, in that the entity which is slathered can be construed as totally affected. The with-phrase is obligatory even though it is an adjunct, because the profiled status of the verb's thick-mass role requires that the role be expressed." (Goldberg 1995: 177)

While Goldberg's analysis of the causative-plus-with-adjunct constructions is used to explain the distribution of arguments with slather in (18), it is problematic when it comes to accounting for the distribution of arguments of other verbs belonging to the slather-class, for example brush as in (19).

(18) a. Sam slathered shaving cream onto his face.
b. Sam slathered his face with shaving cream.
c. *Sam slathered shaving cream.
d. *Sam slathered his face.
e. *Shaving cream slathered onto his face. (Goldberg 1995: 176)

(19) a. Joe brushed tooth paste onto his teeth.
b. Joe brushed his teeth with tooth paste.
c. *Joe brushed tooth paste.
d. Joe brushed his teeth.
e. *Tooth paste brushed onto his teeth.

The examples in (18) and (19) illustrate that although brush belongs to the same semantic class as slather, it exhibits different specifications as to which semantic roles need to be obligatorily realized at the syntactic level. To be more precise, slather requires the mass role to be obligatorily realized as a with-adjunct in (18b, d). In contrast, brush does not exhibit this requirement as (19d) illustrates. The question arises how Goldberg's with-adjunct construction is capable of ruling out examples such as (18d) while allowing examples such as (19d), given that the two verbs belong to the same semantic class and should subsequently exhibit similar profiling requirements.

Another point that is problematic for Goldberg's with-adjunct analysis is her assumption that the causative-plus-with-adjunct constructions fuse with verbs which have a semantic role that can be construed as a patient role. Take, for example, load and throw in the following examples.

(20) a. load < **loader, container, [loaded-theme]** >
b. She loaded hay onto the wagon. (CAUSED-MOTION)
c. She loaded the wagon with hay. (CAUS. & WITH-ADJUNCT)

(21) a. throw < **thrower, container, thrown-theme** >
b. She threw hay onto the wagon. (CAUSED-MOTION)
c. *She threw the wagon with hay. (CAUS. & WITH-ADJUNCT)

Both verbs are specified for three profiled participant roles, namely an agent (loader and thrower, respectively), a container, and a theme.' Due to their verbal semantics, both verbs may fuse with the caused-motion construction as can be seen in (20b) and (21b). The fusion is made possible because in both cases the loader and the thrower can be construed as a cause, the container can be construed as a type of goal-path, and the loaded-theme as well as the thrown-theme can be construed as particular types of themes because they undergo a change of location.

Next, compare what happens when *load* and throw interact with the causative-plus-with constructions. In (20c), the verb's participant roles fuse with the causative construction because the loader can be construed as a cause and the container role can be construed as a type of patient (the entity which is loaded on can be construed as totally affected). Finally, the profiled status of the theme role requires it to be obligatorily realized, which is guaranteed by the with-adjunct construction.

We now turn to example (21c). The important question at this point is: what part in Goldberg's analysis accounts for the unacceptability of (21c)? Note that throw in (21a) has a participant role array that is very similar to that of load in (20a). That is, the thrower role in (21c) can be construed as a cause and the container role on throw's role array can be construed as a type of patient because the entity on which something is thrown can be construed as totally affected. Moreover, the profiled theme role of throw specifies that it has to be obligatorily realized by any construction(s) with which it fuses. Since all three participant roles of throw in (21a) can be construed along the same lines as the participant roles of load in (20a), one would expect that throw should also have a with-variant counterpart to the locative variant licensed by the caused-motion construction in (21b). However, as the unacceptability of (21c) illustrates, this is not the case. The comparison of the types of constructions licensed by load and throw shows that Goldberg's constructional account of the with-variant does not provide us with a straightforward explanation as to why the causative-plus-*with*-adjunct constructions license the acceptable with-variant in (20c) without ruling out the unacceptable with-variant in (21c). The problem of licensing acceptable examples while ruling out unacceptable examples is also evident when it comes to profiling requirements of verbs belonging to other semantic classes, as the following section illustrates.

3.2 Different profiling properties of verbs in the same semantic class

Goldberg suggests that verbs which are members of one of the five narrowly defined classes also exhibit similar profiling properties. For example, with respect to verbs belonging to the heap- and cram- classes, she notes that "verbs of these classes must have three profiled participant roles" (1995: 177). To illustrate her point, Goldberg cites (22a) and (22b) as examples supporting the profiling properties of heap in its lexical entry in (23).

(22) a. *Pat heaped mash potatoes.
b. *Pat heaped her plate.

(23) heap < **heaper,** location, heaped-goods > (Goldberg 1995: 177)

(24) stack < stacker, location, stacked-goods >

Based on Goldberg's claim that all members of a verb class exhibit similar profiling properties, (24) illustrates the structure of the lexical entry for stack, another verb belonging to the heap-class. Since all participant roles of stack are profiled, one would expect that stack requires all three roles to be realized at the syntactic level. However, this is not always the case, as the following corpus-based examples from the British National Corpus illustrate.

(25) 'I must say for an adolescent Venus fly-trap she's got tons of style,' Nicola said as, elbow to elbow, she and Emily stacked the plates. (BNC)

(26) Ruth heard Grant talking to her in the office – which was only a partitioned off slice of the kitchen, so Ruth could hear every word as she stacked the dishwasher. (BNC)

In (25) stack does not occur with the location role and in (26) it does not occur with the stacked-goods role. According to Goldberg's analysis, this result is not expected, since stack – as a member of the heap-class – profiles all three participant roles (cf. (24)) and thus requires them to be overtly realized at the syntactic level. The fact that not all members of a narrowly-defined verb class exhibit the same profiling properties poses another problem for Goldberg's constructional account because it does not predict the full range of acceptable argument realization patterns.

3.3 Transitivity and profiling properties

This section discusses the profiling properties of load and pack, which belong to the narrowly defined class of load-verbs. As discussed in section 2, the lexical

entry of load in (27a) serves to license sentences (27b) – (27d), while ruling out unacceptable sentences (27e) and (27f). (28) lists the lexical entry of *pack* which belongs to the same class as load, according to Pinker (1989).[8]

(27) a. load < loader, container, [loaded-theme] > (Goldberg 1995: 178)
b. Joe loaded boxes onto the truck. (locative variant)
c. Joe loaded the truck with boxes. (with-variant)
d. Joe loaded the truck. (transitive location variant)
e. ?Joe loaded boxes. (transitive theme variant)
f. ?Joe loaded. (intransitive variant)

(28) a. pack < packer, container, [packed-theme] >
b. Lila packed books into the box. (locative variant)
c. Lila packed the box with books. (with-variant)
d. Lila packed the box. (transitive location variant)
e. Lila packed books. (transitive theme variant)
f. Lila packed. (intransitive variant)

A comparison between (27) and (28) shows that load and pack do not exhibit similar profiling properties although they belong to the same verb class. Consider the lexical entry for load. In (27b) – (27d) it serves to license the locative, *with*-, and transitive location variants in combination with the caused-motion and the causative-plus-with-adjunct constructions. At the same time, the transitive theme and intransitive variants are typically judged unacceptable without any supporting contextual information. In contrast, the lexical entry of pack serves to license all five variants, including both the transitive and intransitive theme variants.

In addition, it is not clear how intransitive variants based on verbs participating in the locative alternation are licensed by lexical entries such as in (28a). That is, may both the container role and the packed-theme role be definite null complements? Then the question arises whether (28f) is licensed by the caused-motion construction or the causative-plus-with-adjunct constructions, each capable of being sensitive to definite null complements. Another possibility is an intransitive construction which maps only the packer role to the syntactic level. This option, however, would have to rely on non-profiled container and packed-theme roles.

Our discussion of the data has shown that grammatical constructions of the sort proposed by Goldberg are too powerful when it comes to licensing different argument realization patterns based on a single lexical entry of a verb. The following section outlines an alternative account of the locative alternation which puts less emphasis on the role of independently existing meaningful constructions.

4 Towards a Usage-Based Lexical-Constructional Approach

I would like to suggest that the problems discussed in the previous sections are not necessarily due to mechanisms inherent to the individual grammatical constructions. Instead, it seems as if they are caused by the structure of the lexical entries postulated by Goldberg.[9] On her view, verbs typically have single lexical entries which list their participant roles including both their profiling and null instantiation properties. Furthermore, participant roles of verbs belonging to the same narrowly defined class also share the same profiling properties, according to Goldberg. However, throughout our discussion of the data in section three, it has become clear that it is not always the case that verbs belonging to the same semantic class also exhibit the same profiling properties when it comes to the syntactic realization of their participant roles.

4.1 Polysemy and the structure of the lexicon

In order to solve these problems, I propose to change the structure of lexical entries by systematically including more detailed semantic information about the different types of situations to which a verb may refer. On this view, a verb's meaning is not only represented in terms of a single minimal lexical entry. Instead, the multiple senses associated with a verb are described separately and are linked to each other in terms of polysemy networks of distinct, yet interrelated senses (cf., e.g., Iwata (1998), Fillmore & Atkins (2000), and Boas (2001a, 2002)). This approach has the advantage of not having to rely on a variety of independently existing Goldberg-type constructions in order to license multiple argument realization patterns in combination with a verb's single lexical entry.

For the description and analysis of a verb's multiple senses, I adopt the main ideas of a usage-based lexical-constructional approach as outlined by Boas (2000, 2001b). Central to this approach is the idea that in order to arrive at an adequate description and analysis of language, it is "necessary to not only analyze language from a point of view that emphasizes the structural relations and interdependencies between words in a sentence, but also to take into account how they are used in different contexts." (Boas 2000: 254) This means that it is not sufficient to investigate a linguistic phenomenon in isolation. Rather, the full range of forms and meanings associated with a linguistic unit must be considered."' In order to arrive at this goal, it is first necessary to conduct a thorough usage-based bottom-up description of the full range of argument realization patterns in which verbs participating in the locative alternation actually occur.[11] Based on this information. it then becomes possible to split a verb's individual argument realization patterns into distinct groups according to the different senses of the verb. This procedure results in a much more detailed lexicon in which verbs are associated with a number of conventionalized senses,

each of which forms its own mini-construction that is a pairing of a form with a meaning.[12]

The semantic information encoded by a mini-construction is described in terms of Frame Semantics (Fillmore 1982, 1985). The central idea behind Frame Semantics is that words have to be understood in context in order to arrive at a complete semantic description.

> 'This means that a semantic description of a word should include information about how speakers apply their lexical knowledge in interpreting and producing real discourse. Fillmore proposes that in order to understand the meaning of words in a language we must first have knowledge of the conceptual structures, or semantic frames that underlie the meanings of words. Semantic frames contain frame elements, i.e., descriptions of the frame's participants in terms of situational roles." (Boas 2001b: 4)

Based on these principles, each mini-construction representing a conventionalized sense of a word contains frame-semantic information about the frame to which it belongs. In addition, each mini-construction contains syntactic information about how the frame elements may be realized syntactically. The following section discusses the structure of a number of mini-constructions associated with verbs that participate in the sprayfload-alternation.

4.2 The structure of mini-constructions

To illustrate the relationship between multiple senses of a verb which participates in the *spray/load*-alternation, consider first the verb load. As has been pointed out in the literature, the with-variant is associated with some sort of "holistic" effect, whereas the locative variant is not (cf., e.g., Anderson 1971, Dowty 2000). This observation can be captured in frame-semantic terms by postulating that load has two distinct senses, each belonging to different semantic frames. namely the motion-filling and the motion-placing frames. The motion-filling frame describes situations in which containers are filled or areas are covered with things or substances, thereby achieving the "holistic" effect. The five frame elements (or semantic roles) are agent, theme, source, path, and goal.[13] The following simplified mini-construction represents the distinct "holistic" sense of load, as it occurs in the motion-filling frame."

(31) $load_{m\text{-}f}$: **AGENT** **GOAL** THEME
NP.Ext NP.Obj PP_with.Comp

In (31), the subscript "m-f" indicates that the mini-construction represents the form-meaning pairing of the verb load in the motion-filling frame. The top line contains frame semantic information, whereas the bottom line lists information about how the frame elements are realized syntactically (part of speech as well as grammatical function). This mini-construction serves to license three of the

five frame elements of the motion-filling frame, namely agent, goal, and theme. Bold print indicates that a frame element is profiled and must therefore be realized at the syntactic level." (31) serves to license the following sentences.

(32) a. Joe loaded the truck with boxes. b. Joe loaded the truck.

(32a) is licensed by the mini-construction in (31) because it realizes the agent role of the motion-filling frame as the external NP ***Joe.*** Furthermore, the requirements that the goal and theme role be realized syntactically as an object NP and a PP complement headed by ***with,*** respectively, are fulfilled by (32a). (32b) is licensed in a similar way by (31), except for the fact that the theme role is not realized syntactically. However, this is in accordance with the profiling requirements stated in (31) which specify that the theme role is not profiled (the theme is in non-bold print). Next, we turn to the mini-construction encoding a different sense of ***load*** in (33).

(33) $load_{m\text{-}p}$: **AGENT** NP.Ext **THEME** NP.Obj GOAL PP_onto.Comp

The subscript "m-p" in (33) stands for the name of the motion-placing frame to which the mini-construction in (33) is linked. In other words, it indicates that this mini-construction represents a distinct sense of ***loud*** that differs from that in (31). Although the motion-placing frame has a similar inventory of frame elements (namely agent, theme, source, path, and goal) as that of motion-filling, the semantic relations holding between these frame elements in the motion-placing frame differ from those in the motion-filling frame. The primary difference has to do with the status of the goal role which is profiled in (33), but not in (31). Note also that there is a different linear order of roles indicating the different non-holistic perspective taken of the event. The differences in linear order and profiling properties of the mini-construction in (33) become clear with the types of sentences licensed by it.

(34) a. Joe loaded boxes onto the truck. c. *Joe loaded.
b. ?Joe loaded boxes.

(34a) is licensed by the mini-construction in (33) in that all three frame elements (agent, theme, and goal) are syntactically realized according to the specifications in (33). In addition, (33) accounts for the unacceptability of (34b) and (34c) because it requires both the theme and goal elements to be realized syntactically (they are profiled). Having seen how two different mini-constructions linked to distinct semantic frames serve to describe the locative alternation exhibited by ***load,*** we now turn to a discussion of ***pack,*** a verb belonging to the

same narrowly defined class. Recall sentences (28b) – (28f), here repeated as (35a) – (35e).

(35) a. Lila packed the books into the box.
b. Lila packed the box with books.
c. Lila packed the box.
d. Lila packed the books.
e. Lila packed.

(36) $pack_{m\text{-}f}$: **AGENT** **GOAL** THEME
NP.Ext NP.Obj PP_with.Comp

The mini-construction in (36) is similar to that in (31) in that the agent and goal roles are profiled whereas the theme role is not profiled. This means that (36) licenses both (35b) and (35c). Next, compare the mini-construction in (37), representing the motion-placing sense of ***pack,*** with its counterpart in (33) above.

(37) $pack_{\_\_}$: **AGENT** THEME GOAL
NP.Ext NP.Obj PP_into/onto.Comp

The mini-construction representing the motion-placing sense of ***pack*** in (37) differs from (33) in that neither the goal nor the theme roles are profiled. This means that whereas ***load*** typically requires the theme and goal roles to be overtly realized when it occurs in the motion-placing frame, ***pack*** does not have these requirements. (37) therefore licenses examples (35a), (35d), and (35e). Another difference between (37) and (33) has to do with the status of the goal role, which is represented by italics in (37) but not in (33). Italics indicate that a frame element cannot occur by itself with the agent role but must occur with other roles, such as the theme role, for example. This requirement ensures that mini-constructions such as (37) do not license unattested examples such as ****Lila packed into the box.***

5 Conclusions and Outlook

This paper has outlined an alternative constructional account of the locative alternation that differs crucially from the analysis proposed by Goldberg (1995). Whereas Goldberg emphasizes the role of independently existing meaningful constructions in licensing the locative alternation, this paper has pointed out a number of problems with her account. A survey of a larger range of verbs participating in the locative alternation has shown that Goldberg's constructions produce unacceptable examples. Based on a closer investigation of how verbal and constructional semantics interact, it was suggested that these problems are due in part to the structure of lexical entries proposed by Goldberg. In particular,

it was shown that the notions of profiling and membership of a verb in a narrowly defined semantic class are problematic when it comes to determining the structure of a verb's lexical entry.

The alternative analysis proposed here shifts the burden of explanation from the abstract constructional level to a more concrete lexical-constructional level. On this view, each sense of a verb forms a mini-construction containing frame semantic as well as syntactic information. Each mini-construction is linked to a semantic frame, i.e. its meaning is understood with respect to the overall semantic frame. Our discussion of ***load*** and ***pack*** suggested that their argument distribution is best accounted for by postulating two mini-constructions for each verb, each linked to the motion-filling and motion-placing frames, respectively. Although the mini-constructions representing the distinct senses of the two verbs are linked to the same frame, it was shown that their profiling specifications for the individual frame elements (or semantic roles) differ from each other. Finally, it was proposed that this difference is responsible for the distinct argument realization patterns of ***load*** and ***pack*** in the locative alternation.

The lexical-constructional analysis presented in this paper has the advantage of being more precise than Goldberg's theory in accounting for the different argument realization patterns of verbs participating in the locative alternation. By including more elaborate information in a verb's lexical entry it thus becomes possible to capture the apparent idiosyncrasies exhibited by verbs that are closely related in meaning. In order to arrive at a more global account of the locative alternation, further research remains to be done on a larger number of verbs. Another open question is concerned with the status of grammatical constructions in general. In other words, it is not yet entirely clear as to how much idiosyncratic information needs to be stored in the lexicon and how powerful grammatical constructions really are in licensing other argument structure alternations.

6 Notes

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[2]Goldberg's (1995) constructional approach is fundamentally different from syntactically-oriented analyses employing lexical rules (cf., e.g., Pinker 1989 and Aranovich & Runner 2001). Whereas lexical rule accounts typically assume that rules derive extended lexical entries (and thus alternate argument realization patterns) from a "basic" lexical entry, Goldberg explains argument structure alternations in terms of interactions of verbal and constructional semantics. On this view, different argument structures are due to different constructions (form-meaning pairings) interacting with a verb's semantics.

[3] See Goldberg (1995: 3-5) for a more detailed discussion of the theoretical status of grammatical constructions.

[4] "Lexically profiled roles are entities in the frame semantics associated with the verb that are obligatorily accessed and function as focal points within the scene, achieving a special degree of prominence. (…) Profiling is lexically determined and highly conventionalized – it cannot be altered by context." (Goldberg 1995: 44)

[5] The fusion of constructional and verbal semantics is regulated by two general principles. namely the Semantic Coherence Principle and The Correspondence Principle (Goldberg 1995: 50).

[6] "*Heap*-class: vertical arrangement on a horizontal surface: heap, pile, *stack* … (…) *Cram*-class: mass is forced into a container against the limits of its capacity: cram, puck, *crowd, jam, stuff* …" (Goldberg 1995: 176)

[7] The fact that the loaded-theme role may be realized as a possible null complement of *load* is irrelevant here.

[8] Note that (27) is acceptable given the proper contextual background information.

[9] Nemoto (1999) makes the same point with respect to ditransitive constructions.

[10] The types of information may be syntactic, semantic, pragmatic, morphological, and phonological. among others.

[11] For examples of such an approach to linguistic description, see Salkoff (1983), Guillet & Leclere (1992), and Boas (2000).

[12] On this approach. each sense of a word is encoded in terms of a mini-construction, containing both frame-semantic as well as syntactic information. For an analysis implementing these principles, see Boas (2000) on resultative constructions in English and German and Boas (2001b) on caused-motion constructions.

[13] See Johnson et al. (2001) for a more detailed discussion of the organization of the motion-filling and motion-placing frames.

[14] Verbs that also have senses belonging to this frame include puck. *stuff*, and wrap, among others.

[15] Note that the specifications of the mini-constructions in this paper represent a first approximation of their structure as they pertain to the locative alternation. Due to space limitations, other types of alternations or grammatical constructions are not considered here. As such, these specifications must be regarded as default specifications that are subject to override by productive grammatical constructions such as the passive construction, for example.

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Time and Definiteness Effects Again*

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1 A New Attempt at Some Prominent Facts

Patterns pertaining to 'strong' DMPs and scope in presentational *there*-sentences (henceforth: PTSs) have received much attention, and many attempts have been made to derive them.' Building on the account of Heim 1987, this paper proposes a novel account based on temporal reference encoding and general assumptions concerning the nature of the interface between the computational system of syntax (CS) and the systems of sound and meaning (Chomsky 1999).

1.1 Strong D/NPs and scope in PTSs

In PTSs, 'strong' D/NPs are ruled out, and 'weak' DMPs are confined to a narrow scope interpretation (Milsark 1977. Cf. section 1.3. on the notions 'strong' and 'weak' as understood here):

(I) a. *There are most children in the garden
b. Most children are in the garden

(2) a. There must be a ghost in the house (only: must $\geqslant$ 3)
b. A ghost must be in the house (both: must $\geqslant \exists$, $\exists \geqslant$ must)

Heim 1987 proposes that both the restriction on strong DMPs and the narrow scope facts follow from one underlying filter, given in (3):

(3) a. ***there be*** x, where *x* is an individual variable (Heim 1987:27)

Under the assumptions that (a) 'strong' DMPs have to undergo Quantifier Raising (QR) to be interpretable and that (b) 'weak' D/NPs take sentential wide scope via QR, the effects in (I) and (2) follow: By definition, QR leaves an individual variable in the base position of the raised D/NP, so it is disallowed

across ***there be***. What remains to be explained is why a filter such as that of Heim should hold.

1.2 Proposal

We propose that the facts pertaining to strong D/NPs and scope in PTSs follow from (4):

(4) Presentational ***There***- Sentences get Reference Time token-reflexively

We argue that PTSs are special as concerns the encoding of temporal reference: Unlike 'normal' sentences, they lack the (full) means to encode temporal reference structurally, that is, within CS. Instead, Reference Time (RT), the time where the propositional content associated with the PTS has reference, is determined on the basis of the ***there***- sentence token itself. With RT open in CS, PTSs are not saturated expressions there. For this reason, QR – a syntactic operation defined only for saturated expressions (propositions) – cannot apply across ***there be***. D/NPs that have to QR are ruled out, as is scope taking via QR.

1.3 Background

The view taken here on interpretation is correspondence-theoretic: Sentences depict situations, perceiving a structured set of lexical items is picturing a situation (cf. in particular McGilvray 1991).

Tense, viewed as encoding a relation between Speech Time (ST) and Reference Time (RT) (Reichenbach 1947). is intimately connected to reference and truth: It establishes a relation between a crucial part of speaker reference (Speech Time ≈ the speaker's 'here and now') and a reference point at which a situation as depicted by the sentence is asserted to obtain (Reference Time = the time of which the sentence is (claimed to be) true). [2]

ST is the time 'anchoring' the utterance (Enc 1987): Each and every utterance entails ST, just like an utterance entails a speaker. We take ST to be computable in different ways though. The obvious option is that ST is computed on the basis of the utterance, corresponding literally to the time it takes to utter the sentence token then. Another possibility is that ST is structurally encoded, the important case being that where a D/NP functioning as syntactic as well as logical subject 'binds' ST. To give an example, in

(5) Otto was sick

the predication is restricted temporally to times which are part of Otto's time or – put more cognitively – times of Otto-representations. Meeting certain conditions, D/NPs may effectively determine ST and thus 'anchor' an utterance

temporally in the sense relevant for CS. The crucial idea is that in the absence of the pertaining structural relations, ST is the literal time of utterance. We take nominative case checking and agreement to reflect the relation allowing a D/NP to bind ST such that it is saturated in the sense relevant for CS."

Pending an ST 'anchor', RT plays the role of a reference point or an 'address' where the propositional content associated with the pertaining sentence has reference. Having reference means being represented in extralinguistic terms 'outside' CS, i.e., beyond the interface to interpretation. Without exception, RT has to be related to an ST 'anchor': A bound RT entails a bound ST. Having an open ST entails having an open RT.

ST and RT are taken to be part and parcel of predicate-argument structure.[4] Importantly, an expression with an open RT slot is a (propositional) function and not as a saturated expression (proposition). More in general then, we assume that CS relies on typing (function/argument) information (restricting the operation 'merge' in particular).

QR – assumed here to obligatorily apply to 'strong' D/NPs as well as to be responsible for sentential wide scope of 'weak' D/NPs – is an operation that creates a one place function from a proposition, leaving an individual variable in the base position of the raised D/NP and abstracting over it. This function is then taken as an argument by the generalized quantifier corresponding to the raised D/NP (Montague 1974, May 1985). We take QR to be part of CS.[5]

Following McNally 1998, we assume that the relevant set of strong D/NPs consists of those D/NPs that denote only in the type of generalized quantifiers (GQs). Essentially, these are the D/NPs the meaning of which can be computed only on the basis of at least two sets (most, every, all...). We assume that the wide scope reading of 'weak' (single set denoting, intersective) D/NPs arises through shifting their type to that of a generalized quantifier and subsequent raising.[6] With McNally, we assume that definiteness effects with non GQ-denoting D/NPs are due to a pragmatic felicity condition requiring D/NPs in the scope of there be to introduce novel discourse referents.

2. PTSs: ST-Dependent albeit ST-Deficient

2.1 PTSs and ST (utterance) dependency

The intuition that PTSs have to do with 'location', 'being on scene' and/or 'awareness' is a common one. We cite Firbas' (1966:243) formulation of the idea that PTSs are about [the speaker's] 'here and now':

> These verbs or verbal phrases undoubtedly imply or even express appearance – a kind of coming into existence – on the scene (i.e. the scene created by the narrow. ad *hoc* context at the moment of utterance) or simply existence on this scene.

That presentational *there-* sentences are 'ad hoc' (utterance dependent) in a strong sense shows clearly in Italian where the (unexpressed) location of which a particular situation is asserted to hold has to be interpreted relative to the speaker (cf. Pinto 1997: 127f):

(6) a. Irene e arrivata 'Irene arrived somewhere'
b. LOC e arrivata Irene 'Irene arrived here/at this place'

The Italian case illustrates that PTSs are 'about' something they do not actually seem to express. This is expected if this something is the 'here and now' of the speaker which is as such dependent on the utterance situation rather than being independently encodable.

2.2 Absence of ST in PTSs

While PTSs seem to depend strictly on ST for interpretation, there is reason to believe that they do not encode it structurally. Evidence for this comes from embedded speech acts as well as various syntactic properties associated with PTSs.

2.2.1 Embedded speech acts

Patterns pertaining to embedding speech act verbs provide evidence that PTSs lack (full) strucural encoding of ST (more broadly: speaker reference):

(7) a. Ede said that a hen was walking in the garden
b. Ede said that there was a hen walking in the garden

in the usual case, ambiguity arises with embedding speech act verbs, pertaining to the understood ST of the embedded sentence (cf. e.g. Higginbotham 1995). Thus (7-a) can be understood as meaning that a situation where a unicorn was walking held during Ede's speech, the so-called 'simultaneous past' reading. The other reading (7-a) has is that the situation encoded in the embedded sentence held at some time prior to Ede's speech (the 'distant past' reading). Looking at (7-b), the distant past reading seems to be unavailable: (7-b) means that during Ede's speech, a situation in which a unicorn was walking obtained.' In other words, RT of an embedded PTS seems to coincide with its ST. That ST and RT respectively are not autonomously encoded in embedded PTSs shows also in the fact that adverbs restricting RT to a time different from that of ST are odd in these contexts, as is past perfect tense (entailing disjointness of ST and RT as well as difference between ST and RT in terms of the situation(s) holding at them):[8]

(8) a. Ede said that a hen had been walking in the garden the day before
b. ?Ede said that there was a hen walking in the garden the day before
c. ?Ede said that there had been a hen walking in the garden

We take Tense to realize the relation entertained by the ST and RT arguments. On this assumption, a straightforward explanation for the lack of the distant past reading with embedded PTSs is that the ST argument is not realized independently, if at all.

2.2.2 Structure

Assuming – as is standard – that the encoding of ST (Speaker Reference) is associated with the C/T domain, a range of facts showing the structural poverty of this domain supports the idea that ST is not (fully) encoded structurally in PTSs (saturated in the sense relevant for CS).

As is well known, PTSs have special properties with respect to case and agreement, which are standardly assumed to be associated with Tense. Systematically across languages, agreement needn't or cannot be with the 'associate':[9]

(9) a. There's-SG rats-PL all over
b. Il y'a-SG deux cheveux-PL dans le gardin
It there-has two horses in the garden

Case assignment, another property associated with Tense, is special as well in PTSs. In English for example, it is presumably not nominative case that is assigned/checked in PTSs but rather accusative:

(10) a. ?There was only me-ACC in the garden
b. *There was only I-NOM in the garden

Taking agreement and nominative case checking to reflect a structural relation a (subject) D/NP enters with Tense, the absence of agreement and nominative case checking in PTSs suggests that the pertaining relation is absent as well. We conjecture that there is no structural ST binding (via a DMP subject) in PTSs (cf. section 1.3.).

Many languages make use of a special copula in PTSs (among which e.g. French (cf. (9-b)), Spanish, Tagalog and Hebrew, cf. Freeze 1992). The copula being the 'predicative glue' standardly assumed to be situated in Tense, this supports the idea that temporal reference encoding is peculiar in PTSs.

PTSs are special with respect to force encoding as well, force standardly taken to be associated eith the C/T domain. Grouping force with tense as determining speaker reference, this too supports the claim that the C/T domain is

impoverished or defective in PTSs. For example, adverbs making reference to force underly special restrictions in PTSs:

(11) a. ?* There fortunately appeared a fireman
b. A fireman fortunately appeared

Non-bridge verbs (essentially: speech act verbs entailing force encoding on their complements) seem to be unhappy with PTSs as complements in the absence of a complementizer. again pointing to the latters' C/T defectiveness:

(12) a. Otto thought there was beer in the fridge
b. ?? Otto murmured there was beer in the fridge

In addition, PTSs substituted for propositional variables are somehat odd, indicating that they do not qualify as fully-fledged propositions:

(13) The following proposition is true:
a. Men have livers
b. Jack Myers was in central park at 8pm on June 1973
c. ??There {is, was) a man in the garden

Finally, in donkey contexts PTSs seem to require an adverb of quantification in the scope, indicating that they are defective as respects their temporal quantificational force:

(14) a. If a cat is falling from a roof, it (usually) miaows
b. If there is a cat falling from a roof, it ??(usually) miaows

It seems safe to conclude that PTSs are special with respect to the encoding of temporal reference, generally assumed to be associated with the C/T domain. Patterns with embedded speech act verbs as well as syntactic peculiarities pertaining to the C/T domain suggest that what is funny about PTSs is the encoding of ST which seems to be deficient, if it is part of the structural make-up of PTSs at all. The seeming paradox of PTSs that emerges is that while PTSs are heavily dependent on ST (section 2.1), they do not seem to 'have it' in their structure (this section). In the next section, we argue that the facts pertaining to strength and scope in PTSs follow from exactly this.

3 The ST/RT Relation in PTSs and Token Reflexivity of PTSs

3.1 ST and RT in PTSs

On top of the strong dependency of PTSs on the utterance context, the relation between ST and RT seems to be particularly close in PTSs. Unlike a 'normal' sentence in present tense, a PTS is felt to be uttered truthfully only if the situation it depicts holds at least while the PTS token is uttered. Consider:

(15) a. I am reading the paper
b. There is a woman reading the paper

While (15-a) is not understood to provide information about utterance time (and is strictly speaking contradictory under that interpretation), for (15-b) to be judged true the situation it depicts has to be strictly 'going on' while the token is uttered. Similar pairs are given in the following examples:

(16) a. {Otto, someone) is working in that skyscraper
b. There is {?Otto, someone) working in that skyscraper

(17) a. People are hanging around in Central Park
b. There are people hanging around in Central Park

Each time, while the 'normal' sentences may be uttered truthfully without the situation they depict strictly holding while they are uttered, the PTS variants seem to require that the depicted situation holds while they are uttered. This distinguishing property of PTSs follows if their RT is their ST essentially. Supposing that in PTSs, RT is defined strictly on the basis of ST (utterance time) and assuming for concreteness that the relation between ST and RT is that of identity, the logical form of a PTS can be given as follows:[10]

(18) a. There is a man in the garden
b. in (man, garden, t_{ref}) & $t_{ref} = t_{speech}$

3.2 Self-Reflexivity

Assuming that RT is ST in PTSs and adopting Chomsky's 1999 assumption that spelling out a string does away with its structure, we can construe the following argument:

(19) TOKEN REFLEXIVITY ARGUMENT FOR PTSs:

In PTSs, RT is ST
A PTS's ST is determined strictly on the basis of the PTS's utterance
Utterance (spell out) does away with spelled out structure

Operations depending on temporal saturation are blocked in PTSs

For our context, D/NPs cannot QR across ***there be:*** QR is defined for saturated expressions (propositions) only, but PTSs are not saturated expressions within CS: Their RT slot is open due to the absence of ST encoding. D/NPs that have to be interpreted as GQs and QR are therefore ruled out, as is scope taking via QR.

4 Towards Formalization

The account proposed here is based on a form of self-reference: PTSs are saturated by their own tokens eventually. This section seeks to show how this can be integrated into a more specific set of independently motivated assumptions, showing thus the feasibility of the proposal.

4.1 Level ordering

Chomsky's 1999 assumption that uttering (spelling out) a string does away with its structure is a form of level ordering, quite evidently a property of grammar. Using the advantage that a theory with level ordering furnishes, we can use (essentially) the same metalanguage to formalize self reference without running into paradox. We assume that a function τ (as sometimes used in semantics to map individuals onto their times) situated beyond the interface (spell out) maps a token onto its utterance time. The result may then saturate the open RT slot arriving at the interface. This can be pictured as follows with p standing for a propositional meaning (the situation asserted to obtain in a PTS) and t its reference time:

(20) $\lambda t\,[p(t)]$ [output of CS]

[spellout]

$\lambda t\,[p(t)]\,\tau$ (/there be …/) =

$p(\tau$ (/there be …/)) [the token saturates RT]

4.2 Syntax and semantics

We limit ourselves here to the most important ideas entering analysis, space forbidding detailed discussion and motivation (the reader is referred to Brandt 2001. Brandt in progress).

We assume that the relevant set of PTSs project an unaccusative structure comprising a VP internal theme and location argument (cf. Bende Farkas & Kamp 2001 for similar ideas). The location argument is crucial in providing a free time variable that we assume to be represented at the VP level. Supposing that closure of 'ordinary' individuals applies at the VP level, the VP takes the

form of an 'indefinite small clause': It depicts a situation obtaining at an arbitrary time:

(21) VP: [∃x (in (the garden, x)] (t)

The element ***there*** is a headlclitic situated in a projection located directly above VP that we call tP ('little t' in analogy to 'little v'). tP encodes RT."

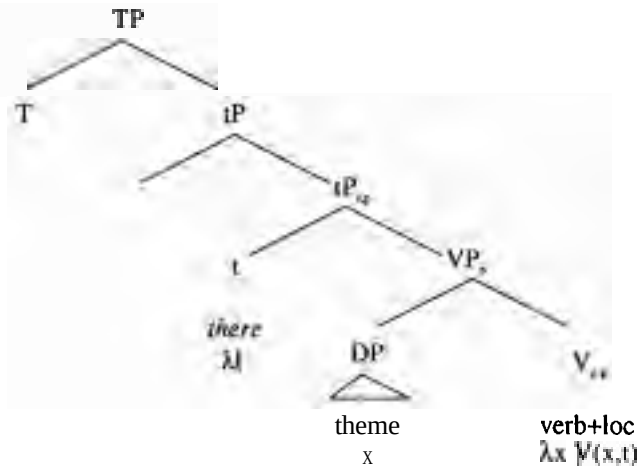
From the perspective of functionlargument structure, what the t head does is abstract over the free time variable: It turns the saturated VP structure – although whith undetermined temporal reference – into a predicate of times, namely the times where the propositional meaning is represented. This operation can be regarded as the substantive analogue of an operation of 'expletivization' proposed in Chierchia 1989 that turns propositions into propositional functions.[12] At the tP level then, we have:

(22) tP: kt [[∃x (in (the garden, x)] (t)]

We take he C/T domain to be inactive in PTSs from a functionlargument perspective, merely providing positions for insertion of the copula and (raised) ***there.*** Matters pertaining to the realization and position of the copula as well as the element ***there*** are put aside as falling under the responsibility of the PF (sound) interface (cf. Holmberg 2001 for related discussion). Consequently, what is given in (22) corresponds to the (functionlargument-)structure generated by the computational system that arrives at the interface to interpretation (spellout).

This is the crucial point: Unlike 'normal' sentences, PTSs cannot saturate the RT slot due to the absence of (structural) ST encoding. Summing up the analysis in a tree, we arrive at the following structure for PTSs (p standing for the type of propositions, t for that of times, e for that of 'ordinary' individuals):

(23)



In order to QR across ***there be,*** the theme argument would have to cross the tP projection, but this is forbidden: tP has function status and hence cannot be the input to the operation of QR (cf. section 1.3).

When PTSs correspond to saturated expressons – in the extralinguistic systems responsible for knowledge, belief and perception – it is too late for QR to apply: QR it is not part of those systems and the PTS structure is not accessible anymore (cf. section 3.2. 4.1). In sum. the patterns pertaining to strength and scope in PTSs are a matter of timing.

4.3 Discussion

4.3.1 Why not QR to a position below 'little t' ?

Why can QR not apply below ***there be,*** that is, adjoin the raised D/NP to a position below t that has propositional status? A straightforward answer is that there is no position available between VP and tP that provides a proper site for adjunction. Adjunction to VP itself is presumably ruled out for independent reasons, candidates being a ban on (string) vacuous movement or a violation of antilocality conditions on operator-variablechains.

4.3.2 Complex tenses

An important question that has to be adressed next is how complex tenses fit the proposal made here – after all, the patterns pertaining to strength and scope in PTSs do not only obtain in simple present tense. Possibly, PTSs in complex tenses have limited access to an ST 'anchor' provided by the 'story' they find themselves in (see also FN 10). The prediction would be that 'definiteness effects' are weaker in complex tenses than in simple present tense. We leave the issue to the future.

5 Notes

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[1] Bende-Farkas and Kamp 2001 as well as McNally 1998 provide concise overviews and discussion of the literature.

[2] The tense relation has to guarantee accessibility of RT from ST. Apart from that, it could be many things (precedence, inclusion, identity etc.). See section 3.1 for the ST/RT relation in PTSs.

[3] Cf. Pesetsky and Torrego's 2001 proposal that nominative case is uninterpretable tense on a D head. *Otto* in (5) functions as what McGilvray 1991 calls a 'companion': making identifying reference to an object nccessarily located in time and space and being what the sentence is 'about', Otto in (5) effectively restricts the times that are quantified over: In order to assess the predication. one has to 'look at' the times associated with Otto (the times the individual referred to by Otto has

'in it' (Goodman 1951)) and check what is (co-) represented at those times. The larger idea is that we are quantifying over times eventually. These times taken to be the times where certain things are represented. they play the same role as far as I can see as Lewis' 1975 'cases' ('true' variable assignments). Cf. Higginbotham 1995 for discussion of tense semantics as opposed to possible world semantics.

[4] Cf. Zagona 1991, Stowell 1995 for analysis of tense in terms of temporal argument structure.

[5] Under the assumption that only individual and set denoting expressions can appear in theta positions. QR saves structures from type clash. To recapture the mechanics of QR, the derivation of the object wide scope reading of a strong D/NP over the subject D/NP looks as follows:

(i) a. A man loves every woman
b. $\lambda y\,[\exists x$ (man (x) & love(x,y)] [after abstraction]
c. $\lambda Q\,[\forall y$ (woman (y) $\rightarrow$ Q (y)] [GQ *every woman*]
d. $\forall y$ (woman (y) $\rightarrow \exists x$ (man (x) & love (x,y))) [after application]

[6] Cf. Partee 1987 on the relevant shifting mechanism. As noted there, shifting to the type of GQs falls directly out of the theory of types and is in this sense a purely formal operation.

[7] Given an elaborate enough context, some speakers get the distant past reading with embedded PTSs as well, suggesting that discourse information can be accessed at a relevant stage of the derivation of the complex sentence. Cf. section 4.3.2.

[8] While Simple Past Tense is standardly taken to encode disjointness of ST and RT as well, it does not clearly entail their difference in terms of the situations obtaining at them, cf. the pair:

(ii) a. I walked. and I am still walking
b. ?? I had walked, and I am still walking

If times arc different (and hence can be disjoint) only to the extent that their properties (concepts represented at them) are different as well. the fact that simple past tense does not clearly entail different properties calls into question the idea that ST and RT have to be disjoint in simple past tense. See also section 4.3.2.

[9] Accusative has been argued to be the default case in English by Schuetze 2001. Cf. Belletti 1988 arguing that case on the associate is not nominative (but what she calls 'partitive case').

[10] There are various options regarding the ST/RT relation in PTSs, e.g. the weaker notion of inclusion of RT in ST. One advantage of taking the relation to be that of identity is that it might explain why progressive tense is needed in PTSs with eventive predicates. The idea is that ST is 'too small' to capture an event 'as a whole': For an event to be complete, it has to be over. However, it is not directly observable anymore then, violating the requirement that what is asserted in a PTS has to be going on during ST (utterance time).

[11] That there has head status is proposed in a.o. Freeze 1992. tP is akin to Stowell's 1995 'zeitphrase', assumed to be associated with RT (ibid.). That the element *there* is not situated in TP but lower cannot be argued here in detail for reasons of space (but cf. Brandt (in progress)). Initial plausibility is given by the French case. where the element y (≈ there) occurs to the right of the expletive element *il* (≈ it) that is in the specifier of TP presumably (cf. (9-b)).

[12] Expletivization is motivated by the predication principle (sentences express predication and predicates must have subjects). Under Chierchia's proposal, expletivization creates a predicate which Ean be saturated only by the domain by definition (cf. Barwise and Cooper's 1981 characterization of intersective NPs) On our execution, the predicate created by expletivization is saturated by what effectively determines the domain of quantification: In the case of a PTS, this is the speaker's 'here

and now'. A question arising but put aside here is whether tP is generally projected or restricted to just some constructions (such as unaccusative constructions and presumably double object constructions (cf. Brandt 2001)). It is of course conceivable that t's feature makeup varies or that different mechanisms are operative in relating it to T.

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Active Phonological Units: Parsimony in Sublexical Errors*

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1 Introduction

Errors in speech production manifest themselves in a variety of speech processing (encoding) chunks. These chunks range from the size of entire lexical items (which can be semantically triggered), and syntactic and morphological type errors, to sublexical errors, which are phonological in nature. The focus of the present study is on sublexical errors and the phonological processes associated with them.

Just as chunk sizes can vary in speech production errors, so can the nature of the error. In terms of sublexical errors, phonological processes surface in different types. The different types of sublexical errors relevant to this study are anticipations, perseverations, substitutions, metatheses, and deletions. Examples (1-5) illustrate.

(1) anticipations	tonal phonology → fonal phonology (Fromkin 1973)
(2) perseverations	gave the boy → gave the goy (Frornkin 1973)
(3) substitutions	things → sings (Poulisse 1999)
(4) metatheses	keep a tape → teep a cape (Fromkin 1973)
(5) deletions	skirts → kirts (Poulisse 1999)

The implications of the study of sublexical errors are especially important in modeling speech production and processing, but such implications are not limited to psycholinguistic model building. Speech errors can also reveal tremendous insights into phonological theory. Fromkin (1973) makes explicit the point that speech errors exist as useful linguistic evidence, most importantly for models of performance. In Fromkin's words, "Speech error data...provide

us with a 'window' into linguistic mental processes and provide, to some extent, the laboratory data needed in linguistics" (1973:43-44). In taking this view, it is reasonable to assume that speech production and planning are based on a hierarchy of linguistic forms which interact at certain levels. To witness an error in production is to view the processing machinery at work.

Sublexical errors can be meaningfully defined by the units that are active in creating the error. The importance of this lies in the recognition of which phonological units are actually doing operational work, and which units are residual, or epiphenomenal. If taken at face value, many sublexical errors will appear to be ambiguous as regards unit activity. For example, in (6-7) the activity is unambiguously a feature exchange involving [voice], while in (8), the activity could be active segments (/f,k/), or it could be viewed as entire onsets (onset /f,k/).

(6) big and fat → pig and vat (Fromkin 1973)

(7) clear blue sky → glear plue sky (Fromkin 1973)

(8) Katz and Fodor → fats and kodor (Fromkin 1973)

It is this type of ambiguity in the speech error data which needs to be examined closer in order to refine our views about phonological units in general.

From a psycholinguistic point of view, there are potentially three different levels of operation and analysis in the production of sound-related speech errors. These are: a)distinctive features, b)segments, and c)syllabic constituents. The goal of this paper is to show that there is positive evidence for distinctive features and syllabic constituents in sublexical errors, and that there never exists positive evidence for segments in errors.

The positive evidence for distinctive features comes in the form of unambiguous feature errors like (6-7). The evidence for syllabic constituents, however, is less clear due to the fact that the vast majority of errors are ambiguous as to whether segments or syllabic constituents are responsible. In these cases, the frequency of errors must be taken into account. There seems to be an uneven distribution of errors between segments in different prosodic positions. Errors of segments in onsets occur much more frequently than do errors of segments in nuclei or codas. If these errors are simply segmental errors, then there is no way of explaining why nucleic and coda errors are much more marked than onset errors (Golston 1995). On the other hand, if the position is taken that syllabic constituents are responsible for the errors, then the general tendencies surrounding prosodic distributions in natural language can also explain the asymmetric distributions of errors.

The application of a particular theory of phonology will be the determining factor in how both phonologists and psycholinguists approach the study of

sublexical errors. Here is where I wish to dispense with outdated segmental approaches in favor of an approach grounded in contemporary autosegmental phonology.

2 Previous Theories

The speech error literature up to this point has predominantly been driven by the belief that segments are the primary units of phonological processing. The assumption has been that segments are actually moving in phonological/processing space, and that their psychological reality can be inferred from this stipulation. There is a small minority that directly challenge this claim (Laver 1980, Mowrey and MacKay 1990, van den Broecke and Goldstein 1980), however, there has never been a serious attempt to demonstrate that features or syllabic constituents are responsible for the supposed segmental activities. The possibility has been discussed as to whether or not speech errors can provide evidence for the psychological reality of features and syllables (Fromkin 1973)[1], but this claim has not been interpreted as a challenge to the status of segments. Rather, it was made to complement a theory of segmental activity.

Many linguists (Boomer & Laver 1968, Nooteboom 1969, Fromkin 1971, Shattuck-Hufnagel 1982, Shattuck-Hufnagel & Klatt 1979) have argued that segments must be the active units in sublexical errors because statistical analyses indicate this to be the case. Shattuck-Hufnagel and Klatt report that segmental errors greatly outnumber any other type of error, and therefore the psychological reality of segments can be inferred from this. What has not been considered in these analyses is the role that syllabic constituents play in these errors.

Feature-based errors do make up a very small number statistically, however there exists unambiguous cases. There also exist analogues with which to compare feature processes that strongly support the psychological reality of distinctive features. By also examining statistics in terms of markedness, it can be shown that there is more reason to adopt a syllabic analysis for errors than a segmental analysis.

3 Harmony

Sublexical errors are the processing analogue of harmony. Both phenomena appear to operate on many of the same principles. Just as featural activity can be accepted in the realm of sublexical errors. similarities can be seen in harmonic operations. Not only does harmony operate on the same distinctive

feature principles, there is also the element of phonological distance involved. Just as sublexical errors tend to operate over distances, harmony does the same.

Vowel harmony can here be defined as an operation that "involves the agreement of vowels within a certain domain with respect to a particular property, or feature" (Polgardi 1998:84). This definition can also be extended to consonant harmony. The result is an assimilation or dissimilation of vowels or consonants that are not directly adjacent in the string of sounds (Shaw 1991). Vowel harmony occurs much more frequently than consonant harmony, however, the present study need not recognize a distinction, as both processes operate under the same principles. What is important to note here is that distinctive features are responsible for triggering and orchestrating harmonic operations. Take the example of Finnish:

(9) Finnish Vowel Harmony (Hakulinen 1961, Polgardi 1998:87):

(9) a.	**tää-ltä**	'here ABL'
b.	kala-lta	'fish ABL'
c.	jaatii-nut	'freeze ACT PAST PART'
d.	hakku-nut	'drown ACT PAST PART'
e.	**vie-köön**	'take IMP SG 3'
f.	tuo-koon	'bring IMP SG 3'

In the above examples, the harmony process is characterized by stem control. In (9), the vocalic feature [front] is responsible for triggering the harmony. According to Polgardi, front and back vowels cannot co-occur within a word. Furthermore, the feature [front] holds a dominant status as far as harmony is concerned: "once [a front feature] element is present, it has all the nuclear positions in the word in its domain*' (1998:87). The presence of front vowels (a, ü, i, e) in the stem triggers harmony in the suffix (-ltä, -nut, koon). The same can be said for consonant harmony systems, as attested by Shaw (1991), which describes the consonant harmony of Tahltan. In Tahltan, as in Finnish, harmony works on the basis of distinctive place features.

In either case, harmony operates over a distance. Non-adjacent sounds are affected by the quality of a distinctive feature responsible for triggering the harmony. What is striking is the fact that there is no such operation in which segments are the controlling units. There is in no language segmental vowel harmony, nor segmental consonant harmony. If the analogy between sublexical

errors and harmonic operations is accepted, then the evidence supporting the claim that a percentage of sublexical errors is featurally controlled is strong.

4 Sublexical Blends

Sublexical blends work in a very similar fashion as sublexical errors. In sublexical blends, new words are "formed by fusing two words into one new word, where internal portions of the base words are often subtracted" (Bat-El 1996:283).

(10) smoke/fog → smog

(11) hall/lobby → hobby (Laubstein 1999)

Sublexical blends have been used as strong evidence to support the view that segments are psychologically real units. It is argued that the nature of this blending process is segmentally based (Stemberger 1983). In other words, the area of the splice, or breakpoint, has been used as evidence for segmental activity. Taking this view, if two lexical items are being fused together at a point where segmental material has been subtracted, then it would appear as though segment strings are being manipulated. This view only holds if there are no syllabic restrictions on blending processes.

Another view that has recently been proposed is that sublexical blends are actually substitution processes. Laubstein (1999) has proposed that the operation of blending is really the substitution of one syllabic element from the intrusion word for a syllabic unit in the target word. The relevance here is that syllable components as explanatory units have been traditionally discounted the same way that syllabic aspects of sublexical errors have been overlooked, namely, as epiphenomenal. Essentially, Laubstein views sublexical blends and sublexical slips as sharing the same critical characteristic: they are both substitution processes.

Accepting the substitution method certainly doesn't do any favors for a segmental approach. In fact, there can be few arguments made at this point that uphold the view that sublexical blends present any evidence for the psychological reality of segments. Stemberger (1983) however, has presented a *prima facie* example in (12):

(12) Zion + Bryce → Zry-

Stemberger claims that the only explanation for this blend is that the target word has been spliced at the segmental level since the onset of the word is a consonant cluster which has been broken up. If syllabic components can be

broken into smaller units in sublexical blends, then again there is good evidence for accepting segments as active and real.

There is, however, an alternate explanation for the case in (12). It is possible that a feature is being lifted, then reinserted into the matrix of the blend. In the case of (12) /ɾ/ is the problematic segment. It can here be proposed that /ɾ/ is defined by only one positive feature that makes it distinct from every other phoneme in the inventory; in other words, a feature that no other phoneme has. In English, /ɾ/ can be defined by the feature [+retroflex]. This is parallel to the treatment of English /l/, in which [+lateral] is the only feature that /l/ carries and is absent as a positive feature in every other phoneme.

If this hypothesis is correct, then it can be possible for the autosegment, the feature [+retroflex], to be lifted out of the target word with the reinsertion of the feature into the blend resulting in the phonological 'filling in' of the rest of the necessary features[2]. The rest of the features are conditional; they are determined by the context in which the feature is dropped[3]. This view is extremely compatible with autosegmental phonology. Since [+retroflex] is the determining feature, there can only be one sound to be constructed in that position: /ɾ/.

This analysis is appealing through the fact that there already exists an analogical counterpart, namely /ɹ/[4], and that it doesn't need to resort to using segments in bolstering explanatory power. Thus, the *prima facie* counterexample (12) falls short of original expectations.

5 The Principle of Phonological Parsimony

The principle of parsimony expounded by Ockham's Razor is as follows: entities should not be multiplied beyond necessity (Spade 1999)[5]. If multiple explanations are available for a phenomenon, the explanation that postulates the fewest entities and performs the most thorough job should be selected. In terms of theoretical phonology, the principle can be refined further: if there are available two explanations for phonological data, the explanation which posits the minimal number of units and performs the maximal expository power should be selected.

Notice the case of (13):

(13) copy of my paper → poppy of my caper (Fromkin 1973)

In (13), there are two possible explanations for the data. The first is that segments are responsible for the error. The second explanation relies on syllabic constituents; in this case, it is onsets that are active. Now notice the case of (14-16):

(14) pedal steel guitar → stedal peel guitar (Fromkin 1973)

(15) finger spell → spinger fell (Fromkin 1973)

(16) filled spec → spilled

Examples (14-16) illustrate the point that an explanation in terms of syllabic units becomes necessary in instances of complex onset switches. Only in cases of consonant clusters which are broken up would there be any unambiguous segmental evidence[6].

Since segmental and syllabic analyses seem to compete over the domain of the majority of errors, there doesn't seem to be much motivation for opting for one explanation rather than the other. Golston (1995), however, has noted that markedness plays a role in the phonology of speech errors. A strictly segmental analysis would predict that a segment anywhere in a given string would be equally prone to error as any other segment. This is not the case. Segments in the onset are typically active in errors dramatically more so than nuclei or codas. An analysis based on syllable constituents, on the other hand, would predict that codas, which are much more marked than onsets, would tend to be active in errors a much lower percentage of the time. The syllabic analysis captures this fact, while segmental analyses fail to. This motivates the employment of one analysis over another, even in the majority of cases which are ambiguous.

6 Conclusion

From the treatment of the data presented above, it is clear that there are three potential levels of explanation. The psychological reality of distinctive features is supported by unambiguous feature exchanges as in (6-7). The remaining number of cases, which seem to be ambiguous in regards to unit activity (i.e. segments or syllabic constituents), because of statistical distributions, seem to be explained better in terms of onsets, nuclei, and codas for reasons of markedness. Segmental analyses fail to capture these aspects of errors.

There are two positive results from this treatment: there is good evidence for the psychological reality of distinctive features and syllable constituents. There exists no positive evidence for segments in the analysis of speech errors.

Both theoretical phonology and psycholinguistic studies have much to gain from the examination of speech errors in terms of distinctive features and syllabic constituents. For phonology, this extends autosegmental theories into another domain of performance. For psycholinguistics, the revelation that features and syllabic constituents are psychologically real promises to have a large impact on the development of speech production and processing models.

Notes

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[1] See Pfau (2000) for an excellent overview and analysis.

[2] Wiese (2001) has argued against a theory of /r/ underspecification in favor of a prosodic model that would account for the entire phonological class of /r/s. See also Evans (1995) for discussion concerning the possible segmental or autosegmental status of retroflexion.

[3] See Broadbent (1991) for how /r/ and glides operate on this basis. For arguments against. see McMahon (2000).

[4] A similar analysis can be used in determining the properties of /ŋ/. Chomksy and Halle (1968) and Fromkin (1973) have suggested that the internal makeup of the phoneme /ŋ/ is actually /ng/. The example of 'springtime for Hitler' → 'sprigtime for Hintler' seems to demonstrate this point, however, if the analysis is based on the feature [nasal], simple assimilation rules will predict that /t/ will trigger a coronal assimilation, changing /ŋ/ to /n/.

[5] An earlier version of the principle is in fact Aristotelian: "We may assume the superiority *ceteris paribus* of the demonstration which derives from fewer postulates or hypotheses – in short from fewer premises; for, given that all these are equally well known, where they are fewer knowledge will be more speedily acquired, and that is a desideratum" (*Posterior Analytics* I.25.86a 33-38)

[6] Fromkin (1973) provides examples of consonant clusters that are broken up in errors. What proves interesting about this is that the majority of cases have /r/ or N in the cluster (retroflexed → retrofrexed, brake fluid → blake fruid). This further helps to demonstrate that /r/ and N seem to hold a special status within these types of errors. The rest of the cases are clusters such as 'strive for perfection → sprive for perfection'. 'steak and potatoes → speak and tomatoes'. These are treated simply if the fricative element of the cluster is viewed as a prependix to the onset and external to the syllable structure.

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Catalan (Non-)Neutralization, Revisited

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1 Introduction

The advent of sophisticated acoustic analysis technology introduced a new tool for the observation of apparent phonological neutralization phenomena. Phonological rules such as word-final devoicing can be examined in terms of measurable phonetic features to determine the degree to which the underlying voicing distinction between segments has been obliterated in speech. Word-final devoicing is a documented phonological rule for many languages, such as German and Polish (O'Dell & Port, 1983, Giannini & Cinque, 1978); however, phonetic analysis has yielded distinctive results for putative neutralizations along the following dimensions: the vowel duration before word-final obstruents; the voicing into the closure of the word-final obstruents; and the duration of the closure (Dinnsen & Charles-Luce, 1984 [hereafter D&CL]). These results challenge the nature of purported neutralizations, such as the degree of acoustic merging necessary to support the phonological claim of neutralization.

Intra- and inter-speaker variance adds another dimension to the discussion of neutralization. Sociolinguists have long observed that various conditions influence the movement of speech phenomena through a speech population and that individual speakers can affect different speech behaviors in accordance with environmental pressures (e.g., Holmes & Bell, 1992). In their study of Catalan, D&CL investigated both the phonetic neutralization status of word-final devoicing and whether all speakers treat word-final devoicing in the same way.

2 The Present Study

The present study is a partial replication of D&CL's 1984 investigation of the phonetic status of the putative phonological neutralization of word-final devoicing in Catalan. The purpose of this study is to contribute to the body of acoustic analysis of Catalan and to adjust the original experimental design to

improve the validity of the study; that is, to ensure that the experiment is investigating the intended phenomena.

2.1 The previous study: Dinnsen and Charles-Luce, 1984

The experimental study undertaken by D&CL investigated the phonetics of the purported neutralization rule of word-final devoicing in Catalan. Catalan was selected because, unlike other languages that employ word-final devoicing (such as German, Russian, and Polish; see O'Dell & Port, 1983, Giannini & Cinque, 1978, Chen, 1970), the orthography of Catalan is largely phonetic. It does not typically reveal the underlying voicing of word-final segments in the way that other languages do (compare the Catalan orthography of *sec* "dry" and *sec* "I sit down" to the German orthography of Rat "advice" and *Rad* "wheel"). Underlying minimal pairs varying only in the voicing feature of the final obstruent were examined for phonetic evidence of the phonological rule devoicing word-final obstruents. Ten test words were selected to represent five underlying minimal pairs. The test words were all orthographically opaque in terms of the underlying voicing of the final obstruent. Table 1 presents the ten test words in phonetic, underlying, and orthographic forms, along with Spanish and English glosses.

Table 1. Experimental Catalan test words, presented in phonetic, underlying, and orthographic forms. Spanish glosses (Spanish glosses were used in D&CL's experiment to help subjects differentiate lexical meanings) are presented in the fourth column, and the fifth column contains English glosses.

Phonetic	UR	Orthographic	Spanish Gloss	English Gloss
[kap]	/kap/	cap	ninguno	no(ne)
[kap]	/kap/	cap	hacia	toward
[kap]	/kab/	cap	cabeza	head
[kap]	/kab/	cap	cabe	he fits
[fat]	/fat/	fat	destino (fatalidad)	fate
[fat]	/fad/	fat	tonto	silly
[sek]	/sek/	séc	arruga (sega)	furrow
[sek]	/seg/	cec	ciego	blind
[sɛk]	/sɛk/	sec	seco	dry
[sɛk]	/sɛg/	sec	me siento	I sit down

According to D&CL, the underlying voicing of the final obstruents was determined by morphophonemic evidence. The test words were embedded in

two carrier sentences to provide two conditioning environments with respect to the voicing of the onset of the word following the test word. The carrier phrases are presented in Table 2. The first environment provides a voiceless stop as the onset of the following word, and the second provides a vowel as the following onset. Words which have an underlyingly voiced final obstruent are expected to emerge phonetically as either voiceless due to word-final devoicing (in the __#C environment) or as voiced due to regressive voice assimilation (in the __#V environment).

Table 2. Catalan carrier phrases used to present test words to speakers. The Catalan orthography, the phonetic transcription used by D&CL, and the English gloss are shown for each phrase.

__#C:	Maria va dir _____ clarament.
	[maria va ði _____ klaramen]
	"Mary said _____ clearly."
__#V:	Maria va dir _____ aixi.
	[maria va ði _____ əʃi]
	"Mary said _____ thus."

A total of 100 experimental sentences (ten words x two environments x five repetitions) were recorded from each of five subjects, and 560 filler sentences were used to disguise the nature of the experiment. Subjects were native speakers of Barcelona Catalan.

Three phonetic parameters were chosen for measurement due to their status as phonetic correlates of voicing in many languages: (1) Vowel duration, measured from the onset of periodicity to a sudden drop in amplitude; (2) Consonant closure duration, measured from the offset of the vowel to the consonant release burst; and (3) Voicing into consonant closure, measured from the onset of consonant closure to the end of glottal pulsing. All measurements were made on a waveform.

In the analysis of the data across all subjects, a significant main effect of vowel duration was found in the __#C environment. Vowels were shortened by about 9% before word-final obstruents that were followed by the word-initial consonant. No main effects or interactions were found for closure duration. although word-final obstruents in general tended to be shorter in the __#V environment. No main effects or interactions were found for voicing into closure in either environment. The data were also analyzed for inter-speaker variation. No main effects or interactions were found for any individual subject for voicing into closure. Two of the five subjects showed no main effects or interactions for

any voicing parameter. One subject showed a significant main effect of environment (__#V) for closure duration. Another subject showed a significant main effect for both vowel duration and closure duration, and a significant interaction between environment and underlying voicing. The fifth subject showed main effects of environment and underlying voicing for closure duration.

The group results failed to indicate that word-final devoicing is non-neutralizing in Catalan. D&CL maintain that these results do not mean that word-final devoicing is neutralizing; rather, they say the group results can only be interpreted to mean that no differences corresponding to underlying voicing were found in the voicing parameters measured. Furthermore, they point out that among the speakers who apparently maintained a distinction, various strategies were used. D&CL conclude that the underlying voicing contrast is not neutralized at least for some speakers of Catalan.

2.2 Experimental design: D&CL, 1984

In the present study, the appropriateness of the ten test words used by D&CL was reconsidered. D&CL claimed that the underlying voicing listed for the final obstruent in each test word was morphophonemically justified. Mascaró (1987) gave a critical review of the word list, and her observations were incorporated into the design of the word list used in this study. Mascaró also pointed out dialectal considerations, which were corroborated by the informant for the present study and incorporated into this work.

The word ***cap*** (D&CL: **/kab/** "head") was removed from the word list because only some lexicalized derivatives show a sound other than the voiceless **[p]** (e.g., [β] in **[kəβɔtə]** "nail head"). Other derivatives contain [p] and regular forms only show [p], e.g., the diminutive forms [kaparo] and [kapet] (Mascaró, 1987). Instead, only ***cap*** (D&CL: **/kab/** "he fits") was chosen for this experiment, as the underlying voicing of the final obstruent is more reliably explained by the infinitive form ***caber*** and the inclusion of [β] as part of its conjugation (e.g., Ipp **[kəβɛm], 3pp [kaβən]**). The verb paradigm also includes **[p]** (e.g., 1ps subj. [kapiya]), indicating that a phonological rule of intervocalic obstruent voicing is not the motivation for the presence of **[β]** in some verb forms.

The words fat (D&CL: /fat/ "fate") and fat (D&CL: **/fad/** "silly") are not part of the vernacular of Barcelona Catalan; rather, they are archaic or, at best, literary terms which are not used in the spoken language (Mascaró, 1987). All five subjects of D&CL's experiment were native speakers of Barcelona Catalan. The informant for the current study confirmed the non-vernacular status of these words. She did not even recognize them and therefore invalidated their use as tokens to test for underlying voicing. The words were retained in the current

study for the purposes of comparison. Since the speaker was unfamiliar with the words and their lexical distinction, she would be unlikely to produce them with separate intentions at any linguistic or cognitive level. Mascaró (1987) recommended analyzing both terms as /fat/ underlyingly. In this study, the underlying representation /fad/ will also be considered when analyzing the data. The variation of her speech along the test parameters on these two tokens will be compared to the variation she shows on the other, reliably underlyingly distinct minimal pairs.

The removal of *fat* (/fat/) and *fat* (/fad/) from the effective word list eliminates the only minimal pair of word-final alveolars. In preparation for this experiment, no other /CVd/-/CVt/ pair could be found. The words *sort* (/sort/ "fate") and *sord* (/sord/ "deaf") (Ramer, 1996) were added to the test word list to replace the loss of a word-final alveolar minimal pair. These words are orthographically transparent as to their underlying voicing, and the approximant preceding the final obstruent may impede clear analysis of the voicing of the segment under investigation. The group data will be assessed with and without these tokens.

Mascaró (1987) argues that *séc* (D&CL: /sck/ "furrow") is inappropriately considered to have a final /k/ because it is etymologically related to the verb *segar* "to cut/slit" which has an underlying root-final /g/. The /g/ emerges phonetically as [y]; thus she claims that the morphophonetics actually posit an underlying /g/ at the send of *séc*. *Séc* was retained as an item in this study due to the possibly lexicalized nature of the Catalan word for "furrow". It has no derivatives (one of the criteria Mascaró evaluated in his criticism of the item *cap* "head" as a test word) and therefore no direct evidence of an underlying /g/.

.The presentation method used by D&CL is also questionable. D&CL chose Catalan as the language of study because its underlying voicing is not revealed by its orthography. They wanted to ensure that speakers were not producing voicing distinctions in their speech as the result of orthographic influence. However, to ensure that speakers knew which Catalan lexical item was in each carrier phrase, the experimenters provided a Spanish gloss of each test word at the end of each sentence. The Spanish glosses contained, in some cases, the voicing distinction being sought by the experimenters (Mascaró, 1987). D&CL did not disclose the Spanish glosses they used in the publication of their experiment. The glosses indicated in Table 1 were contributed by the present researcher. In two cases, two potential glosses are given. The first gloss is the more common translation, and the second one, while less common. is orthographically transparent in terms of the underlying voicing of the related Catalan cognate in one case, and exactly contradictory in the other case. Four of the remaining eight test words are glossed with Spanish words whose orthography reveal the underlying voicing of the Catalan words. The value of the non-transparency of the Catalan orthography was compromised not only by the Spanish glosses, but probably also by the fact that native speakers of Catalan have a mental familiarity with Spanish cognates (Mascaró, 1987). Mascaró said

that these effects may have contributed to D&CL's finding of great inter-speaker variability by affecting speakers to different degrees.

2.3 Experimental design: the present study

Based on the consideration of D&CL's experimental design, the following set of test words was chosen for this study (see Table 3). Only English glosses were provided. The removal of Spanish glosses from the experiment removes the influence of the Spanish orthography; however, the speaker in this study is literate and speaks Spanish, so the variable of a mental representation of Spanish cognates cannot be eliminated.

Table 3. Twelve experimental Catalan test words, presented in phonetic, underlying, and orthographic forms. English glosses are provided in the fourth column. The words fat (/fat/) and far (/fad/) used in D&CL's study are retained here for comparison data, not as valid exemplars of an underlying voicing distinction.

Phonetic	UR	Orthographic	English Gloss
[kap]	/kap/	cap	toward
[kap]	/kab/	cap	he fits
[kup]	/kup/	cup	fitted
[kup]	/kubl	cup	cube
[fat]	/fat/	fat	fate
[fat]	/fad/	fat	silly
	/sort/	sort	fate
[sort]	/sord/	sord	deaf
[sek]	/sek/	séc	furrow
[sek]	/seg/	cec	blind
[sɛk]	/sɛk/	sec	dry
[sɛk]	/sɛg/	sec	I sit down

The carrier phrase was modified slightly from the phrase used in D&CL's study. Mascaró (1987) noted the ungrammaticality of the original phrase and that the transcription put forth by D&CL did not reflect the normal pronunciation of a Catalan speaker. The speaker used for the present study confirmed Mascaró's observations. The carrier phrases used in this study are in Table 4.

Table 4. Catalan carrier phrases used to present test words to speakers. The Catalan orthography, phonetic transcription, and English gloss are shown for each phrase.

__#C:	La Maria va dir _____ clarament. [la maria βa/ə di _____ klaramen] "Mary said _____ clearly."
__#V:	La Maria va dir _____ aixi. [la maria βa/ə ði _____ əʃi] "Mary said _____ thus."

A total of 72 experimental sentences (12 words x two environments x three repetitions) were recorded. 18 filler sentences were used to help disguise the nature of the experiment. Sentences were randomized and presented to the speaker with an English gloss after each sentence to inform the speaker of the lexical meaning of the Catalan word.

The speaker in this experiment is a 44-year-old native speaker of Barcelona Catalan. She began learning Castilian Spanish when she became school age and used Spanish exclusively at school and sometimes with friends. She used Catalan exclusively at home and almost exclusively socially. She studied English only a little in school and began actually using English when she moved to the United States in 1991.

Digital recordings of the test material were made in the University of Washington Phonetics Lab using an Electro-Voice RE20 microphone with a frequency response between 45-18,000 Hertz. Data were recorded at a 44,100 Hertz sampling rate onto a DAT (tape) using a Tascam DAT recorder. The subject was instructed to read each sentence at a comfortable, conversational rate with a brief pause between sentences (to create the same basic intonational environment for each token).

The same time-based parameters measured by D&CL were measured in this study: (1) Vowel duration, measured from the onset of periodicity to a sudden drop in amplitude; (2) Consonant closure duration, measured from the offset of the vowel to the consonant release burst; and (3) Voicing into consonant closure, measured from the onset of consonant closure to the end of glottal pulsing. All measurements were made on a waveform.

Mascaró (1987) argued that all words ending in [k] in the __#C carrier phrases should not yield a closure duration measurement due to the merging of the closures of the test word-final [k] and the carrier phrase-initial [k]. It would be impossible to measure only the duration of the first consonant in a geminate closure; however, the speaker in this study consistently released the test word-final [k] before producing the onset [k] of the following word, as evidenced by a

small release burst on the waveform. Thus, a closure duration measure was available for all tokens.

3 Results

No significant differences were found between underlyingly voiced and voiceless final obstruents in any of the measured parameters across all word pairs and both conditioning environments. When each minimal pair was considered separately and in each conditioning environment independently, only one word pair showed measurement differences which emerged as significant. Considering a p-value of <.05 as a benchmark for significance, both vowel duration (p = <.0486) and voicing into closure (= <.0011) measures were significant. Interestingly, this word pair was *sort* (/sort/ "fate") and ***sord*** **(/sord/** "deaf'), the only minimal pair in the token list which exhibited an orthographic voicing distinction on the word-final obstruent as well as an underlying one. Table 5 shows the average duration measurements and standard deviations for each parameter across word tokens and conditioning environments.

Table 5. Average duration measures of each voicing parameter for each token in each conditioning environment. VD = Vowel duration; VC = Voicing into closure; CD = Closure duration. Avg = Average duration measure; SD = Standard deviation. Underlying minimal pairs are listed at left. Measures in the three columns under __#V are from tokens preceding a word-initial vowel; under __#C are from tokens preceding a word-initial voiceless consonant. The measures which emerged as significant are shaded: Vowel duration for /sort/-Isordl and voicing into closure for **/sort/-/sord/.**

	#V						#C					
	VD		VC		CD		VD		VC		CD	
UR	Avg	SD	Avg	SD	Avg	SD	Avg	SD	Avg	SD	Avg	SD
/kap/	89	9.07	4	0.6	152	91.8	70	7.4	5	1.7	146	105
/kab/	80	11	4	0.6	138	49	72	2.5	6	2.6	103	4.2
/kup/	47	13.3	13	2.5	102	50.1	42	2.6	14	4	89	9.1
/kub/	55	10.6	17	9.3	119	36.1	52	6.6	17	8.1	97	19.9
/sek/	64	3.8	2	3.5	135	41	64	13.1	3	4.6	154	63.5
/seg/	68	7.5	6	1	131	32.6	69	8.3	5	4.6	143	19.7
/sɪk/	87	1	2	1.5	77	3.2	104	10.3	0	0	221	79.2
/sɪg/	93	13.4	0	0	121	47.9	87	6.1	7	11.5	148	56.2
/sort/	116	4	4	6.4	178	45	102	7.5	0	0	161	35.5
/sɔɹd/	19	0.6	8	3.2	204	14.2	[illegible]				214	67
/fat/	93	2.6	6	5.1	81	5.1	92	12.5	5	3.6	55	18
/fad/	92	18.5	8	6.1	73	9.3	90	9.1	4	4	62	9.8

In the environment preceding a word-initial consonant, the ranges of values measured for vowel duration for **/sort/** and **/sord/** were 94-109 ms and 113-125 ms, respectively. The ranges of values measured for voicing into closure for **/sort/** and **/sord/** were 0 ms and 10-14 ms, respectively. These pairs are the only exemplars in the entire data set of value ranges within a single voicing parameter that were not at least partially overlapped between both members of the underlying minimal pair. For example, the vowel duration ranges for **/kap/** and **/kab/** in the environment preceding a word-initial vowel were 79-97 ms and 69-91 ms, respectively. In the current study, the degree of intra-speaker variation across repetitions was tremendous, particularly in the closure duration measurements. For example, the closure duration of the final obstruent in **/sek/** in the pre-consonant environment ranged from 114-226 ms. The amount of variation within a given parameter on a single token was often greater than the difference along the same parameter between underlying minimal pair members.

These data suggest that, at least for this speaker, the underlying voicing distinction is effectively neutralized at the phonetic level. It also appears that the speaker is influenced by the orthographical representation of the underlying distinction. The presence of the **/r/** preceding the final segment may have had an effect on the speaker's pronunciation; however, this study was not designed to evaluate the specific contribution of the **/r/.** In addition, this speaker pronounced the word **/sort/** with the lax mid back rounded vowel **[ɔ] ([sɔrt])** instead of the tense mid back rounded vowel [o] ([sord]) that she used in **/sord/.** The tense-lax difference between the vowels could have contributed to the differences in vowel duration and closure duration between the two forms. It should also be noted that the pair ***fat/fat*** (D&CL /fat/ "fate" and **/fad/** "silly"), which were lexically unavailable to the speaker, behaved no differently from each other. nor did they behave differently than any other word pair. This suggests thatfat (/fat/)

and fat (/fad/) were treated the same in terms of production, and possibly that the members of each underlying minimal pair were treated essentially the same as well.

In the original study, D&CL claimed that subjects who did not neutralize the voicing contrast maintained the contrast through different strategies. One speaker in their study exhibited a statistically significant interaction between underlying voicing and the conditioning environment for vowel duration. Another speaker appeared to use closure duration to signal the underlying voicing distinction. The phonological phenomenon of word-final devoicing was met with great inter-speaker variation in D&CL's study. As Mascaró (1987) argued, this variation could have been due to the questionable validity of the tokens used in that study. The token set in the present study was adjusted to improve the accuracy of the identification of true underlying minimal pairs. In no case do the results show non-neutralization across the data set along any parameter, possibly indicating that this is a Catalan speaker for whom the contrast is neutralized, like two of the five subjects in D&CL's original study. D&CL reanalyzed their data, incorporating the more accurate characterization as offered by Mascaró and used in the present study. Their reanalysis showed that all five subjects maintained a voicing distinction in terms of vowel duration [D&CL, 1987]). It is interesting that the re-characterization of the data yielded a stronger result for D&CL (non-neutralizing behavior for all subjects) while in the current study. no evidence of non-neutralization was found on any of the test items shared between the two studies.

4 Discussion

The phonetic differences in duration produced by the speaker in the current study do not appear to be functionally relevant in terms of classifying the underlying voicing of final obstruents. D&CL claim that a production difference not discriminated by speakers may yet be linguistically significant. They also claim that phonological rules can apply to allow underlying distinctions that would otherwise be obliterated to be recovered or preserved (D&CL, 1984). These ideas suggest a production-driven model of linguistic distinctiveness as opposed to a perception-based model, or at least suggest that the two bases are linguistically independent. The lack of productive or statistical discrimination between underlying word-final voiced and voiceless obstruents presented here indicates that this distinction is not productively maintained. Perceptual research, including commutation testing (see Labov, Karen & Miller, 1992). needs to follow this kind of investigation into the phonetic production of underlying distinctions. A perception-based model may indicate that lexical retrieval of these minimal pairs requires an appropriate discourse context, thereby indicating that the phonological contrast is perceptually neutralized as

well. A perception-based investigation would ideally include a variety of permutations of the minimal pair data, including tokens spoken in isolation; tokens extracted from carrier phrases which both do and do not indicate the lexical meaning of each token; tokens extracted from carrier phrases designed to provide various phonological environments for the tokens; and tokens in (and extracted from) carrier phrases in which the token word attracts a pitch accent at the sentence level and in phrases where it does not, to account for intonational effects such as lengthening of stressed syllables.

Furthermore, the issue of orthographic influence needs to be addressed in phonetic production investigation. Removing the Spanish gloss in the current study was only one step toward removing the influence of orthography. Perhaps test tokens could be elicited from speakers through a purely oral task, eliminating reading altogether. However, any speaker who is literate will at least have a mental representation of the orthography of his/her own language and possibly the orthography of cognates in other languages as well (such as Spanish cognates of Catalan words). Well-designed research with illiterate (and ideally monolingual) populations whose languages appear to show neutralization behavior could help determine the influence of orthography and characterize the basis of linguistic distinction in terms of perception and production.

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Intervention and Subjacency: Two Sides of the Same Coin

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1 Introduction

I will address an interesting asymmetry of intervention effect between *way* (why) and the other wh-words in Korean, when it comes to negative polarity item and wh-word scope interaction. It will be claimed that the asymmetry in the intervention effect between the two types of wh-words can receive a satisfactory account once the asymmetry of movement between *way* (why) on the one hand and other wh-words on the other is accepted: *way* (why) should move into Spec CP at LF while the other wh-words stay in situ. The asymmetry of movement between the two types of wh-words is further supported by their asymmetry with respect to subjacency.

1.1 Intervention effect

The following paradigm in (1-2), where a negative polarity item (NPI, henceforth) in the matrix subject position and a wh-word co-occur, shows a contrast in grammaticality (also see Cho 1998): [1] [2]

(I) a. ***Amwuto** nwukwu-lul mannaci an haessni?
anyone whom-ACC meet NOT did
'Whom did no one meet?'

b. ***Amwuto** Tom-ul eti-ese mannaci an haessni?
anyone T-ACC where-at meet NOT did
'Where did no one meet Tom?'

c. ***Amwuto** Tom-ul ence mannaci an haessni?
anyone T-ACC when meet NOT did
'When did no one meet Tom?'

d. ***Amwuto** **ettehkey** Seoul-lo o-ci an haessni?
anyone how Seoul-to come NOT did
'How did no one come to Seoul?'

e. ***Amwuto** oss-ul **ettehkey** ip-ci an haessni?
anyone clothes-ACC how wear NOT did
'How did no one wear clothes?'

(2) amwuto Tom-ul **way** mannaci an haess-ni?
anyone T-ACC why meet NOT did
'Why did no one meet Tom?'

Given the above paradigm in **(1-2),** ***way*** (why) seems to stand apart from the rest of wh-words in terms of grammaticality. In other words, the sentence with ***way*** (why) in (2) is grammatical while the other sentences with other wh-words in (1) are all ungrammatical.

1.2 Previous proposal

Beck and Kim's (1997: 347) proposal that a wh-word cannot bind its trace under the scope of negation at LF is not satisfactory. The effect of their proposal is that once a wh-trace occurs under the scope of negation with the wh-word above the negation at LF, the sentence should be ungrammatical. The relevant LF structure for the sentences in (1-2) will be roughly the following in **(3),** given the assumption that NPI should be under the scope of negation (Ladusaw 1980) and the position of negation can vary at LF, according to them:

(3) [$_{CP}$ Wh-word [$_{IP}$ Neg [$_{IP}$ NPI [$_{VP}$ t$_i$ V]]]]

The contrast in grammaticality in (1-2) is thus puzzling to them, since in the LF representation in (3) the trace of wh-words in (1-2) will be under the scope of negation with the wh-words in Spec CP above the scope of negation, given the assumption that wh-words uniformly undergo movement into Spec CP.

2 Proposal

As illustrated in the paradigm below in **(4),** wh-words quantifying over individuals, means or manners in Korean do not have their own quantificational force, but their quantificational force is solely determined by the relevant morpheme they combine with (Choi 1935, Chung 1995: 140 also see Suh 1990: 27ff).

(4)

existential quantifiers		universal quantifiers	
nwukwu-nka	'someone'	nwukwu-tunci	'everyone'
mwues-nka	'something'	mwues-tunci	'everything'
eti-nka	'somewhere'	eti-tunci	'everywhere'
ency-nka	'sometime'	ency-tunci	'whenever'
*way-nka	----------	*way-tunci	----------

Nka is a morpheme conveying existential quantificational force, while ***tunci*** is a morpheme conveying universal quantificational force. The paradigm above in (4) shows that the adjunct wh-word ***way*** (why) quantifying over reasons is different from the rest of the wh-words in that it combines with none of these morphemes. For convenience sake, other than the adjunct wh-word ***way*** (why), I will call wh-words in the above paradigm in (4) 'non-propositional wh-words' since they cannot quantify over proposition contrary to ***way*** (why).

Based on the above paradigm in (4), I thus propose that non-propositional wh-words in Korean are an indefinite in the sense of Heim (1982) (see Choi 1935 for Korean, Kuroda 1965, Nishigauchi 1986, 1990 and Watanabe 1991 for Japanese, Cheng 1997 and Tsai 1994 for Chinese for similar claim). I further propose that non-propositional wh-words do not undergo movement at LF and their scope is marked by the question morpheme (see Baker 1970) which binds them, while ***way*** (why) should undergo movement into Spec CP at LF to mark its scope as a last resort (Chomsky 1995) to be properly interpreted by forming an operator variable chain. I assume that the question morpheme (QM, henceforth) is base-generated in the head of IP following Kim (1990) and that a quantifier phrase (QP, henceforth) and a wh-word scopally interact (May 1977, 1985), quantifying into questions (against Chierchia 1991, 1993). I will also assume c-command in the sense of Reinhart (1976) as a necessary condition for scope determination. The present proposals can account for the contrast in the intervention effect in (1-2) rather naturally.

Consider the contrast in grammaticality between ***way*** (why) and the rest of wh-words in (1-2). The LF structures for the sentences in (1) will be the one in (5a) while the LF structure for the sentence in (2) will be the one in (5b), with the irrelevant portion suppressed.

(5) a. $[_{CP}\ [_{IP}$ NPI $[_{I'}$ QM$_i$ $[_{VP}$ WH$_i$-word V]]]]

b. $[_{CP}$ Why$_i$ $[_{C'}$ QM$_j$ $[_{IP}$ NPI $[_{I'}$ t$_i$ $[_{VP}$ t$_i$ V]]]]]

The wh-word in (5a) is acting as a variable bound by the QM in the head of IP. The subject QP (NPI), translated as ***no one***, cannot have a pair list answer, since it is meaningless to ask a wh-question with ***no one*** having wide scope over the wh-word (see Higginbotham 1993). 'The QM in the head of IP cannot have

scope over the subject QP (NPI) either, since it cannot c-command the latter, hence no single answer. The ungrammaticality of the sentences in (1) thus follows, since they do not admit either a pair list answer or a single answer, given the prominence of the two types of answers as answering a wh-question. How about the grarnmaticality of the sentence in (2)? Consider its LF representation in (5b). Again, wide scope of no one is impossible for the reason mentioned above. However, way (why) in Spec CP at LF can c-command and take scope over the subject QP (NPI), yielding a single answer, hence grammatical.

3 Prediction

The prediction I make is that when an NPI occurs in a position other than matrix subject position, then the contrast in grammaticality between the two types of wh-words may disappear. This is indeed confirmed by the following examples in (6-7): [4] [5]

(6) a. John-i amwu-ekey-to nwukwu-lul sokayhaci an haess-ni?
J-NOM anyone-DAT whom-ACC introduce NOT did-QM
'Whom didn't John introduce to anyone?

b. John-i amwu-ekey-to Mary-lul way sokayhaci an haess-ni?
J-NOM anyone-DAT M-ACC why introduce NOT did-QM
'Why didn't John introduce Mary to anyone?

(7) a. John-i [$_{CP}$ amwuto nwukwu-lul mannaci an haessta-ko] malhaess-ni?
J-NOM anyone whom-ACC meet NOT did-COMP said-QM
'Who did John say no one met?

b. John-i [$_{CP}$ amwuto Mary-lul way mannaci an haessta-ko] malhaess-ni?
J-NOM anyone M-ACC why meet NOT did-COMP said-QM
'Why did John say no one met Mary?'

Sentences in (6-7) are grammatical, yielding a single answer. Consider the simplified LF representations in (8-9) for the sentences in (6-7).

(8) a. [$_{IP}$ NP-NOM [$_{I'}$ QM, [$_{VP}$ NPI WH-word, V]]]

b. [$_{CP}$ Why$_i$ [$_{C'}$ QM$_i$ [$_{IP}$ NP-NOM [$_{I'}$ t_i [$_{VP}$ NPI t_i V]]]]

(9) a. [$_{IP}$ NP-NOM [$_{I'}$ QM$_i$ [$_{VP}$ [$_{V'}$ [$_{V'}$ NPI [$_{V'}$ WH-word$_i$ V]]]]]

b. [$_{CP}$ Why$_i$ [$_{C'}$ QM$_j$ [$_{IP}$ NP-NOM [$_{I'}$ t$_i$ [$_{VP}$ [$_{V'}$ [$_{V'}$ NPI [$_{V'}$ t$_j$ V]]]]]]]

Given the LF representation in **(8a)** for the sentence in **(6a),** the grammaticality of the sentence follows, since the QM in the head of IP can c-command the QP (NPI) in the indirect object position and have scope over it, yielding a single answer. Similarly, the grammaticality of the sentence in (6b) also follows given the LF representation in **(8b)** for it: Way (why) in Spec CP can c-command the QP (NPI) in the indirect object position, yielding a single answer, hence grammatical. Pair list answer is not a possibility again for the reason as mentioned above.[6]

Similarly, the grammaticality of the sentences in (7) also follows given the LF representations in (9) for them: The QM in the head of matrix IP in (9a) can c-command the QP (NPI) in Spec of the embedded IP, yielding a single answer for **(7a)** and ***way*** (why) in Spec of the matrix CP in **(9b)** c-commands the QP (NPI) in Spec of the embedded IP, yielding a single answer for **(7b).**

4 Correlation

The non-movement of the non-propositional wh-words as opposed to ***way*** (why), which is forced to move at LF for proper interpretation as a last resort, has immediate implications for the contrast between the two types of wh-words with respect to subjacency in (10-11).

(10) a. **[** Nwu-ga ssun chayk **]-i** cemiiss-ni?
who-NOM wrote book-NOM interesting-QM
'What is the person **x** such that a book that x wrote is interesting?'

b. **[** John-i eti-ese ssun chayk **]-i** cemiiss-ni?
J-NOM where-at wrote book-NOM interesting-QM
'What is the place x such that a book that John wrote at **x** is interesting?'

c. **[** John-i ence ssun **chayk]-i** cemiiss-ni?
J-NOM when wrote book-NOM interesting-QM
'What is the time x such that a book John wrote at **x** is interesting?

d. **[** John-i ettehkey kulin kulim **]-i** pissa-ni?
J-NOM how painted painting-NOM expensive-QM
'What is the means x such that a painting that John painted by x is

expensive?'

e. [Oss-ul ettehkey ipnun **salam]-i** ne-uy isanghyengi-ni?
clothes-ACC how wear man-NOM you-POSS ideal type-QM
'What is the manner x such that a man who wears in x is your ideal type?

f. *[John-i way ssun **chayk]-i** cemiiss-ni?
J-NOM why wrote book-NOM isinteresting-QM
'What is the reason x such that a book that John wrote for x is interesting?'

(11) a. Ne-nun [nwu-ka ssun chayk **]-ul** ilkess-ni?
you-TOP who-NOM wrote book-ACC read?
What is the person x such that you read a book **x** wrote?

b. Ne-nun [John-i eti-ese ssun chayk **]-ul** ilkess-ni?
you-TOP John-NOM where at wrote book-ACC read?
What is the place x such that you read a book John wrote at x?'

c. Ne-nun [John-i ence ssun chayk **]-ul** ilkess-ni?
you-TOP J-NOM when wrote book-ACC read?
What is the time x such that you read a book John wrote at x?

d. Ne-nun [John-i ettehkey kulin **kulim]-ul** sass-ni?
you-TOP J-NOM how painted painting-ACC bought?
'What is the means x such that you bought a painting John painted by x?'

e. Ne-nun [ettehkey oss-ul ipnun **salam]-ul** choaha-ni?
you-TOP how clothes-ACC wear man-ACC like-QM
'What is the manner x such that you like a man who wears a clothes in x?'

f. ***Ne-nun** [John-i way ssun chayk **]-ul** ilkess-ni?
you-TOP J-NOM why wrote book-ACC.read-QM?
What is the reason **x** such that you read a book John wrote for x?

Wh-words in (10-11) occur inside a relative clause. The difference between examples in (10) and (11) is that the complex NP including the relative clause occurs in the subject position in (10) and in the object position in (11). Two main proposals have been made to account for the contrast in grammaticality

when it comes to subjacency as in (10-11). One is the unbounded wh-word movement approach (Huang 1982). The other is LF pied-piping approach (Choe 1987, Nishigauchi 1990), whereby the whole island including the wh-word moves into Spec CP at LF. The unbounded wh-word movement approach ascribes the grammaticality contrast as in (10-11) to the asymmetric behavior of an argument wh-word and an adjunct wh-word with respect to the ECP: The trace of the argument wh-word can be properly governed by the verb as opposed to the trace of the adjunct wh-word.

However, the contrast in grammaticality as shown in (10-11) is not along the argument wh-word on the one hand and the adjunct wh-word on the other. The point is clear when one considers the behavior of the adjunct wh-word ***ettehkey*** (how) in (10e-11e), which is still immune to subjacency even under manner construal, which can never be an argument wh-word.

The LF pied-piping approach attributes the contrast in grammaticality to the asymmetry in type match. An argument wh-word is nominal as opposed to an adjunct wh-word, thus being able to match the nominal feature of the head noun of the relative clause, thus leading to a large-scale pied-piping at LF. This account, which is based on type match, however, raises a similar question I raised with respect to the unbounded movement approach, since under this approach the grammaticality of the sentences with ***ettehkey*** (how) as in (10e-11e), which has a manner interpretation, thus can never be a nominal wh-word, is a puzzle.

The grammaticality contrast between ***way*** (why) on the one hand and the other wh-words in (10-11) on the other suggest that the grammar has two different ways of interpreting the scope of in situ wh-words in Korean: unselective binding by the QM for in situ wh-words quantifying over individuals, means or manners (non-propositional wh-words) and LF movement for in situ adjunct **wh**-word ***why*** (propositional wh-word).

5 Conclusion

To conclude, we claimed that the asymmetry of the two types of in situ **wh**-words with respect to the intervention effect and subjacency can receive a satisfactory account once the asymmetry of movement between them is accepted. The non-propositional in situ wh-words do not undergo movement at LF while the propositional in situ adjunct wh-word has to. The QM marks the scope of the former while the latter marks its scope by undergoing LF movement into **Spec** CP to be properly interpreted by forming an operator-variable chain.

Notes

As always, I would like to express my special thanks to JinHee Kim for her native speaker intuition for the Korean data in this paper.

1. NPI can appear in the subject position in Korean as shown below.

a. Amwuto **oci** an haessta
anyone come-NOT did
'Anyone did not come.'

2. The wh-word ***etrehkey*** (how) in (1d) has a 'means' construal and the one in (1e) has a 'manner' construal.

3. The QP (NPI) in Spec IP do not have to undergo quantifier raising since it does not have a type mismatch problem given λ-abstraction. I adopt the view that quantifier raising is driven by type mismatch (Heim and Kratzer 1998). I suggest that The Q M in the head of IP should be raised into the head of CP at LF to enter into a spec-head relation with the adjunct wh-word in Spec CP. Although Korean is head-final in CP level too. I will represent it as if head-initial at CP level for convenience sake for the reader.

4. A sentence which is similar to the one in (6a) is reported as ungrammatical in Beck and Kim (1997: 343). However. I do not agree with their intuitions. After all, native speakers whom I consulted (JinHee Kim (pc. July 2001) and Choon Kwu Lee (pc. August 2001)), report that the sentence in (6a) is acceptable, yielding a single answer.

5. It should be also noted that the grammaticality of the sentences in (6a -7a) remains essentially the same when ***eti*** (where), ***ence*** (when) and ***errehkey*** (how) replaces ***nwukwu*** (whom).

6. The QP (NPI) in the indirect object position in (8) should be adjoined to VP at LF to avoid type mismatch. However, I will not represent this for the LF representations, since it is immaterial for the discussion here.

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Verb Raising as Syncretic Category Movement

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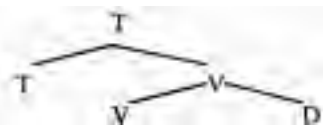
1 Introduction

There are several syntactic phenomena that have been dealt with as involving head movement: incorporation (Baker 1988), inversion (or T-to-C movement), verb raising (or V-to-T movement), and different types of N-raising (Cinque 1995, Longobardi 1994). Although the operation in question is quite natural within the principles and parameters framework, this is not the case under the minimalist bare phrase structure approach, because of the problems in (1).

(1) a. Head movement violates the Extension Condition (Chomsky 1995, 2001).
b. Head movement assumes a theory where heads have different labels from phrases (i.e. some type of X-bar theory) to ensure that only heads are targeted, not their phrasal projections (Chomsky 2001).

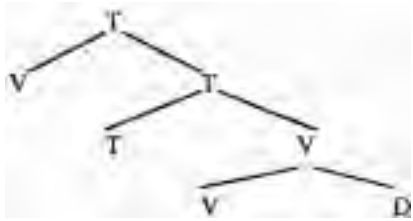
The Extension Condition requires that Merge always extend the structure to which it applies. Essentially, what this means is that if an element X has a sister Y, a third element Z can be merged with the complex element consisting of X and Y but not with its individual members. But this is exactly what head movement does. Consider, for example, the V-to-T operation. Its input is a structure like (2).

(2)



The only way that V-raising could satisfy the Extension Condition would be by copying and merging V with the whole structure (2), yielding (3).

(3)



But this is not the correct structure. Instead, the operation must yield **(4),** in violation of the Extension Condition.

(4)

Problem (I b) can be illustrated by raising the following question: Given structure **(2),** how does the computational component know that the rule must target the lower, not the higher, label V, since in a bar-less system these are non-distinct?

These theoretical problems with head movement have given rise to two kinds of solutions:

(5) a. Head movement is a PF operation, thus not subject to the Extension Condition (Chomsky 2001, **Boeckx** and Stjepanovic 2001).
b. Head movement is an interarboreal operation and it complies with the Extension Condition (Bobaljik and Brown 1997).

Lasnik (1999) has argued that certain instances of V-to-T might be replaced by a PF operation. It is less clear, however, how this proposal could be extended to cases like T-to-C or incorporation.

The interarboreal proposal can be illustrated as follows: Assume the array in (6).

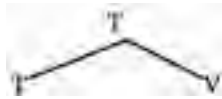
(6) {T, V, D}

Assume that V and D are merged yielding (7).

(7)

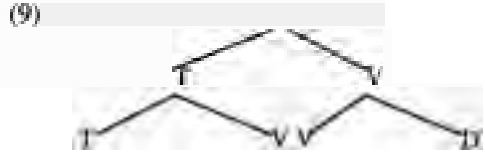
We now merge T **with** a copy of **the** lower V **in (7),** yielding **(8).**

(8)



Finally, the two trees are combined yielding (9).

(9)



We have generated a structure identical to (4) without violating the Extension Condition. The crucial step that allowed us to do that was the 'interarboreal' operation relating (7) to **(8),** which according to **Bobaljik** and Brown should be allowed by the theory.

Without entering into the question of whether such operations are legitimate or not, I want to suggest that a uniform solution to the head-movement problem is misdirected, and that we must consider the different cases in isolation. In previous work (Contreras 2001) I have suggested that T-to-C can be dispensed with if we assume with Chomsky (2000,2001) that Case can be checked in situ and that the feature [+Interrogative] can be associated with either C or T, following **Rizzi** 1991. In this paper I want to discuss V-to-T and suggest that some cases fall under Merge while others involve a type of head movement which I will refer to as Syncretic Category Raising and which is triggered by **c-**selectional requirements of the features of the syncretic head. This operation, as we will show, observes the Extension Condition and does not require different labels for heads and their projections.

Consider the facts in (10) and **(11).**

(10) a. La directora **explicó** cuidadosamente la propuesta.
the director explained carefully the proposal
'The director carefully explained the proposal.

b. La directora cuidadosamente **explicó** la propuesta.
the director carefully explained the proposal
'The director carefully explained the proposal.'

c. *The director explained carefully the proposal.

d. The director carefully explained the proposal.'

(11) a. No sabemos si corre Juan.
not we-know if runs John
'We don't know if John runs.'

b. No sabemos si Juan corre
not we-know if John runs
'We don't know if John runs.'

c. *We don't know if runs John.

d. We don't know if John runs.

These sentences show that Spanish allows the orders Verb-Adverb-Complement and Verb-Subject, while English disallows them. In the spirit of early minimalism (Chomsky 1995), one might attempt to account for this difference by positing a strong versus a weak V-feature in Tense responsible for attracting the verb past the VP-adverb ***cuidadosamente*** 'carefully' in (10a) and past the subject ***Juan*** in (11a). Since by assumption the relevant feature is weak in English, the verb remains in its base position. The fact that the verb does not raise above the subject in (10a) can be accounted for under the assumption that Spanish pre-verbal subjects are clitic-left-dislocated elements, as proposed by Barbosa (1995). Olarrea (1996), Alexiadou and Anagnostopoulou (1998) and others. This unified treatment of (10) and (11), however, cannot be correct. There are languages like French that allow the order shown in (10a) but disallow that in (11a), except under special circumstances:

(12) a. Jean embrasse **souvent** Marie.
John kisses often Mary
'John often kisses Mary.'

b. *Je me demande si partira ton ami.
I wonder if will leave your friend
'I wonder if your friend will leave.'

c. Je me demande quand partira ton ami.
I wonder when will leave your friend
'I wonder when your friend will leave.'

(12c) is a case of so-called Stylistic Inversion, where the order Verb-Subject correlates with the presence of a fronted wh-element (Kayne & Pollock 1978). In other structures the order Verb-Subject is disallowed, as illustrated in 12b).

It appears then that the Spanish/English contrasts illustrated in (10) and (11) are unrelated and require different treatments. I will suggest that while the order Verb-Subject does involve a type of movement, the order Verb-Adverb-Complement does not, but results instead from a particular implementation of Merge permitted in Spanish but disallowed in English, along the lines suggested in Contreras and Masullo (1998199,2000).

2 Problems with the Head-Movement Account

The verb-raising account of the contrast in (10) goes back to Ernonds (1976). Pollock (1989) reformulates the analysis within the Principles and Parameters model, and Chomsky (1995) further refines it in minimalist terms. In Chomsky's version, V adjoins to T(ense) overtly in Spanish because T(ense) has a strong V-feature. Since by assumption the V-feature of T in English is weak, there is no overt V-raising.

There are several problems with this account, however. Empirically, it is not true that English entirely disallows the order Verb-Adverb-Complement, as noted by Pesetsky (1989), Ouhalla (1990), Johnson (1991) and others. These authors point out that adverbs may intervene between the verb and its complement as long as the complement is not a DP. The following examples from Pesetsky (1989) and Johnson (1991) illustrate this:

(13) a. Chris walked quickly down the street.
b. Mickey talked slowly to Gary.
c. Sam said suddenly that we must all leave.
d. Betsy spoke loudly to everyone.
e. Mary tried diligently to leave.

On the basis of these facts, Pesetsky (1989) suggests that the verb does raise out of VP in English, but to a lower position than in French (and Spanish). Since there are additional problems with the Verb-Raising account that Pesetsky's proposal does not obviate, I will not pursue this solution.

Another empirical problem with the Verb-Raising account of (10) comes from the fact that be and auxiliary *have* do seem to raise out of VP, as originally suggested by Emonds (1976), and illustrated in (14).

(14) a. The director has carefully explained the proposal.
b. *The director carefully has explained the proposal.
c. The director was carefully explaining the proposal.

d. *The director carefully was explaining the proposal.

The problem is: If the attracting feature in T is weak in English, why do ***be*** and ***have*** raise overtly? Pollock (1989) proposes a solution in terms of theta-role assignment:

(15) a. English Agr is opaque to theta-role transmission because it is not morphologically rich. If a verb with theta-roles to assign raises, it is unable to assign them, resulting in a Theta Criterion violation.
b. ***Be*** and ***have*** do not assign any theta-roles, so nothing prevents them from raising.

This solution, however, is not compatible with the minimalist assumption that movement is a last-resort operation.

Chomsky (1993) suggests that ***have*** and ***be*** are semantically vacuous, hence not visible to LF operations. Thus, unless they raise overtly, they will not be able to raise at all. There are empirical and theoretical problems with this proposal, however. Wexler (1994) notes that in Swedish auxiliaries pattern with main verbs in that they do not raise out of VP, as shown in (16).

(16) a. om hon inte ofte har sett honom
whether she not often has seen him

b. *om hon har inte ofte sett honom
whether she has not often seen him

c. *om hon inte har ofte sett honom
whether she not has often seen him

Presumably, if English auxiliaries are devoid of semantic content, Swedish auxiliaries are also, and under Chomsky's account they should be unable to raise at LF, and they should undergo overt raising instead. From a theoretical point of view, as pointed out by Lasnik (1999) it is questionable that syntactic operations, even those applying at LF, should be sensitive to semantic considerations. It seems fair to say, then, that the behavior of ***be*** and auxiliary ***have*** remains mysterious under the verb-raising account of the contrast in (10).

In addition to these empirical problems the Verb-Raising account of (10) faces the theoretical difficulties referred to above. First, as noted in Chomsky 2001. since the minimalist program does not formally distinguish X-bar levels, it is not clear how to ensure that the feature to be checked by T(ense) is in fact checked by raising just the verb and not the phrasal projection headed by it. Second, it is well known that all head-movement operations violate Chomsky's (1995)

Extension Condition, which requires that Merge always extend the structure. thus ensuring strict cyclicity.

3 Verb-Adverb-Complement as a Product of Merge

I will propose that the relative order of Verb, Adverb and Complement is established by different applications of Merge, as suggested in Contreras and Masullo (1998199, 2000). In this proposal, Merge is interpreted not as a free operation as in Chomsky 1995 but as motivated by the need to check selectional or intrinsic features. We make the following assumptions:

(17) a. C-selectional features are categorial features which are uninterpretable in their hosts, thus requiring Merge with a matching category.
b. Merger of adjuncts must establish an agreement relationship between the adjunct and some intrinsic feature of the host.
c. C-selectional features may be strong or weak.
d. Only weak c-selectional features percolate.
e. Intrinsic features percolate up to the maximal projection of the category they are associated with.
f. The category whose feature is checked provides the label for the product of Merge.[2]

To illustrate these assumptions, let us consider the partial numeration (18).

(18) {hit. it. repeatedly)

By assumption, the verb ***hit*** is associated with the strong selectional feature D and the intrinsic feature [action], among others. Merging ***hit*** and ***repeatedly*** is legitimate, since the adverb presumably agrees with the intrinsic feature [action] of the verb. The label for the output is V. The structure generated is (19).

(19)

This structure can then merge with the lexical item ***it,*** but the uninterpretable selectional feature of ***hit,*** being strong, has not percolated, so it cannot be checked. The derivation crashes. If, on the other hand, we first merge ***hit*** with ***it,*** the selectional feature of ***hit*** is checked. The second merge with ***repeatedly*** is allowed, since the intrinsic feature of ***hit*** does percolate and is thus still visible after the first merge.

Applying this approach to the data in (10), we assume that the difference between English and Spanish lies in the relative strength of the selectional feature D associated with transitive verbs: the feature is strong in English and weak in Spanish. This ensures that in English the verb must merge first with its object and then with the adjunct, while in Spanish either order is allowed, since weak selectional features, by assumption, do percolate and are thus still visible after the verb has merged with an adverb.

The approach also provides a straightforward account of the difference between the English examples in (10) and those in (13), if we assume that the selectional features of English verbs taking PP and clausal complements are weak.

What remains unaccounted for is the behavior of English have and *be*. I will return to these in a later section.

4 The VS Order

Let us now consider the VS order illustrated in (11). This order has also been interpreted as resulting from V-raising to a higher functional projection, either to check morphological features of that category (Suiier 1994) or its EPP feature (Alexiadou and Anagnostopoulou 1998). These treatments present the same theoretical problems associated with the V-raising account of the order Verb-Adverb-Complement: the operation violates the Extension Condition and it requires a non-'bare' phrase structure theory capable of differentiating between bar-levels, to ensure that only the head raises.

The approach sketched in the previous section to account for the contrast in (10) does not extend to these cases. I cannot think of a well-motivated treatment based on the relative strength of selectional features from which the contrast between the VS and the SV orders might follow. I will propose that in this case there is in fact a type of Verb Raising at work, but reformulated so as to overcome the theoretical difficulties discussed in the introduction. Before presenting this account, however. I must motivate a difference between English and Spanish that arises from work by Warner (1986) and Lasnik (1999).

4.1 The Warner/Lasnik facts

Warner (1986) has pointed out that there is a difference between English main and auxiliary verbs with respect to VP ellipsis. Main verbs count as "identical" for the purposes of VP ellipsis even when their tense inflection is different; auxiliary verbs, on the other hand, do require strict identity of tense (20b), although agreement features may differ. as the Gapping example (20c) shows:

(20) a. John slept, and Mary will [...] too.
b. *John was here, and Mary will [...] too.
c. She is writing a novel, and they [...] a poem.

Warner points out that this difference holds even in cases where the main verb is highly irregular:

(21) John went, and now Mary will [...].

On the basis of these facts. Lasnik (1999) suggests that the lexical entries for main verbs are their bare forms, not the inflected ones as suggested in Chomsky (1995), and that Tense is an independent syntactic element which need not contain any uninterpretable features in need of checking. Under his proposal, Tense and main verb are joined at PF by an updated version of the old Affix Hopping rule. At the point where VP deletion occurs (or is interpreted) for a case like (9a) there are identical occurrences of the bare form sleep in both conjuncts. Auxiliary verbs, on the other hand, enter the numeration fully inflected as standardly assumed.

I will assume that this account is correct, and examine the behavior of Spanish verbs. As is well known, main and auxiliary verbs are equally inflected in Spanish, although they differ in distribution, as shown by Picallo (1990) among others. We consequently expect them to behave alike in elliptical contexts.

The VP ellipsis difference illustrated above for English cannot be replicated in Spanish for reasons discussed in Zagona (1988) and elsewhere. In order to examine the behavior of Spanish verbs under ellipsis I will resort instead to Gapping, illustrated in (22).

(22) a. Maria escribe poemas, y Pedro [...] novelas.
Mary writes poems and Peter novels
'Mary writes poems, and Peter novels.'

b. Maria está escribiendo poemas, y Pedro [...] leyendo novelas.
Mary is writing poems and Peter reading novels
'Mary is writing poems, and Peter reading novels.'

(22a) illustrates ellipsis of a main verb, and (22b) ellipsis of an auxiliary. What we want to establish is whether Gapping requires identity of tense or not. The ill-formedness of the structures in (23) suggests that it does.

(23) a. *Maria escribió una carta ayer, y Pedro [...] maiiana.
Mary wrote a letter yesterday. and Peter tomorrow
(Cf. Mary wrote a letter yesterday, and Peter will tomorrow)

b. *María estaba escribiendo una carta ayer, y Pedro
Mary was writing a letter yesterday and Peter
[…] leyendo el diario maiiana.
reading the paper tomorrow
'Mary was writing a letter yesterday. and Peter […] reading the paper tomorrow.'

Spanish verbs behave like English auxiliaries, not like English main verbs, with respect to ellipsis. Agreement features need not be identical, as shown by (24), but this is also true of English auxiliaries, as illustrated in (18c).

(24) a. Maria escribe poemas, y nosotros […] novelas.
Mary writes poems and we novels
'Mary writes poems, and we novels.'

b. Maria está escribiendo poemas, y nosotros […] leyendo novelas.
Mary is writing poems and we reading novels
'Mary is writing poems, and we reading novels.'

These facts suggest, following Lasnik's (1999) logic, that Spanish verbs enter the numeration fully inflected, with Tense specified as one of their features. Thus there is no point in the derivation where a bare verbal stem is available for any syntactic process, including ellipsis. I will propose, in addition, that since Tense is part of the feature complex of verbs, it does not exist as a separate functional head in Spanish. This radical proposal is justified, I believe, on the basis of parsimony. In particular, it would follow if we were to adopt a restriction on null categories as follows:

(25) Lexical Parsimony
A lexical item a can lack phonetic features in L, where L is the lexicon of a particular language, only if L includes an item b nondistinct from a which is associated with phonetic features.[1]

According to the principle of Lexical Parsimony, the category Complementizer, for example, may have null members in both English and Spanish, because in both languages there are phonetically overt members of it. Similarly, null pronouns are allowed in both languages because they both have overt pronouns.

Consider now the category Tense. English has at least one morpheme, the auxiliary do that can be reasonably interpreted as being a pure expression of Tense. Consequently, according to the principle of Lexical Parsimony, English may have phonetically null Tense. Spanish, on the other hand, does not have any lexical item that can be interpreted as a pure expression of Tense.

According to the principle of Lexical Parsimony, there cannot be an independent Tense in the Spanish lexicon.

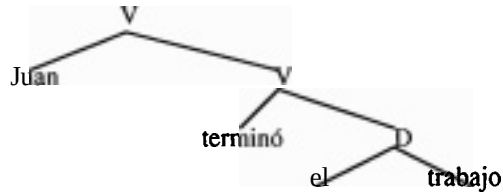
But now we face a dilemma. Under standard assumptions, it is the null functional head Tense that attracts the verb past the subject in Spanish to yield the VS order. In the absence of an attracting head, how can we achieve the same result? I suggest an answer to this question in the next section.

5 Syncretic Category Movement

Recall the Contreras and Masullo (1998199, 2000) assumptions concerning Merge, in particular the idea that merger of arguments is triggered by uninterpretable selectional features of lexical items. Selection is standardly assumed to affect both lexical and functional categories. It is thus uncontroversial that Tense in English takes VP (or perhaps vP) as a complement. Whether the selectional properties of functional categories are invariant or language-specific depends on what inventory of such categories one assumes. On one extreme, there are proposals like Cinque's (1999) and Rizzi's (1997), with a rather large inventory for clausal functional categories; on the other, Chomsky (2001) seems to restrict the class to C, T and little v. Under either view, however, it appears that the selectional properties of T are invariant. If this is true, it seems reasonable to suggest that the syntax of individual languages should reflect this fact. For languages like English, with an independent functional head T, Merge applies in the usual manner, namely the selectional feature V in T requires merger of T and VP. What about a language like Spanish? All we need to assume is that T is associated with the same selectional features regardless of whether it is an independent lexical item or a feature. However, features alone cannot undergo overt movement, perhaps because PF is unable to interpret the resulting structures. So the only way Spanish can satisfy the selectional properties of Tense is to move the whole feature complex of which it is part. I refer to this as Syncretic Category Movement. I will illustrate the proposal with a simple derivation. Based on numeration (26), assume we have assembled the structure in (27), given in tree form for convenience and omitting the functional category little v.

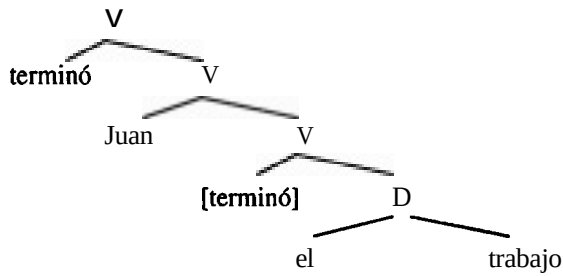
(26) (Juan, terminó, el, trabajo)
John finished the work

(27)



The selectional feature D of ***termind*** 'finished' has been checked by merger with ***el rrabajo*** 'the work'. ***Juan*** has been merged to check a selectional feature of 'little v' omitted from the representation. By assumption, ***termind*** 'finished' includes the feature 'past tense' with its own selectional feature V. This feature can be checked by copying and merging the head ***termind*** 'finished' with structure **(27),** yielding (28).

(28)



Notice that this type of head movement, not being an adjunction, obeys the Extension Condition, thus obviating one of the problems associated with the standard approach. What about the other problem'? How does the computational component know that the element to be raised is just the head ***terminó*** 'finished' and not any of its projections, given the absence of bar levels? I will suggest that the answer follows from one of the proposals in Contreras and Masullo (1998199, 2000). Recall that under that analysis, strong selectional features do not percolate. Since V-raising is overt in Spanish, it is reasonable to assume that the selectional feature of Tense is strong. This means that only the head carries it, not any of the phrasal projections, which determines that only the head undergoes copy and merge.

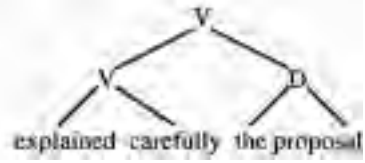
There is a potential objection to this account that needs to be dealt with. Recall the analysis of **(10c),** repeated here.

(I0c) *The director explained carefully the proposal.

The crucial assumption was that the selectional feature D of the verb ***explained*** was strong, and thus could only be checked by first merging the verb with its object, since by assumption strong selectional features do not percolate. The problem that arises now is that in my account of (28) I have allowed for 'delayed' checking of a strong selectional feature. This raises the question: Couldn't such a delayed checking be applied to (10c)? We will see that even though this is in principle possible, it cannot rescue the structure (10c).

Assume that we have first merged ***explained*** with ***carefully,*** and then merged this structure with ***the proposal,*** as shown in (29).

(29)



The selectional feature D of ***explained*** remains unchecked and because it cannot percolate it is only present in the head, not in any of its phrasal projections. Why can't ***explained*** be copied and merged with structure (29), as we did in (28) with ***terminó*** 'finished'? If we adopt the minimalist assumption that syntactic operations are not free but triggered, the verb cannot raise in (29). because such raising would not lead to the checking of its selectional feature, since its sister after raising would be V not D. There is no conflict, then, between the 'immediate' checking required in (10c) and the 'delayed' checking allowed in (28).

In conclusion, the VS order in Spanish results from a strong selectional feature of Tense, which requires it to merge with VP (or vP). Since by hypothesis Spanish Tense is a feature of V, not an independent head, the only way this selectional feature can be checked is by raising the whole lexical category which contains this feature. This type of head raising, in contrast with the standard adjunction operation, obeys the Extension Condition and it does not require enriching the theory of phrase structure by the addition of bar levels.

6 English *have* and *be*

I now return to the analysis of English auxiliary ***have*** and ***be.*** According to Lasnik's (1999) proposal, they enter the numeration fully inflected. This accounts for their behavior in ellipsis, as discussed above. He further assumes that Infl (Tense in our terms) can be either an affix with no features to check or a set of abstract features. When Infl is featural, its features are strong in English just as they are in French or Spanish. There are then four possible combinations in Lasnik's system:

(30) a. Affixal Infl + bare verbal stem
b. Featural Infl + inflected verb
c. **Affixal** Infl + inflected verb
d. Featural Infl + bare verbal stem

(30a) is the structure for main verbs in English. According to Lasnik, affixal Infl merges with the bare verbal stem at PF by a process distinct from head movement which requires adjacency. This is essentially the old Affix Hopping rule. **(30b)** is the case of English auxiliary ***have*** and ***be*** and also the case of all French (and Spanish) verbs. The other two combinations lead to crashing derivations: **(30c),** because the features of the inflected verb are not checked: and **(30),** because the features of Infl are not checked. In addition, Lasnik suggests that **(30c)** leads to a PF crash, since an affix is added to an already inflected verb.

This proposal has the virtue of making the right empirical generalizations. However, it still assumes the version of Verb Raising that violates the Extension Condition and requires reference to bar levels. I will propose instead that the type of raising that affects ***be*** and auxiliary ***have*** is the same as the one that operates in Spanish for all verbs, namely Syncretic Category Raising. In other words, ***have*** and ***be*** raise to satisfy the selectional requirements of their Tense feature, not because they are attracted by a higher functional head. This proposal requires that we modify Lasnik's assumptions concerning English Infl. Instead of allowing for both an affixal and a featural type, we can assume that English Infl is always affixal, and it never contains any uninterpretable features in need of checking. We must also assume that affixal Infl is optional. The four possibilities under this account are as follows:

(31) a. Affixal Infl + bare verbal stem
b. **Affixal** Infl + inflected verb
c. No Infl + bare verbal stem
d. No Infl + inflected verb

(31a) works just as Lasnik suggests; (31b) crashes at PF, due to the addition of an affix to an already inflected form. **(31c)** presumably crashes at LF due to the lack of Tense specification. **(31d)** is the case of ***be,*** auxiliary ***have,*** and all Spanish verbs.

7 Conclusions and Problems

In conclusion. I have suggested that differences between English and Spanish concerning the relative order of verbs, complements and adverbs can. be accounted for in terms of Merge without positing Verb Raising. The analysis

suggested yields the correct empirical results and avoids the theoretical problems associated with head movement.

With respect to the order VS, allowed in Spanish but not in English, I have suggested that Spanish verbs raise out of VP in order to satisfy the selectional requirements of their Tense feature. I refer to this type of operation as Syncretic Category Raising. English main verbs, following Lasnik (1999), enter the numeration in their bare form, and do not undergo Verb Raising. Auxiliaries, however, behave like Spanish verbs and undergo Syncretic Category Raising.

This proposal raises a number of questions for future research:

(32) a. What other cases of Syncretic Category Raising are there and what are the general properties of this operation?
b. How can we deal with incorporation?
c. What is the correct analysis of the various types of N-raising suggested in the literature?
d. If Spanish verb raising is not triggered by the presence of a higher Functional category, how are the presumably uninterpretable **phi**-features of the verb (Chomsky 2000:124) checked?

Each one of these topics is a research project on its own. All I can offer at this point is a bit of speculation on the last three. Incorporation should probably be dealt with as a case of 'early Merge' of two heads, perhaps triggered by some selectional feature requiring immediate checking. With respect to N-raising, the type discussed by Cinque, illustrated by the contrast in (33), should probably be considered on a par with the V-raising examples in (10), that is, as exemplifying different orders of Merge related to differences in the strength of the selectional features of N in English and Spanish.

(33) a. la **destrucción** completa de la ciudad
the destruction complete of the city
'the complete destruction of the city'

b. la completa **destrucción** de la ciudad
the complete destruction of the city
'the complete destruction of the city'

c. the complete destruction of the city

d. *the destruction complete of the city

I have nothing to say about the N-to-D raising proposed by Longobardi (1994). Finally, with respect to (32d), I will speculate that phi-features are perhaps added to verbs at PF. Recall that part of the motivation for Verb raising in the

minimalist program is to eliminate the phi-features of V because they are uninterpretable at LF. Under my alternative proposal, these features do not reach LF because they are not part of narrow syntax. In support of this view, recall that these features seem to be invisible for the purposes of ellipsis, as shown in (20c) for English and (24) for Spanish.

Endnotes

[1] Both languages allow the adverb in VP-final position as well. For the purposes of the present discussion, I will ignore that version. Adverb position has been the object of numerous studies. A recent proposal which is compatible with the approach suggested here is that of Ernst (forthcoming).

[2] There are some exceptions to this discussed in Contreras and Masullo (2000).

[3] This is reminiscent of Emonds' (1987) Invisible Category Principle, stated in (i), but there are crucial differences.

(i) If all marked canonical features F on B are alternatively realized by AR, except perhaps B itself, then B may be empty.

(ii) Alternative Realization (AR): A syntactic feature F canonically associated in UG with category B can be alternatively realized in a closed class grammatical morpheme under X^U, provided X^0 is the lexical head of a sister of B.

Emonds' principle stipulates when a category may be phonetically empty. The principle of Lexical Parsimony states that unless there are oven members of a category, the category itself does not exist.

[4] Although Lasnik does not specify it, I assume that it is the phi-features of the verb that are responsible for the crashing derivation, not its tense features, which are interpretable.

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Negation at the Left Periphery: Evidence from Algonquian and Salish[1]

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1 Proposal

Although the semantics of propositional negation is uniform across languages its morphosyntax is not. In response to this, various proposals in the literature, including Acquaviva 1997, have argued that negation is best analyzed in terms of a universally bipartite structure. On this view, there is an operator position (OP) in combination with a lower negative element (NEG), as in (1).

(1) OP [$_{CP}$ ... NEG ...

With respect to (1), languages may differ according to which part. of the OP-NEG structure are overt. With this as background, we consider evidence from two language families, Algonquian and Salish, which provide support for the OP-NEG analysis.

We first consider the Algonquian languages, where the bipartite structure is overtly realized (§2). We then extend the OP-NEG analysis to the Salish languages, where negation is arguably distributed throughout the CP-layer (independent of whether OP is overt or covert). That is, Salish NEG may be positioned immediately above or immediately below C with correlated morphosyntactic consequences (§3).

Finally, we show that negation in the CP-layer is associated with cyclic effects: a verbal negative predicate may give rise to a "C-based negation". Such cyclic effects are attested in both Algonquian and Salish in different ways (§4).

2 The Bi-partite Structure: Evidence from Algonquian

Algonquian provides evidence for the claim that negation is universally realized as a bipartite OP-NEG structure. For our purposes, it is important to recognize that a proposition must be associated with a polarity value. Following Martins 1998, we distinguish the following three polarity values: i) veridical (affirmative); ii) non-

veridical (negative); and iii) a-veridical (modality). Note that negation is compatible with both non-veridical and a-veridical polarity. As we will see below, this distinction is highly relevant for the Algonquian languages. We consider evidence from Ojibwe, Blackfoot. and Plains Cree.

2.1 Ojibwe

In Ojibwe (Nichols 1980; Reinholtz 1999), negation is realized by means of two morphemes, one of which is at the left periphery of the clause (kaawiin or keko) and the other is a suffix on the verb (*-ssi* or *–e*). This is summarized in (2):

(2) Ojibwe negation

	non-veridical		a-veridical: imperative		
	OP	NEG		OP	NEG
matrix	**kaawiin**	**-ssi**	prohibitive	keko	**-e**
embedded	∅	-ssi	hortative	keko	-ssi

There are reasons to identify *kaawiin/keko* with OP and *–ssi/-e* with NEG. In addition to being bimorphemic, Ojibwe negation is sensitive to the polarity value of the proposition, as well as to the distinction between matrix and embedded clauses. In particular, in non-veridical contexts, suffixal NEG is realized as *-ssi* in both matrix and embedded environments, (3). As for OP, in matrix non-veridical clauses it has overt content, kaawiin in (3)a. In embedded clauses, OP has no overt content, O in (3)b.

(3) a. kaye **wiin, kaawiin** aakkosissiin.
as.for him **neg** sick(vai 3 indep neg)
'As for him, he's not sick.' (Nichols 1980: 209)

b. amanc kaye **O** nantone'waassikwaa
I.wonder and neg look.for.s.o.(vta 3-3' cj neg)
'I wonder that they're not looking for him.' (Nichols 1980: 211)

The non-veridical contexts in (3) contrast with the a-veridical (imperative) contexts in (4). In the latter, OP is realized as keko while suffixal NEG is realized as *–e* or *–ssi*. The selection of suffixal NEG is determined by the distinction between prohibitive (4)a versus hortative imperatives (4)b.

(4) a. keko **niimikken**.
neg dance(vai 2 imper prohib)
'Don't dance!' (Nichols 1980: 208)

b. keko niimissiitaa
neg dance(vai neg hort)
'Let's not dance' (Nichols 1980: 207)

Ojibwe negation provides transparent support for a bipartite OP-NEG structure. The fact that the selection of *kaawiin* vs. *keko* is determined by the polarity value of the proposition is consistent with their status as operators (OP). Moreover, the fact that *-ssi* may mark negation by itself, as in (3)b, indicates that it has negative force, consistent with its NEG status. In addition, we take the complementarity of *-ssi* and *-e* in imperatives to follow from the fact that they both instantiate NEG and so compete for the same position. Finally, the fact that OP is O in embedded non-veridical contexts is reminiscent of a more general matrix/embedded asymmetry in OP-constructions. Blackfoot, to which we turn next, provides further evidence for this distinction.

2.2 Blackfoot

Like Ojibwe, Blackfoot negation is also bipartite (cf. Frantz 1991). In addition, it displays a larger range of polarity distinctions and a more systematic encoding of the matrix/embedded distinction. Note that in Blackfoot this distinction is suppletive. The inventory of Blackfoot negative morphemes in summarized in (5):

(5) Blackfoot negation

	non-veridical		a-veridical			
			irrealis		imperative	
	OP	NEG	OP	NEG	OP	NEG
matrix	-hpa	máát-	-htopi	kátá'-		
embedded	∅	saw-	∅	sta'-	∅	miin-

In non-veridical matrix clauses, NEG is realized as a prefix on the verb (*máát-*) and OP is realized as a suffix on the verb (*-hpa*), (6)a.[2] In non-veridical embedded clauses, OP is null and NEG is realized as a prefix –*saw*, (6)b.

(6) a. n-[imáát-á-ooyi]-hpa
1-neg-dur-eat-nonaffirm.local
'I'm not eating' (Frantz 1991: 84)

b. kit-ssksini-hpwa nit-[saw-á-ooyi]-his
2-know(vti)-theme-3 1-neg-dur-eat-conj
'You know I'm not eating' (Frantz 1991: 85)

Blackfoot a-veridical contexts subdivide into two types according to modality, with a distinction between irrealis versus imperative. Irrealis a-veridicals continue to show a matrix/embedded distinction. In matrix irrealis clauses, negation is realized by a

combination of prefixal NEG (*kátá'-*) with suffixal OP (-htopi), 0a. In embedded **irrealis** clauses negation is realized by prefixal **NEG** (sta'-) with null OP, Ob:

a. **n-[ikátá'-inaa-yi]-htopi** nit-yáak-saki-a-opii.
1-neg-chief-be-unreal I-fut-stilldur-stay
'Were I not chief, I'd still be home' (Frantz 1991: 84)

b. kit-iiksstat-o**k-[ááhk-sta'-ipottaa]-his**
2-want(vta)-1:2 2-might-neg-fly-conj
'I want you to not fly' (Frantz 1991: 85)

With a-veridical imperatives NEG is realized as prefixal (*miin-*) and OP is null:"

(7) **miin-wa:sai'ni-t**
neg-cry-2(imper)
'Don't cry!' (Frantz 1991: 84)

Blackfoot provides additional evidence for a bipartite OP-NEG structure. In addition, Blackfoot negation is systematically conditioned by the **matrix/embedded** distinction; we take this to be symptomatic of a system where NEG is in **the CP-domain.**

2.3 Plains Cree

Whereas Ojibwe and Blackfoot provide overt evidence for a bipartite OP-NEG structure, propositional negation in Plains Cree has either an overt OP, or an overt NEG, but not **both. As** in other Algonquian languages, Plains Cree **NEG** also shows sensitivity to non-veridical versus a-veridical contexts. This is summarized in (8):

(8) Plains Cree negation

	non-veridical		a-veridical	
	OP	NEG	OP	NEG
matrix	∅	**nam-**		
embedded	**êkâ-**		**ēkā-**	

In non-veridical matrix clauses, OP is null and NEG is realized by **pro-clitic** *nam*, **(9)a.** In non-veridical embedded clauses, negation is marked by *ēkā*, **(9)b.**

(9) a. **Namôya nikiskêyimâw.**
neg know.so(vta 1-3 indep)
'I do not know him.' (Wolfart 1996, 3a)

b. Kiskêyihtam êkâ ê-pakitiniht …
know-s.t.(vti 3 indep) neg release.so(vta indf-3 cj)
'He knew that he would not be freed …' (Wolfart 1996, 5a)

We have seen that the OP-NEG structure can be bimorphemic. For Plains Cree, based on evidence to be presented immediately below, we claim that *nam* is the realization of NEG, whereas *êkâ* is a negative OP. Initial support for distinguishing the two negative morphemes syntactically comes from the fact that *nam* is used in negative yes/no questions (10)a, while *êkâ* is used in negative wh-questions[4] (10)b.

(10) a Nama cî nika-kî-masinahikân?
neg Q able-write(indep 1)
Won't you let me have credit?' (S)

b. Tânêhk dwa êkâ kâ-wî-mîcisot, nêkâ, kitêm?
why this(3) neg going.to.eat(vai 3 cj) mother(voc) your(2)-dog(3)
'Why will not this creature eat, Mother, this dog of yours?' (W96, 4b)

The data in (10) can be interpreted as follows. On the one hand, the fact that *nam* co-occurs with the question particle *cî* indicates that *nam* is distinct from and higher than C (assuming that Q-particles are in C); we identify this position as Spec,CP. On the other hand, the fact that *êkâ* occurs with wh-questions, indicates that it occupies a position external to CP (assuming that wh-words are in SpecCP); we identify this as the OP position.

Turning to a-veridical environments, as in Blackfoot, Plains Cree distinguishes irrealis modality from imperative modality. In Plains Cree, all irrealis clauses, which include subjunctive and future irrealis, behave as embedded clauses (cf. Déchaine & Wolfart 1998). As such they are marked by the negative operator *êkâ*:

(11) a —êkâ wanikiskisiydni,…
neg forget.st/so(vai-t 1 cj subj)
'—if I do not forget it, …' (Wolfart 1996, 4c)

b. pikw ânima êkâ ka-pakiciyan, …
it.is.necessary that(0) neg fut-give.up(vai 2 cj)
'You must not give up on this, …' (Wolfart 1996, 6c)

Finally, as in Blackfoot, Plains Cree negative imperatives pattern with embedded clauses inasmuch as they are marked by the negative operator *êkâ*:

(12) Nisimis, êkâya mâto!
my.younger.brother(voc) neg cry(vai 2 imper)
'Little brother, do not weep!' (Wolfart 1996, 2ai)

In Plains Cree we have seen evidence that either part of the OP-NEG structure may be overt. We next turn to the Salish languages, where only NEG has overt content.

3 Negation in the CP-layer: Evidence from Salish

Evidence **from** Salish establishes that left-peripheral negation does not necessarily correspond to the operator component of the bipartite OP-NEG structure. Rather, **NEG** can be in a high position in the CP-layer, without instantiating OP. In particular, **NEG** can be a syntactic head immediately below or above CP. The **former** is instantiated in Halkomelem **(§3.1),** the latter in **Squamish** ($3.2).

3.1 Halkomelem

Wiltschko (2000) argues that NEG is a syntactic head located immediately below C in Halkomelem. Combined with the bipartite OP-NEG structure, this yields **(13).**

(13) OP [$_{CP}$ C [$_{NEGP}$ NEG]

Evidence for the status of NEG as a head in Halkomelem comes from the fact that it interacts with other heads in a predictable way. First, **NEG** undergoes head movement. This is shown by the fact that NEG may follow or precede a subject clitic as in (14):

(14) a tsel Cwe **lí-l** yóyes
1sg.s neg aux-**1sg.subj** working
'I am not working'

b. **éwe-tsel lí-l tl'íls-th-òmè**
neg-**1sg.s** aux-**1sg.subj** want-trans-2sg.o
'Idon't like you.' (Galloway 1993: **p.186)**

We take the two possible word orders in (14) to be indicative of head-movement, as illustrated in (15). In **(15)a** the negative marker *éwe* occurs in its base position; in **(15)b** it has undergone head-movement adjoining to the subject clitic in **C**.[5]

(15) a. OP [$_{CP}$ [C] [$_{NEGP}$ NEG$_i$ ...
b. OP [$_{CP}$ [NEG$_i$ – C] [$_{NEGP}$ t_i ...

A second piece of evidence for treating NEG as a head in Halkomelem comes from the fact that it acts **as** an intervening head for movement of other heads. In declaratives, both main verbs and auxiliaries can move to **C, as** shown by the fact that they may precede the subject clitic (analyzed as an inflected C):[6]

(16) a [tl'íls-th-òmè]-tsel
want-trans-2sg.o-1sg.s
'I like you.'

b. [lí]-chexw lá:yem
aux-2sg.s laughing
'Are you laughing?'

(16) establishes that V to C movement is possible, while (17)a/b shows that NEG blocks head movement to C. This is expected if NEG is a syntactic head below C. (17)c establishes that if NEG is present it may move to C and surface in initial position.

(17) a. *[lí]-tsel Cwe yóyes
aux-1sg.s neg working
'I'm not working.'

b. *[yóyes]-tsel Cwe
working-1sg.s neg
'I'm not working.'

c. [éwe]-tsel lf-I yóyes
neg-1sg.s aux-1sg.subj working
'I'm not working'

A third argument for treating NEG as a head below C in Halkomelem, is the fact that it acts as an intervening head for head-government. Recall that subject clitics are here treated as inflected Cs. As such, their pronominal features identify *pro* in SpecIP as shown in (18)a/b:

(18) a tsel *pro* tl'íls-th-òmè
1sg.s want-trans-2sg.o
'I like you.'

b. $[_{CP}\ [_{C}$ subject clitic$_i]\ [_{IP}\ pro_i$ ....

Crucially, in the presence of NEG, the normal agreement pattern is ill-formed, (19)a. Instead, an additional auxiliary appears bearing subjunctive agreement, (19)b.

(19) a *éwe tsel t_{Neg} pro tl'íls-th-òmè
neg 1sg.s want-trans-2sg.o

b. **éwe** tsel $[_{Neg}$ *pro* **lí-l** tl'ils-th-ómè
neg 1sg.s aux-1sg.subj want-trans-2sg.o
'I don't like you.'

Wiltschko 2000 analyzes the appearance of subjunctive agreement as the effect of head-government. NEG blocks identification of *pro* in SpecIP by C and subjunctive agreement is inserted in I as a last resort strategy:

(20) $[_{CP}$ [C subject clitic] $[_{NegP}$ $[_{Neg}$ *ewe*] $[_{IP}$ pro_i $[_{I}$ subjunctive agreement$_i$ ....

In sum, evidence from Halkomelem establishes that NEG can be a syntactic head located immediately below C. We now turn to a closely related language (Squamish) where NEG is a syntactic head located immediately above C.

3.2 Squamish

In Squamish, NEG always precedes the subject clitic (Gillon 2001):

(21) a. **haw chen ka=lh** xwekws ta shukwa
neg 1sg.s irr=rel use det sugar
'I don't use sugar.' (Gillon 2001 ex. (10))

b. ***chen haw ka=lh huya7**
1sg.s neg irr=rel leave
'I didn't leave.' (Gillon 2001 ex. (30))

As in Halkomelem, Squamish subject clitics have the status of inflected Cs (Gillon 2001). Consequently, the fact that NEG obligatorily precedes a subject clitic indicates that NEG is higher than C in Squamish; in particular, NEG introduces a CP complement. This leads us to expect that NEG can select for C. This prediction is borne out since Squamish NEG selects for an irrealis C (*k*):

(22) **haw k=an** ts'its'ap'
neg irr=1subj work
'I didn't work.'/'I don't work.' (Gillon 2001 ex. (6))

Because the irrealis C (*k*) has no pronominal features (as opposed to subject clitics, which are analyzed as inflected complementizers) subjunctive agreement is inserted in I^0 (as a last resort strategy) to identify *pro* in SpecIP

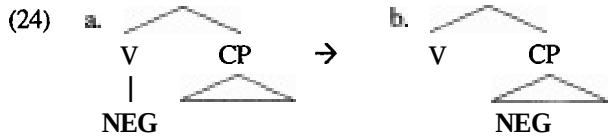
(23) $[_{NegP}$ $[_{Neg}$ *haw*] $[_{CP}$ [C irrealis] $[_{IP}$ pro_i $[_{I}$ subjunctive agreement$_i$ ....

The Salish data establish that left-peripheral negation need not be an OP, but rather can instantiate a syntactic head (the NEG-component of the OP-NEG structure). Independent of its position, in both Halkomelem and Squamish NEG interacts with the C-system. We now consider the cyclic effects that such C-based systems exhibit.

4 Cyclic Effects

In the literature on negation, it has been observed that negation shows,cyclic effects. This is often referred to as *Jespersen's* cycle: preverbal negation gets reinforced by postverbal polarity items, which are reanalyzed as negative markers (Horn 1989). Syntactically, the domain in which this reanalysis takes place is the IP. This contrasts with Algonquian and Salish, where NEG is associated with the CP domain. In both language families cyclic effects are attested in the CP-domain: a verbal negative predicate may be reanalyzed as a C-based negation, as illustrated in (24).

(24)



4.1 The cycle in Salish

Recall that, in Salish, NEG can precede C in one of two ways: either NEG is a head located immediately below C (Halkomelem) or NEG is a head located immediately above C (Squamish). Across the Salish language family, a third pattern is attested (Davis 2001), whereby NEG is itself the main predicate, taking a propositional (CP) complement, (25)a. This is illustrated in (25)b for Lillooet (Northern Interior Salish):

(25) a. [OP [NEG_{pred} [$_{CP}$ C …

b. x̣ʷʔaz k̓ʷ=s=ʔack̓-an-cí-has

neg det/C=nom=see-trans-2sg.o-3trans.s

'He didn't' see you' (Davis 2001 p. 57 (4))

The evidence for treating Lillooet NEG as a predicate taking a complement clause is as follows (see Davis 2001 for detailed discussion). First, NEG obligatorily appears in sentence-initial position, which is the canonical predicate position. Second, the CP following NEG has possessive morphology, a mark of subordination. Third, the determiner/complementizer which introduces the clause is the same element that elsewhere introduces subordinate clauses.

The Lillooet data, together with Halkomelem and Squamish, indicates that there are (at least) three patterns of propositional negation in Salish, as illustrated in (26):

(26) THE **CYCLE** IN **SALISH**:

a. **Halkomelem:** [OP [$_{CP}$ C [$_{NEGP}$ **NEG** …
b. Squamish: [OP [$_{NEGP}$ **NEG** [$_{CP}$ C
c. **Lillooet:** [OP [$_{VP}$ [V_{NEG}] [$_{CP}$ C

Just as in the IP domain, where negation may precede or follow the inflected verb, in the **CP-domain,** negation may be pre- or post-CP. The relative position of negation with respect to C has predictable consequences for its integration into clausal structure. Following **C, NEG** is an independent head, **(26)a.** Preceding C, NEG may be an independent head **(26)b,** or it may be an independent predicate **(26)c.**[7]

4 2 The cycle in Algonquian

Plains Cree has three patterns of negation. In addition to the OP **NEG** (*êkâ-*) and the **SpecCP** NEG (*nam-*), Plains Cree also has a predicative NEG (*namat-*). This is summarized in (27):

(27) Plains Cree negation

	propositional				predicative (43.1)	
	Non-veridical		a-veridical			
	OP	NEG	OP	NEG	OP	NEG
matrix	Ø	nam-	–	–	Ø	namat
embedded	êkâ-		êkâ-			

The predicate-based **NEG** of Plains Cree is illustrated in (28):

(28) a. …; **kahkiyaw êkoni** mina **ê-ati-namatakohki, …**
all dem also C-prog-not.exist(vii cj)
'all of these things are also in the process of disappearing,' **(AL294)**

b. **…, pôti pêyak kâ-namatakot [nâpêw],**
behold one not.exist(vai 3 cj)
'…, behold, one of [the men] was missing, **…'** (SW-ms)

Reasons for treating *namat-* as a predicative element include the following **(Déchaine & Wolfart 2000):** it occupies a predicate position in the verbal complex; it may be inflected with pronominal agreement; it may be preceded by an **aspectual** marker (progressive ati- in **(28)a);** it may occur with overt **complementizers** (*kâ-* in **(28)b**).

Taking into account predicate based NEG, we observe that in Algonquian there are (at least) three patterns of propositional negation as summarized in (29):

(29) THE **CYCLE** IN **ALGONQUIAN**

a [OP NEG [$_{CP}$ C^0 …

b. [OP [CP **NEG** [C^0
c. [OP ... [VP **NEG** [VP... I

The operator NEG, **(29)a,** is attested in Plains Cree (*êkâ-*); the CP NEG, **(29)b,** is also attested in Plains Cree (*nam-*); and **NEG** in the **VP** domain **(29)c** is attested in Blackfoot (*máát-, saw-, kátá'-, sta'-*) and Ojibwe (*-ssi, -e*).

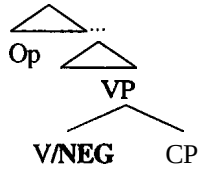
As in Salish, Algonquian NEG participates in a cycle. On the basis of both diachronic and synchronic evidence, there **are** reasons to think that the base position for NEG in Algonquian is pre-verbal (as in **(29)c)** and that NEG may **raise** to higher positions outside of IP (as in **(29)a/b).**

While in Salish **NEG** is hosted by X^0 positions, in Algonquian **NEG seems** to **be** associated with **specifier/adjunct** positions: the operator position in **(29)a,** the **SpecCP** position in **(29)b,** and the **VP** adjoined position in **(29)c.** We now address the question of what accounts for this difference between Salish and Algonquian.

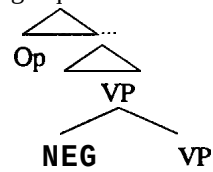
4 3 V-based negation in Salish and Algonquian

When negation is realized in the **VP-domain** we observe that, in Salish, NEG is parasitic on V **(i.e.** it is a verbal predicate) and so functions as a subordinator, **(30)a.** In contrast to this, in Algonquian NEG adjoins to **VP** and so functions as a **VP-modifier, (30)b.**

(30) a. Salish



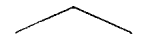
b. Algonquian



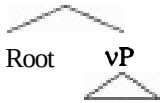
The different status of **NEG** in Salish and Algonquian arguably reduces to an independent difference in the syntax of roots in these two language families. In Salish. all roots are **unaccusative** (Davis 1998) and so introduce an internal argument, **(31)a.** Consequently, if **NEG** is a root it too introduces an internal argument, namely a **CP-**complement, **(31)b.** This automatically accounts for the status of Salish **NEG** as a subordinator:

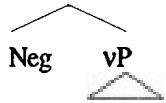
(31) a.

b.



As for Algonquian, **Déchaine 2001** independently argues that Algonquian roots are **vP** modifiers. **(32)a. Consequently,** when **NEG** is a root, it is a **vP-modifier, (32)b.**

(32) a. 

b. 

In this way, the differences between Salish and Algonquian NEG reflect independently motivated language-specific properties concerning the syntax of roots.

5 Conclusion

Starting with the assumption that propositional negation is bipartite, we have presented evidence from Algonquian and Salish which supports the following claims. First, the OP-NEG structure may be overtly realized by two different morphemes (Ojibwe and Blackfoot). Second, NEG can be realized in the CP-layer independent of whether OP is overt or covert (Plains Cree, Halkomelem, Squamish). Third, NEG in the CP-layer can be associated with cyclic effects: a verbal negative predicate may give rise to C-based negation.. Finally, the cyclic effects attested in Algonquian and Salish reflect independent differences in root structure.

More generally, it seems that while the OP position is invariant, NEG may be realized in any portion of the clause. In particular, NEG can be an autonomous syntactic head (Salish) or NEG can be a feature hosted by other categories (Algonquian).

The distinction drawn here between C-based and I-based NEG has consequences for the syntax and semantics of negation. With respect to C-based NEG, we observe the following: i) there is a connection between negation and irrealis marking; ii) the answer to yes/no questions is the same as the simplex NEG; iii) there are predicates based on the simplex negative; iv) negation can scope over argument expressions; v) there are no negative quantifiers; vi) there is no constituent negation. This cluster of properties is not attested with I-based NEG. This is summarized in (33).

(33) Differences between I- based Negation vs. C-based Negation:

	C-based NEG Salish, Algonquian	I-based NEG Romance, Germanic
i) Connection of Negation with Irrealis	✓	×
ii) Answer to yes/no Q same as simplex negative	✓	×
iii) Has predicates based on simplex negative	✓	×
iv) Can directly scope over argument expression	✓	×
v) Has negative quantifiers	×	✓
vi) Has constituent negation	×	✓

We take properties (i-ii) to be symptomatic of C-based NEG, as both irrealis marking and Q-marking are associated with the CP-layer. Property (iii) reflects the affinity

between the C-position and the V-position (recall the discussion of predicate based negation). Properties (iv -vi) indicate that in a C-based system, NEG cannot directly be associated with the DP domain. (See Déchaine & Wiltschko in prep. for more detailed discussion.)

Notes

[1] Thanks to the UBC working group on negation and to the WECOL audience for discussion and comments. We would also like to express our appreciation to the Halkomelem elders Rosaleen George and Elizabeth Herrling for sharing their knowledge of the Halkomelem language. The research on this paper was supported by a UBC-HSS grant (awarded to RMD & MW) and the Academy of science Austria (APART 435 awarded to MW).
Abbreviations used: 1 = 1st person; 2 = 2nd person; 3 = 3rd person; aux = auxiliary; cj = conjunct mode; det = determiner, dur = durative; fut = future. hort = hortative; imper = imperative; indep = independent mode; indf = indefinite; irr = irrealis, local = 1/2 person; neg = negative morpheme (OP or NEG component); nom = nominalizer; nonaffirm = nonaffirmative; o = object; prog = progressive; prohib = prohibitive; Q = yes/no question marker; rel = relative; s = subject; sg = singular; subj = subjunctive; trans = transitive; vai = intransitive animate verb; vii = intransitive inanimate verb; voc = vocative; vta = transitive animate verb; vti =transitive inanimate verb.

[2] We assume Déchaine's 1999 analysis of Algonquian morpheme linearization in which prefixes such as *maat-* are positioned relatively close to the VP (cf. Glougie 2000) and suffixes such as *–hpa* attach as enclitics outside of the IP-domain. This is consistent with the claim in this paper that prefixal NEG *maat-* is lower than suffixal OP *–hpa*.

Given that elsewhere in Blackfoot OP is null in embedded clauses, we assume that the null OP of Blackfoot imperatives indicates that these are embedded clauses. This is consistent with proposal, which have argued that imperatives should in general be treated as a kind of embedded clause.

[4] More generally *êkâ* occurs with operator-sensitive constructions including whquestions, relative clauses and clefts (cf. Blain 1997).

[5] This is based on the assumption that Halkomelem subject clitics are inflected complementizers (cf. Wiltschko 2000).

[6] In Halkomelem, movement of the main verb to C is optional whereas movement of the auxiliary to C is obligatory (Wiltschko 2000).

[7] At present, it is not clear which of the three patterns is historically prior. On one scenario, it is conceivable that the lower NEG is the historical source for reanalysis. Recall that in this pattern ((26)a, attested in Halkomelem) NEG raises to C resulting in a surface ordering of NEG–C. This linear ordering can be reanalyzed as a base order, yielding (26)b, which in turn may be reanalyzed as (26)c.

Conversely, predicate based negation may be the historical source of reanalysis.' On this view, the chain of change would be in the opposite direction, with predicate NEG being reanalyzed as a purely functional head above and subsequently below CP. On syntactic grounds, such a 'lowering'' analysis. is conceptually problematic, because generally the direction of movement is upward..

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The Changed Power Structure Between Husband and Wife*

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1 Introduction

This study investigates the dynamics of the power relationship between husband and wife in China by examining spousal terms of reference in Chinese. On the basis of the critical-comparative analysis of the reference terms used predominantly in the earlier historical periods and those used mostly in the contemporary Chinese society, the paper argues that wives, especially those who live in the urban area, have gained much power over the Chinese history to the extent that they are now on an equal footing with their husbands in the social life.

As is noted by Fairclough (1989), critical sociolinguists attempt to explicate normalized conventional usages in linguistic encounters by examining the power relations and ideological processes that help to determine the particular convention. They hold that language is often used as more than an innocent instrument of information communication. Instead, it is a major tool in the process of social construction and 'an instrument for consolidating and manipulating concepts and relationships in the area of power and control' (Fowler 1985:61), where power is defined as a type of control over the minds of people, thus influencing their knowledge, attitudes or ideologies to favor the powerful.

Fairclough (1989) also observes that language is often used to favor certain wordings of events or realities, while excluding others. He argues that such practice is a form of hidden power, for the favored wordings are those of the power holders in our society. Consequently, as Bourdieu (1991) comments, the very linguistic exchanges in everyday life bear the traces of social structure. In this sense, the use of language bespeaks the location of power. And changes in certain linguistic behavior suggest the altered power distribution.'

This article first provides the theoretical framework within which this study was conducted. It then describes the data examined, including the source of data and the motivation to select spousal reference terms as the target of

investigation. The bulk of the paper is a critical-comparative analysis of the spousal terms of reference used in different historical stages. After this the paper provides a brief overview of the social historical profile in China which helps to explain the elevation of wives', or more broadly speaking, women's status in the society. The paper concludes with a discussion of the need to develop a critical sense in the use of language, which will contribute to the fight against social injustice and the struggle for social equality.

2 The Theoretical Framework

This study was conducted within the framework of critical discourse analysis (e.g., Fairclough 1985 & 1995; Kedar 1987; van Dijk 1985). Discourse plays an essential role in the manufacturing of consent from, and in the control of, others (Herman and Chomsky 1988). To explain the relationships between discourse and power, there arises within critical sociolinguistics a sub-discipline called critical discourse analysis (Henceforth CDA). The goal of CDA is to account for how power is enacted, reproduced, and legitimized through the text in the discourse (van Dijk 1996). CDA, according to Fairclough (1992). is an approach to the analysis of discourse that is theoretically adequate and also practically usable. For one thing, such an approach synthesizes both the insights from linguistics and those from the social theory on language and discourse.

According to Fairclough (1989:46), there are two major types of relationship between discourse and power: 1) power in discourse, viz., 'controlling and constraining the contributions of non-powerful participants', for example, in a discourse it is usually the powerful that interrupt and then start a new topic, and 2) power behind discourse, which refers to the notion that 'the whole social order of discourse is put together and held together as a hidden effect of power', for instance, the characteristic doctor-patient verbal interaction is usually the effect of, among other things, the unequal power distribution between doctors and patients.

This study investigates the power behind discourse. In other words, it examines how in a certain historical period the use of spousal terms of reference in a discourse mirrors the power relationship between husbands and wives. In so doing this study compares different spousal terms of reference used in different eras and argues that the changed power structure between husband and wife.

3 The Data

Most of the data examined in this study were collected from the dialogues in three Chinese movies randomly chosen, ***Hongmeigui He Baimeigui*** ('Red Rose

and White Rose'), ***Nanfunuzhuren*** ('A Village Male Director of Women's Affairs'), and ***Shui Shuo Wo Buzaihu*** ('Who Said *I* Don't Care'). Even though these data were not collected directly from the real life, they still reflect the real situations of language use in China, although in an indirect manner, given that discourse in these movies still reflects the norm governing the everyday use of linguistic forms, in this case spousal terms of reference.[2] To supplement the data from these three movies, some other spousal terms of reference were also introduced and then briefly discussed.

The backdrop of ***Hongmeigui He Baimeigui*** is Shanghai in the early 1940's. Its stories revolved around the life of a young intellectual, a social elite who had been educated overseas, in relation to his wife, mistresses, and family. Both ***Nanfunuzhuren*** and ***Shui Shuo Wo Buzaihu*** portrayed what happened in the late 1990's, with the setting being respectively a Northeastern village and Beijing. ***Nanfunuzhuren*** described the life of a middle-aged villager in relation to his wife and other people in the village and the commune, especially two local cadres. And ***Shui Shuo Wo Buzaihu*** depicted the life of a middle-aged doctor and director of his department, who was considered an intellectual in the Chinese context, in relation to his wife, daughter, and colleagues, one of whom once fell in love with him.

Although the geographical location of the stories in ***Hongmeigui He Baimeigui*** on the one hand and in ***Nanfunuzhuren*** and ***Shui Shuo Wo Buzaihu*** on the other are not the same, it is assumed that such a difference is not a key contributor to the use of different spousal terms of reference in these two historical periods, viz., the early 1940's and late 1990's, if a relevant factor at all. To answer the question if the observed spousal terms of reference in ***Hongmeigui He Baimeigui*** are also used in Shanghai today and those in ***Nanfunüzhuren*** and ***Shui Shuo Wo Buzaihu*** were also used in the Northeastern village and Beijing in the 1940's, in other words, if there are no changes concerning the use of spousal terms of reference over approximately 50 years' time, a survey was conducted. The result from the survey pointed to a predominantly negative answer.

Furthermore, in the Chinese context, especially today, the use of spousal terms of reference generally does not much vary with most social variables, such as the formality of context, although it does vary with few other variables, for instance, the education level of the user of the reference term. In general, it can be safely assumed that the spousal terms of reference observed in ***Hongmeigui He Baimeigui*** are representative of those used among intellectuals in the early 1940's and the terms found in ***Nanfunüzhuren*** and ***Shui Shuo Wo Buzaihu*** were used most commonly among, respectively, villagers and city residents in the late 1990's.

In this study terms of reference were chosen as the target of investigation because they are sensitive to the social structure in China, and hence reflective of the power hierarchy in the Chinese society. where most types of social relationships are required to be articulated in overt linguistic forms. The power

distribution between husband and wife is a component of the various power hierarchies in the Chinese society, so the terms of reference for husband and wife are also capable of reflecting the spousal power relationship. In this study the user of spousal terms of reference may be either the husband/wife or somebody else. And the husband/wife referred to may or may not be a participant in the discourse where the term was used.

4 The Data Analysis

This paper first examines spousal terms of reference used in ***Hongmeigui He Baimeigui*** and some others used before 1949, the year when the People's Republic of China was founded. It then analyzes the terms used in ***Nanfuniizhuren*** and ***Shui Shuo Wo Buzaihu,*** and some other terms, particularly those used in the contemporary Chinese society. Spousal terms of reference observed in ***Hongmeigui He Baimeigui*** and others used before the establishment of the People's Republic show that wives had lower status than husbands, whereas spousal reference terms used in ***Nanfunüzhuren*** and ***Shui Shuo Wo Buzaihu*** and also those employed in the current Chinese society indicate that wives are on the same power hierarchy as their husbands. This contrast points to the argument that wives have gained much power over half a century's time.

In this article Chinese sentences exemplifying the use of spousal terms of reference by movie characters are provided in italicized ***pinyin,*** the Chinese phonetic alphabet. For the convenience in reading, terms of reference under discussion are given in italic boldface.

4.1 Reference terms used in earlier times

In ***Hongmeigui He Baimeigui,*** one of the main characters in the movie, the wife of Wang Shihong, was referred to approximately twelve times. Whenever talked about as the third person, she was invariably referred to as the wife of somebody. No other terms of reference, which may signify independence from or equality with her husband, was ever used. Examples of actual reference terms used are given in (1-3).

In (1) the speaker used the reference term ***wo taitai,*** which consists of the possessive pronoun wo ('my') followed by ***taitai*** ('wife'), to refer to his wife. In (2) the first speaker used the reference term ***Wang*** [illegible], which consists of the second speaker's last name, ***Wang,*** and ***taitai*** ('wife'). And in (3) the second speaker used ***Wang Shihong taitai,*** which is made up of the full name of the man followed again by ***taitai*** ('wife'). In all these usages the identity of the wife is established by referring to the husband, instead of by, for example, using her own name, which bespeaks the subsidiary status of the wife in comparison with the husband.

(1) a. Zhenbao, lai, jianjian wo *taitai qu.*
Name come see my wife go
'Come on, Zhenbao. Let me introduce my wife to you.'
(From Hongmeigui He Baimeigui)

(2) a. *Zenme* Wang taitai *fanliang* zheme xiao a?
Question Mrs. Wang food portion so small Particle
'Why does Mrs. Wang eat so little?'

b. Ta ya, *pa* pang!
she Particle afraid of fat
'She's afraid of gaining weight!'
(From Hongmeigui He Baimeigui)

(3) a. *Zhewei* shi...?
this person is
'May I ask who this is?'

b. Zhewei shi Wang Shihong *taitai.* Congqian ye
this person is Name wife before too
'This is Wang Shihong's wife. She used to live in

shi *zai* Aidingbao de.
is Preposition Edinburgh Particle
Edinburgh too.'
(From Hongmeigui He Baimeigui)

Example (2) also shows that upon marriage, women automatically gave up their last name. Although upon marriage the replacement of the wife's original last name by the husband's is a common practice in the Western society, and hence tends to be taken for granted, in the Chinese society things are diametrically different. Consequently, the term of reference in (2) appears to be very glaring to the Chinese audience, which is readily associated with the low status of the wife. It should also be noted that the presentation of the examples in (1-3) does not intend to imply that these terms are not used in the contemporary Chinese society anymore. The fact of the matter is that they are still used in limited geographical areas, but the total areas where such terms are used are now greatly reduced.

In contrast to those terms referring to the wife, when the husband was referred to, the reference term usually consists of his last name followed by the honorific xianshen ('Mr.'), or as is shown in (4), the full name, in this case Ai Xu, followed by the honorific xianshen ('Mr.'). The contrast indicates the husband's higher status in a family.

(4) a. ***Ai Xu xiansheng kehai shi mangdehen?***
Name Mr. still is very busy
'Is Mr. Ai Xu still very busy?'

b. ***Shiya, buran jinnian xiatian yao huijia yitangle...***
yes if not this year summer will go home one time
'Yes. Otherwise we'll go back home this summer.'
(From ***Hongmeigui He Baimeigui***)

In the earlier historical periods, some other linguistic forms were also used to refer to a married woman, for example, ***jiannei*** ('ignoble inside'), ***neiren*** ('inside person'), and the sequence of ***husband's last name + wife's last name + shi*** ('last name'). As is clear from the semantics of these terms of reference, the wife was demoted to a subordinate position in the earlier Chinese society.

The denotation of the expression ***jiannei*** suggests that the wife was once considered an ignoble person whose only sphere of activity was home. It is true that ***jiannei*** was exclusively used by the husband and was also used to show his modesty. However, these scenarios do not comprise the claim that this usage suggests the low status of the wife in the husband/wife power structure, given that this degrading term was not used, and there was no analogous demoting term, to refer to the husband. The denotation of ***neiren*** shows that the wife was not treated as a dishonorable person, but her activity was still confined to her home. The reference term formed by the sequence of ***husband's last name + wife's last name + shi,*** for example, ***Zhanglishi,*** which is constituted by the husband's last name, ***Zhang***, followed by the wife's last name, *Li*, followed by the word ***shi,*** shows that upon marriage the original last name of the wife was maintained, but was relegated to the secondary position. This still signifies the inferior position of the wife.

Fowler (1985) observes that in addition to the transmission of information, language is also used to reproduce and normalize various kinds of power structures in the society. In this sense, the use of any of the above spousal terms of reference, which discriminated against the wife, not only manifests the effect of the unequal power distribution between husband and wife but also constitutes a loaded weapon that reproduces and legitimizes the powerful position of the husband on the one hand, and the powerless position of the wife on the other.

4.2 Reference terms in current societies

In both ***Nanfunuzhuren*** and ***Shui Shuo Wo Buzaihu*** a variety of linguistic forms were used to refer to either the husband or the wife. In ***Nanfunüzhuren,*** among a total of approximately seven terms referring. to the wife and another twelve referring to the husband, no reference term discriminatory against the wife was observed. Similarly, in ***Shui Shuo Wo Buzaihu,*** among a total of eight terms

referring to the wife and another fourteen referring to the husband, no discriminatory term was found. Instead, these spousal reference terms suggest that the wife and the husband were on a completely equal footing. In other words, the wife possessed the same power as her husband.

The use of spousal terms of reference in Nanfuniizhuren are exemplified in (5-8). In (5), the term ***Nimenjia*** Fenglian was used by a village cadre to refer to the wife of the second speaker. Here the expression Nimenjia does not indicate the subordinate position of the wife, since similar expressions were also used in (6-7) when the husband was referred to. What is significant is the use of the first name, ***Fenglian***, to refer to the wife. In other words, the wife was referred to independently from her husband. Hence she had her own social identity.

(5) a. ***Nimenjia*** ***Fenglian*** yuanyi ***gan*** nie?
your home Name willing do Particle
'Does your wife Fenglian want to do that?'

b. Ta bu yuanyi ***gan*** wo ***gan***.
she not willing do I do
'If she's not willing to do it, I'll do it.'

(From ***Nanfunüzhuren***)

In (6) ***anjia*** *Liu* Yiben, and in (7) ***anmenjia*** nakouzi, was used by the wife to refer to her husband. Here again the use of the modifier ***anjia*** ('my home') and anmenjia ('our home') is not significant. What is important is the term of reference used after these modifiers. In (6) it is ***Liu*** Yiben, the full name of the husband. And in (7) it is ***nakouzi*** ('the significant other'). Similarly, in (8) Yiben. the first name of the husband, was used when somebody other than the wife referred to the husband. No elevating honorific was attached to these terms of reference. Instead, just as the term used in (5), these usages suggest an equal spousal relationship.

(6) a. Kanjian ***anjia*** ***Liu*** Yiben ***ma?***
see my home Name Question
'Did you see my husband Liu Yiben?'

b. Mei Kanjian ne.
no see Particle
'I didn't see him.'

(From ***Nanfunüzhuren***)

(7) a. Da ***saozi,*** kanjian ***anmenjia*** ***nakouzi*** ***ma?***
big sister-in-law see our home that person Question
'Big sister-in-law,did you see my husband?'

b. Mei kanjian.
no see
'I didn't see him.'

(From ***Nanfunuzhuren)***

(8) a. ***zadi, zhao yiben ne?***
what look for Name Particle
'Are you looking for Yiben?'

b. Eng-a.
Particle
'Yes.'

(From ***Nanfunuzhuren)***

The use of spousal terms of reference in ***Shui Shuo Wo Buzaihu*** is exemplified in ***(9-14).*** In ***(9)*** and **(10),** the expression ***wo ma*** and ***wo ba*** was respectively used by the daughter to refer to her mother and her father. In **(11)** ***shushu*** and ***ayi*** was used respectively by the daughter to refer to the husband and the wife in another family. Once more, all these usages signify the equal status between husband and wife, at least in the eyes of a child.

(9) a. ***Ni pa bu pa shiqu wo ba?***
you fear not fear lose my father
'Are you afraid of losing my father?'

b. ***Ni faxian shenme jixiang le ma?***
you find what sign Perfective Question
'Have you detected any sign?'

(From ***Shui Shuo Wo Buzaihu)***

(10) a. ***Wo*** ma ***dao le gengnianqi, ni zhi bu zhidao?***
my mother reach Perfective climacterium you know not know
'Don't you know that my mother has reached the climacteric stage?'

b. ***Ni*** ma ***suishu hai mei dao ne!***
your mother age still not reach Particle
'Your mother has Not reached her climacteric stage!'

(From ***Shui Shuo Wo Buzaihu)***

(11) a. ***Shushu ayi zaijian.***
uncle aunt good-bye
'See you later, Uncle and Aunt.'

b. *Zaijian.*
good-bye
'See you (wife and husband saying together).'
(From *Shui Shuo Wo Buzaihu*)

The terms of reference in (12-13) show that the husband may be referred to by respectively ***womenjia Lao Wang*** ('our home Old Wang'), and ***Gu daifu*** ('Dr. Gu'). The term in (14) shows that the wife may be referred to as ***airen*** ('the person one loves'). In the expression ***womenjia Lao Wang***, ***womenjia*** has been discussed above, which has no significance in this study. And ***Lao Wang*** is formed by the honorific ***Lao*** plus the last name of the husband. The term ***Gu daifu*** consists of the husband's last name followed by his profession. Again, these three terms show no superiority of the husband in the husband/wife power hierarchy. Instead, they manifest the equal power structure between husband and wife. For one thing, these *same* terms may be used to refer to both the husband and the wife.

(12) a. *Ni bu zhidao* ***womenjia Lao Wang*** *ta zhen shi hao la.*
you not know our home Lao Wang he really is well Particle
'You don't know that my husband Lao Wang has really recovered.'

b. *Na hao.*
that good
'That's good.'
(From *Shui Shuo Wo Buzaihu*)

(13) a. *Huitou rang nijia* ***Gu daifu*** *gei kankan.*
turn back head let your home Dr. Gu give see
'When you're home, ask your husband Dr. Gu to have a check-up.'

b. *Hai, zhiwang ta!*
Exclamation depend on him
'I can't depend on him.'
(From *Shui Shuo Wo Buzaihu*)

(14) a. *Lao Wang he ta* ***airen*** *hai dating nin zhu zai na?*
Lao Wang and his wife also ask you live Preposition where
'In addition, Lao Wang and his wife asked where you live.'

b. *Gan shenme?*
do what
'Why?'
(From *Shui Shuo Wo Buzaihu*)

Yet again, such spousal reference terms as in (5-14) were used more than as a mere reflection of the consequence of the changed power structure between husbands and wives. On the contrary, they were also employed as a means, particularly on the part of wives, by which the new equal spousal power relationship was enacted, reproduced, and normalized.

It is true that in the current Chinese society, especially in the rural area, a limited number of terms of reference are still discriminatory against the wife, for example, the term *jiali* ('home inside'), which is sometimes used to refer to the wife but not the husband. As is shown by the gloss, this usage suggests that the sphere of wives in the countryside is still confined to their homes, which points to their relative low status. Such terms of reference also indicate that wives in China, especially those in the countryside, still need to struggle before they are able to enjoy the same power as their husbands.

5 Social Historical Profiles in China

If wives have gained power over the recent Chinese history, it must be the case that the socio-cultural, economic, and political situations in China have undergone such transformations that they favor the acquisition and maintenance of more power by wives. A brief review of the Chinese history confirms this point.

China used to be a country where husband and wife were on completely different power hierarchies. In practically all the historical periods up to the May 4th Movement in 1919, the husband was, as a rule, the master of the household, who had absolute power in almost every aspect of the family life. In contrast, the wife was degraded to a very low status, sometimes even as low as that of a slave. This kind of power asymmetry was a consequence of various social, ideological, and also economic realities.

Socially and ideologically, women were considered to be inferior in the traditional Chinese culture. This ideology was deeply rooted in the life philosophy of the ancient Chinese people, philosophers and ordinary people as well, which is captured by the axiom *nanzunnübei*, which literally means 'males are respectable while females are ignoble'. Economically, the husband was the sole breadwinner in the household. And the wife was not encouraged, or even permitted, to work outside. Instead, her main responsibility was to take care of the housework and the needs of her husband and children. Women were also not encouraged to receive education, which is reflected in another axiom *nüziwucaibianshide*, which literally means 'women are not corrupted who are not talented or versatile'.

The status of the wife, or more broadly speaking, of women, has been elevated over the recent historical periods, especially after the May 4th Movement, which is also known as 'The New Culture Movement'. This movement was strongly

influenced by Western democracy and ideologies, which, for the first time in the Chinese history, called for total equality between males and females. This movement also encouraged women to receive education, which, in turn, helped women to find jobs and gain economic independence from their husbands. All these changes eventually led women to be on a higher social ladder and gain more power.

The establishment of the People's Republic of China in 1949 further raised women's social economic status in China. If the May 4th Movement advocated parity between males and females and initiated the ideology among people that men and women should be equal, the establishment of the People's Republic of China, in the form of laws and regulations, helped to make it more likely that women have the same power as men. The equality between males and females was written into the Constitution. And women also received the equal opportunity to be educated, since laws and regulations were enacted to prevent parents from not sending their daughters to schools.

Thus, it is only natural that the elevated social economic status of women has brought about the change in the power distribution between males and females, or in this case between husband and wife, which, in turn, has demonstrated its impact on the use of spousal terms of reference in the discourse.

6 Conclusion and Further Discussion

Given that discourse is a locale where the impact of power is manifested, the use of dissimilar reference terms for husbands and wives in different historical periods bespeaks the changed power structure between husbands and wives in the Chinese society. The use of particular terms of reference, in turn, helps to normalize and reproduce the power *status quo* that favors the powerful. So, the relationship between language and power is dialectic. Of course, as is discussed above, the power status of husbands or wives cannot be entirely, or even primarily, attributed to the use of language, in this case the use of spousal terms of reference. It is also, and maybe more essentially, the consequence of the interaction among various socio-cultural, political, and economic forces.

Power as examined in this study is a property of relations between social groups, in this case, husbands and wives. Hence a social power, not an individual power. In addition, the power relationship between husband and wife is not static or absolute. Instead, it is always dynamic and gradual, which is readily subject to change when the right environment arises. As is observed by Fairclough (1989:1), 'consciousness is the first step towards emancipation'. Consequently, if people are to become more conscious of the exercise of power both in and behind discourse and also aware of the role that language plays in the manipulation and control of people's minds and actions, they will be more

likely to become active and effective agents in the fight against social injustice and struggle for social equality.

Notes

[1] This paper originated from the seminar in Critical Sociolinguistics instructed by Professor Braj Kachru at the Department of Linguistics, University of Illinois at Urbana-Champaign in spring 2001. I would like to express my gratitude to Professor Kachru for his comments and suggestions on an earlier version of this paper. Thanks also go to those who kindly offered their comments and suggestions at the WECOL conference held at the University of Washington at Seattle, especially to Professor Alicia B. Wassink.

[2] It should be cautioned that the relationship between language and power might not be as straightfonvard as it is expected. For one thing, as is discussed in Scott (1985). wherever there is exercise of power, there is usually resistance that helps the existent power structure to evolve, which ultimately favors the less powerful in the struggle for power. Such dynamic power relationships. together with contextual variations in linguistic encounters, make it difficult to invariably attribute the use of one linguistic form to exactly one power relationship. The interaction between language and power discussed in this study is assumed to be an ideal situation.

[3] It is true that in certain cultures the linguistic behavior of movie characters differs drastically from that of people in their daily life. For instance, it may be the case that in certain countries movie characters talk formally in all the contexts, formal and informal as well. In the Chinese culture, however. it is claimed that language behavior of movie characters closely resembles that of people in the daily life, which is deemed an important feature of any well-received movie.

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Cross-linguistic Variation in the Development of INFL: A New Argument for Universal Grammar

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1 Introduction

Recent work in psycholinguistics maintains that UG-based approaches to language development based on the Continuity Hypothesis have never had "strong empirical support" and are insufficient to explain empirical findings on early language development (e.g., Brain 1994. Tomasello 2000). This work reviews empirical findings on the acquisition of properties associated with INFL in early child French, German, and Italian and shows that there are both language-internal and cross-linguistic differences in the acquisition of subject-verb agreement, the use of overt subjects, and the use of root infinitives.

In this work, I show that while these cross-linguistic differences cannot be adequately explained based on cognitive learning principles, these developmental findings may receive a principled and unified account by adopting a particular version of the Continuity Hypothesis known as the Minimal Competence Hypothesis following Griffin (2000a,b, 2001), a minimalist version of the Full Competence Hypothesis, based on the Feature Acquisition Principle and minimalist analyses of the verb movement properties of finite and non-finite verbs in the target languages being acquired (positive evidence in the linguistic environment) following Belletti (1990). Speas (1994). and Zwart (1995). I conclude that the developmental data provide strong empirical support for the central tenets of the Universal Grammar Hypothesis, that language development is guided by innate principles and parameters and positive evidence in the linguistic environment. Namely, a minimalist model of grammar which adopts the Minimal Competence Hypothesis and the Feature Acquisition Principle.

2 Developmental Findings

In the last 20 years, a growing body of research on language development has identified numerous differences in the development of properties associated with Inflection (INFL). In the following subsections, I briefly review the general findings of these studies on the acquisition of subject-verb agreement, the use of overt vs. null subjects, and the use of root infinitives and summarize the developmental observations which must be accounted for under any explanatorily adequate theory of language acquisition and linguistic theory more generally.

2.1 Acquisition of subject-verb agreement

Developmental studies show that there are significant developmental differences in the acquisition of subject-verb agreement in early child French, German, and Italian. In the case of early child German, Clahsen and Penke (1992). and Ingram and Thompson (1996) show that children learning German begin acquiring subject-verb agreement at around age 2;0 and that the rule-governed use of subject-verb agreement is largely acquired by around age 3;0 (also see Boser 1997). In the case of early child French, Pierce (1992) and Weissenborn (1992) show that children learning French begin acquiring subject-verb agreement before age 2;0 and that subject-verb agreement is largely acquired by around age 2;6. In the case of early child Italian, Guasti (1994) show that subject-verb agreement is used correctly at a very early age and that the adult subject-verb agreement system is largely acquired by around age 2;0 (Grinstead (1993) reports similar findings for early child Spanish and Catalan).

These findings show that there is a three-way distinction in the acquisition of subject-verb agreement in these language: subject verb-agreement is acquired very early in children learning languages like Italian, somewhat later in children learning French, and even later in children learning German. Any adequate theory of language acquisition must provide some account for these empirical differences in the acquisition of subject-verb agreement.

2.2 Acquisition of subjects

Developmental studies likewise show significant differences in the use of overt vs. null subjects. It is well-known that children learning overt subject languages like early child German and French initially omit required (overt) subjects with relatively high frequency. Weissenborn (1992) however shows that the notion of required (overt) subject is acquired earlier in children learning French than in children learning German; children learning French acquire the notion of required (overt) subject by around age 2;6 while children learning German acquire the notion of required (overt) subject by around age 3;0 (also see

Clahsen and Penke 1992). In contrast, Guasti (1994) (among many others) show that children learning null subject languages like Italian tend to omit required (lexical) subjects with high frequency even up to age 3;0 and later.

In addition to providing an account for these differences in the use of subjects, research findings also show that there is a correlation between the acquisition of subject-verb agreement and the early use of overt subjects. Clahsen and Penke (1992) find a correlation between the development of subject-verb agreement and the increased use of overt subjects between age 2;0 and 3;0. Guasti's (1994) findings also suggest a correlation, but in the opposite direction, where the early use of subject-verb agreement correlates with a high frequency use of null (or missing) subjects. The findings of Weissenborn (1992) and Pierce (1992) also suggest a correlation between the development of subject-verb agreement and the increased use of overt subjects, thought this relationship has yet to be directly investigated.

In summary, research to data not only shows significant difference in the use of overt subjects in early child French, German and Italian, but also suggest a correlation between the increased use of subjects and the development of subject-verb agreement in overt subject languages (OSL's) but not in null subject languages (NSL's)—facts which must receive some account under any adequate theory of language development.

2.3 The root infinitive stage

A growing body of research shows that children pass through a stage of development where they may use non-finite verbs as the root of a declarative (matrix) sentence even though these are generally ungrammatical in the adult target languages considered here. This has become known as the Root Infinitive Stage (henceforth RIS) (see Wexler, 1994, 1998, among many others).

Empirical studies on the RIS show that there are significant differences in the duration of the RIS in early child French, German, and Italian. In the case of early child German, Clahsen et al. (1994) and Phillips (1995) show that root infinitives occur with significant frequency throughout early language development and do not disappear until around age 3;6. In the case of early child French, Pierce (1992) and Phillips (1995) show that root infinitives also occur with significant frequency but that these disappear at a much earlier age, around 2;6. In the case of early child Italian, Schaffer (1990). Guasti (1994) and Rizzi (1994) show that root infinitives occur only very rarely in early child Italian and that these disappear at an even earlier age, around age 2;0 (for a review and discussion of research findings on the RIS see Wexler 1994, 1998, Hoekstra and Hyams 1998, Griffin 2001).

In short, the research findings show clear differences in the duration of the RIS between early child French, German and Italian which must be accounted for under any adequate theory of language development.

3 Four Empirical Problems for Acquisition Theory

The empirical findings on early language development discussed above pose four empirical problems for any theory of language acquisition. The first, as illustrated by the cross-linguistic differences in the acquisition of subject-verb agreement, the use of overt subjects, and the duration of the RIS, illustrates what I have referred to elsewhere ***as the problem of cross-linguistic variation in language development*** (see Griffin 2000a,b, 2001).

The second is aptly illustrated by the empirical findings on the development of INFL in early child German. While the findings show that properties associated with INFL are acquired in finite clauses by around age 3;0, the findings on the RIS show that the grammatical requirement that matrix, declarative clauses must be finite does not appear to be acquired until around age 3;6. These findings show that there are language internal differences between finite and non-finite utterances in the acquisition of properties associated with INFL, a problem which I have referred to elsewhere as ***the problem of language internal variation in language development*** (see Griffin 2000a,b, 2001).

It is worth noting that the problem of cross-linguistic variation in language development is more complicated when we consider comparative differences in the developmental data illustrating the problem of language internal variation. While the data show that there is variation in the acquisition of properties associated with INFL in finite and non-finite utterances in early child German, the data also crucially show that there are no significant developmental differences in the acquisition of properties associated with INFL (for the properties considered here) in finite and non-finite utterances in early child French and Italian (these being largely acquired by around age 2). Let us refer to this problem henceforth as the ***problem of comparative differences in internal language development.***

The fourth problem concerns the relationship between the use of overt and null subjects and the acquisition of subject-verb agreement morphology. How are we to account for the correlation between the increased use of overt subject and the acquisition of subject-verb agreement morphology in OSL's and the prolonged use of null subjects in NSL's?

In sum, it is clear that any adequate theory of language acquisition must not only provide a principled account for the developmental differences in early language development but must also provide a plausible solution for these four empirical problems in language development.

4 A Solution from Cognitive Learning Theory?

Tommasello (2000), while arguing that a continuity approach cannot account for empirical data on language development, maintains that cognitive learning

theory and cognitive linguistics provides an adequate explanatory account of early language development. In this section, I show how this approach fails to adequately explain the developmental differences and problems outlined above.

4.1 **The problem of the RIS**

Tommasello (2000) maintains that imitative learning (also call mimicking or social learning) plays a key role in language development, suggesting a rather direct relationship between what is in the linguistic environment and what the child may produce. Operating within Cognitive Linguistic Theory (e.g., Langacker 1991), imitative learning or "rote-learning" may provide the mechanism by which children initially acquire a fixed repertoire of "lexically-based patterns" or "formulas" or "formulaic frames which superficially pattern after adult patterns, but only later develop or emerge "spontaneously" into the "high-level constructional schemas" (grammatical constructions) of adult language once they have acquired a "sizeable" repertoire of formulas via maturation of memory and memory retrieval.

Consider once again the developmental data on the RIS. While an imitation or "rote learning" account might account for the absence of root infinitives in early child Italian (i.e., root infinitives are generally not used in the target language environment, so there are few root infinitives to imitate), it cannot account for the relative high frequency of root infinitives in early child French and German since root infinitives likewise do not occur in matrix clauses in these target languages. In other words, how can they imitate or learn a form which is nor in the linguistic environment?

One might suppose that this is just an instance where children have not yet acquired a sufficient repertoire of "formulas" (formulas involving required modal and auxiliary verbs) to move into a stage of development which allows the use of "high-level constructional schemas."

This cannot be the case however since such an account would still fail to explain the observed differences in the duration of the RIS between early child French and German. Such an approach does not explain why a "constructional schema" of any complexity should be used at an earlier age by children learning a language like French than in children learning a language like German, especially given the fact that they have the same essential grammaticality requirement, a non-finite verb cannot occur in a matrix declarative clause without a finite modal/auxiliary verb.

4.2 The problem of subject-verb agreement

One basic tenet of cognitive grammar is that knowledge of language is captured in form-meaning pairs called "symbolic units," the most basic being the morpheme. Under this view, it is clear that the acquisition of subject-verb

agreement must involve the construction of a more complex schema (e.g., an inflected verb) from more basic units (i.e., a verb unit, an agreement morpheme unit). Thus, it follows that in order to produce a constructional scheme for an inflected verb, a child must first acquire or learn the agreement morpheme unit which is to be combined with a verb unit before being able to create a higher level constructional schema. The only alternative being that the verb and its morpheme are acquired or learned as a single unit. Ultimately, these are the only two possible scenarios (under a cognitive learning approach) by which children can learn subject-verb agreement. Let's consider these in relation to the developmental findings on subject-verb agreement.

If subject verb agreement is learned as a single unit with a verb, then the task of the child is to acquire the distinct forms of the morphological paradigm as distinct lexical verbs as individual formulas. In relation to the morphological paradigms of these languages, a child learning either French, German or Italian must learn six distinct verbal entries varying on the dimensions person (i.e., 1st, 2nd, and 3rd person) and number (i.e., singular and plural). Thus, under this view, the learning task is the same for any child learning either of these languages. Thus, we should predict that children learning these languages would learn subject-verb agreement at roughly the same time since the learning task for all children would be essentially the same. This, of course cannot be correct since there are differences between these languages in the age at which subject-verb agreement is acquired.

If, on the other hand, verbal agreement morphology is acquired as a separate unit which is combined with a verb to form a more complex formula, the task for the child would still be essentially the same for children learning these languages since they must acquire values for the same essential agreement paradigm (3 values for Person (by) two values for number).

One might argue that the learning task is not the same for children learning each language since (in the case of French and German) the same phonemic morpheme may be used to represent a value in the overall paradigm. Thus, one possibility is to say that a simpler paradigm (one with fewer morphemes) is easier to learn than more complex paradigms (one with more morphemes). This possibility may be immediately rejected on the basis of the data on the development of agreement morphology in Italian which is acquired at an earlier age than in early child French and German even though it has more distinct agreement morphemes.

The remaining possibility is to say that a more "uniform" or more "distinctive" agreement paradigm is easier to learn than one which is more "mixed" or less "distinctive". A cognitive learning approach might plausibly account for the developmental differences in subject-verb agreement only if it can do so under this last possibility. At present, I know of no cognitive learning analysis which accounts for these developmental facts, so it remains to be seen if it can in fact account for these facts.

4.3 Two additional problems

A basic problem emerging from our discussion thus far is that, no matter how the properties of INFL are represented within a cognitive learning theory, children learning all three of these languages must acquire a "high-level constructional schema" which corresponds to the basic representation below where any INFL property (e.g, agreement morphology in finite utterances or a modal/auxiliary with a non-finite verb) is combined with a more basic unit.

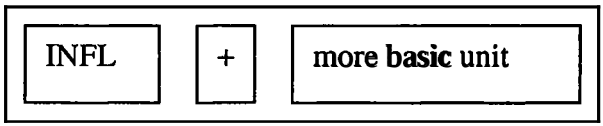

Figure 1. High-level schema combining INFL property with any verbal unit.

Since all of these component units are available (to be imitated or rote-learned) in the target language environment, there is no immediate basis on which we may distinguish one high-level schema with the basic structure above as easier to learn or more difficult to learn than another with the same basic structure. In fact, as we have seen in the case of the RIS and subject-verb agreement, such a view makes incorrect predictions concerning development. As a result, while this approach might account for the absence of differences in the development of INFL in finite and non-finite utterances in languages like early child French or Italian, such a view cannot account for the problem of language-internal variation in the acquisition of properties of INFL in finite and non-finite utterances illustrated in the findings on early child German. Moreover, it is difficult to see how such an approach would explain why there are language-internal differences in the acquisition of properties associated with INFL in finite and non-finite verbs in early child German but not in early child Italian. In other words, this approach does not offer an immediate solution to the problem of comparative differences in language internal development.

5 The Minimal Competence Hypothesis

As outlined in Griffin (2000a,b), the Minimal Competence Hypothesis (MCH) assumes a minimalist model of grammar essentially following Chomsky (1995). the analysis of null and overt subjects proposed in Speas (1994). and the Lexical Learning Hypothesis following Clahsen et al. (1996). Under this view, the principles of UG (e.g., Full Interpretation, Last Resort, Economy of Projection) do not change in the course of language development. All syntactic development involves the gradual acquisition and setting of **initially** underspecified feature

parameters. As the setting for feature parameters are gradually acquired, these become increasingly "visible" to principles of UG (like Full Interpretation) and increasingly available for syntactic operations (i.e., feature checking operations) within the computational system (HCL) as required by principles of UG. In other words, while the principles required for computing and projecting syntactic structure are provided in the initial state of UG (a strong Continuity Hypothesis), the features required for computing and projecting clause structure are initially absent.' Thus, under this view, the task of the child then is to acquire and set the feature parameters to the target language environment.

A central component of the MCH is that it furthermore states that the initial state of UG provides the child not only with a finite set of underspecified parameters, but also with a principle which guides the child in acquiring and setting underspecified feature parameters. This is known as the Feature Acquisition Principle (FAP) (from Griffin 2001):

(1) Feature Acquisition Principle
Features which require overt movement (at PF) in the target language are acquired before features which require covert movement (at LF) or merger without movement (lexical insertion).

In the following sections, I show that adopting the FAP as a principle of UG will allow us to not only provide an adequate account of the development findings discussed earlier but will also provide a principled explanation and to the problems confronting acquisition theory.

6 Language Development and Adult Language Structure

One central tenet of the principles and parameters theory is that language development, due to formal learnability requirements, is guided solely by positive evidence in the linguistic environment or the structure of the target languages being acquired (in addition to principles and parameters of UG). In this section, I show how adopting the MCH and the FAP as a principle of UG will not only allow us to account for the cross-linguistic differences observed in language development but will also allow for a principled solution to the four problems facing acquisition theory based on independently motivated, minimalist analyses of verb movement properties of the adult target languages.

6.1 Differences in verb movement properties

Minimalist analyses of the verb movement properties of adult French, German and Italian shows that there are cross-linguistic differences in the position of finite and non-finite verbs in adult clause structure. In the case of languages like Italian, both finite and non-finite verbs are analyzed as moving overtly through

T to Agr (see Belletti 1990. Guasti 1994, Rizzi 1994, Mensching 2000). Romance languages like Italian differ from other Romance languages like French where non-finite main verbs generally do not raise to T, though there are important exceptions with common non-finite verbs such as *être* 'to be' and ***avoir*** 'to have' (Pollock 1989, Mensching 2000). Finite verbs in French differ from non-finite verbs in that these are analyzed as moving overtly only to T. except in constructions with subject clitics, in which case finite verbs are analyzed as moving overtly to Agrs (Pollock 1989, Belletti 1990, Mensching 2000). Both Italian and French further differ from languages like German where finite verbs are analyzed as raising to T (or possibly higher to C, but not overtly to Agrs) while non-finite verbs are analyzed as remaining in-situ in V, deriving the final position (e.g., Wexler 1994 Speas 1994. Zwart 1995).

6.2 Deriving subject properties

Speas' (1994) analysis of null vs. overt subject languages is based on the Principle of Economy of Projection in (2).

(2) Principle of Economy of Projection (EOP)
Project XP only if its head X or its specifier [Spec, XP] has independent semantic or phonetic content

Under this analysis, the fact that languages like French and German require overt subjects derives from the (EOP) and the properties of "mixed agreement morphology, which presumably cannot head its own Agr projection and is realized directly on the verb. Thus, the specifier of AgrsP must be filled (usually by a subject) such that AgrsP may be projected and agreement may be checked at LF. In contrast, the fact that language like Italian do not require overt subjects is due to the fact that "rich" agreement morphology may head its own projection, which then combines with the verb in the overt syntax.

Combining these analyses, we arrive at the basic derivational structures for finite and non-finite main clauses in adult French, German and Italian in (3)-(5).

(3) Adult French

a. [AgrsP SUBJECT$_j$ Agrs [TP [+F VERB]$_i$ [vP t_j t_i [VP ti]]]]

b. [AgrsP (CLITIC) SUBJECT$_j$ + [+F VERB], [TP t_i [vP t_j t_i [VP t_i]]]]

c. [AgrsP SUBJECT$_j$ Agrs [TP [+F MOD/AUX] [vP t_j [-F VERB]$_i$ [VP t_i]]]]

d. [TP [-F VERB]$_i$ [vP t_i [VP t_i]]]

(4) Adult German

a. [AgrsP SUBJECT$_j$ Agrs [TP [+F VERB]$_i$ [vP tj t_i [VP t_i]]]]

b. [AgrsP SUBJECT$_j$ Agrs [TP [+F MOD/AUX] [vP t_j [VP [-F VERB]$_i$]]]]

(5) Adult Italian[2]

a. [AgrsP pro [+F VERB]$_i$+ AGR [TP t_i [vP t_i [VP t_i]]]]

b. [AgrsP [-F VERB]$_i$ [TP t_i [vP t_i [VP t_i]]]]

6.3 Explaining early language development

Based on these analyses of the adult target languages, consider how the FAP will allows us to account for the patterns observed in early language development.

In the case of the RIS, the fact the RI's disappear at such an early age in ECI is due to the FAP and the fact that non-finite verbs move overtly to Agrs (or even T) in the adult target language. Since non-finite verbs in French move overtly to v (and with some exceptions T), the FAP will explain why RI's disappear at a later age ECF relative to ECI, non-finite verbs raise to a higher position in Italian than in French. For the same, reason, the FAP explains why RI's do not disappear until such a late age, non-finite verbs in adult German do not undergo overt movement.

In the case of the acquisition of subject-verb agreement, the fact that it is acquired at such a relatively early age in ECI is due to the FAP and the fact that finite verbs raise overtly to Agrs in adult Italian. The fact that subject-verb agreement is acquired at a relatively later age in ECF is due to the FAP and the fact that finite verbs generally move overtly to T (except in constructions with subject clitics where finite verbs raise to Agrs). The fact that subject-verb agreement is acquired even later in ECG is due to the FAP and the fact that finite verbs do not raise overtly to Agrs.

The relationship between the acquisition of subject verb agreement and the use of overt and null subject also finds an immediate and principled explanation under this approach. In OSL's like ECF and ECG, the reason that subject-verb agreement correlates with the increased use of overt subjects is that, as agreement is acquired, it will require movement of an overt subject to the specifier of AgrsP in order to project AgrsP in accordance with the Principle of Economy of Projection following Speas (1994). The fact that these languages differ in when the overt subject requirement is acquired thus derives from the differences in the acquisition of subject-verb agreement based on the FAP and the verb movement properties of finite verbs in these target languages.

The fact that null subjects persist to a late age in ECI is due to the fact that subject-verb agreement morphology is acquired at such an early age (due to the FAP and the fact that finite verbs raise overtly to Agrs in the target language).

Since subject-verb agreement morphology may head its own projection (and is combined with the verb in the overt syntax), it does not require movement of a overt subject to project AgrsP in accordance with the EOP following Speas (1994).

7 Conclusions

As we have seen, while a cognitive learning view may have difficulties or may even be unable to explain the developmental data discussed here (let along provide a principled solution for empirical problems facing acquisition theory), these facts may be accounted for under the Minimal Competence Hypothesis based on the Feature Acquisition Principle and independently motivated analyses of the verb movement properties of the adult target languages—while also providing a principled solution to the empirical problems facing acquisition theory.

The fact that cross-linguistic differences in the development of properties of INFL may be explained in a principled way (while offering a solution the empirical problems facing acquisition theory) provides a strong, new argument for the central tenets of generative linguistic theory and UG: that language development is determined by the principles and parameters of UG, a strong version of the Continuity Hypothesis (the MCH), and positive evidence in the linguistic environment—namely, a view of UG which adopts the FAP as a principle of UG.

Notes

[1] The only necessary criterion for a strong Continuity Hypothesis is that the principles of UG do not change in the course of language development. The confusion here stems from a fundamental differences in GB and Minimalist theory, while clause structure (D-structure representation) and principles of X' theory are provided in the initial state of UG in GB theory, they are derived by independent principles of the computational system in minimalism. Thus. there is no need to say that the "adult" clause structure is provided to the child in a minimalist theory *as was necessary* under a *GB* theory.

[2] Belletti (1990) analyzes non-finite verbs in Italian as raising overtly to Agrs, but it should be noted that the proposed analysis for development will also work if we assume non-finite verbs raise overtly to T.

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Syntactic and Semantic Genitive

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1 Two Positions for Genitives in German

German has two positions for constituents which are morphologically marked for genitive case. In (1), the genitive occurs prenominally, in (2) it occurs postnominally. In postnominal position, genitive marking can occur indiscriminately on arguments of relational nouns (2a), and on genuine modifiers (2b). Genitive modifiers can be replaced with a PP (2c).

(1) Fidos Behandlung/Knochen
Fido-GEN treatment/bone
'Fido's treatment/bone'

(2) a. die/eine Behandlung des Hundes
the/a treatment the$_{GEN}$ dog$_{GEN}$
'the treatment of the dog'
b. der/ein Knochen des Hundes
the/a bone the$_{GEN}$ dog$_{GEN}$
'the bone of the dog'
c. der Knochen [$_{PP}$ von dem Hund]
the bone of the dog

Pre- and postnominal genitives can also cooccur in German.

(3) Peters Eroberung Roms
Peter-GEN taking Rome$_{GEN}$
'Peter's taking of Rome'

The majority of generative analyses of genitive in German (cf. Haider 1988, Bhatt 1989, 1990, Olsen 1988, Lindauer 1995, de Wit and Schoorlemmer 1996, Fortmann 1996) share the contention that both genitives are maximal projections, and that both genitives are instances of structural (syntactic) case (licensed e.g. to the left by D^0, and to the right by N^0). In many of the analyses,

the prenominal genitive is derived from a postnominal base position. Variants of the 'symmetric' analysis, which treats pre- and postnominal genitives alike, are given in (4):

(4) a. [$_{DP}$[$_{DP}$ Peters] D^0 [$_{NP}$ Eroberung [$_{DP}$ Roms]]]
b. [$_{DP}$[$_{DP}$ Peters]$_i$ D^0 [$_{NP}$ t_i Eroberung [$_{DP}$ Roms]]]
c. [$_{DP}$[$_{DP}$ Peters]$_i$ D^0 [$_{NP}$ Eroberung [$_{DP}$ Roms] t_i]]

In contrast, we would like to argue for an 'asymmetric' theory of genitives in German. On this analysis, prenominal genitives are D-heads, while postnominal genitives are full DPs (cf. also Lattewitz 1994 and Demske 2001). Second, German distinguishes between syntactic genitive (which licenses case) and semantic genitive (which denotes a relation variable). On a cross-linguistic note, we argue that English differs from German in that it lacks (morphologically encoded) syntactic genitive. Overt genitive marking in English is always semantic.

2 Problems for the Symmetric Analysis

The distribution of genitives in German (and to a certain degree in English) is subject to a number of restrictions which are hard to capture in a purely syntactic account.

First, the prenominal genitive position in German is restricted to proper names. Full DPs are generally not licensed in this position (cf. Bhatt 1989, 1990, de Wit and Schoorlemmer 1996, Demske 2001)

(5) a. die Wohnung [meines kürzlich nebenan eingezogenen Nachbarns]
the flat my$_{GEN}$ recently next.door moved.in neighbour$_{GEN}$
'the appartment of my neighbour who moved in recently'
b. *[meines kürzlich nebenan eingezogenen Nachbarns] Wohnung
my$_{GEN}$ recently next.door moved.in neighbour$_{GEN}$ flat

Second, there are interpretive restrictions on postnominal genitives which depend on the semantic type of the head noun (cf. Partee and Borshev 1998). Postnominal genitives with property nouns (''P-noun'', type <e,t>) can stand in various relations to the head noun.

(6) der Verein der Präsidentin
the club the$_{GEN}$ president-FEM$_{GEN}$
'the club owned by the president' / 'the club where the president plays' / 'the club which is supported by the president'

In contrast, postnominal genitives with relational nouns (''R-noun'', type <e,et> or <e,vt>) are preferably interpreted as internal argument.'

(7) die Explosion Hugos
the explosion Hugo_{GEN}
'Hugo explodes' / ??'the explosion caused by Hugo'

Unlike postnominal genitives, prenominal genitives always stand in a free (contextually determined) relationship to the head noun.

(8) a. Sarahs Verein
'the club owned by Sarah' / 'the club where Sarah plays' / 'the club supported by Sarah' (cf. also Fortmann 1996, Partee and Borshev 1998)
b. Hugos Explosion
'the explosion caused by Hugo' / 'Hugo explodes'

Turning to English, we find that postnominal genitives in English are never interpreted as internal arguments. Instead, they stand in some (contextually) determined relation to the head noun.

(9) a. a book of Peter's
b. a treatment of Peter's
'Peter treats somebody' / NOT: 'Peter is treated'
c. *a destruction of Rome's

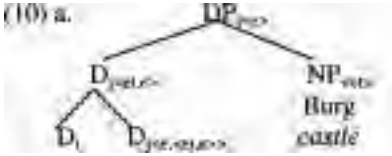
Summing up, this section has shown that the ***distribution*** of the genitive depends on the nature of the genitive expression itself (proper name vs. description). The ***interpretation*** of the genitive depends on at least two factors: (i) its occurrence in pre- or postnominal position, and (ii) the semantic type of the nominal head (P-noun vs. R-noun). Finally, the ***difference*** between German and English is that postnominal genitives are not used to mark the internal argument (of R-nouns) in English. A purely syntactic account is not able to capture these (mostly) semantic distinctions. In the following, it is replaced with an integrated syntactic-semantic account.

3 Prenominal Genitives

Following the spirit of Demske (2001), we assume that German prenominal genitives form part of the determiner system of the genitive expression. More precisely, we argue that they are adjoined to the D^0-position which hosts the prenominal genitive morphology. Our proposal is compatible with Longobardi's (1994) theory that assumes movement of proper names into the D^0-position.

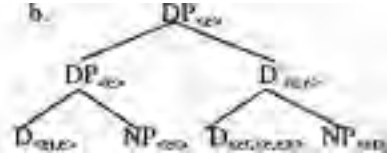
English differs from German in that prenominal genitives are not D-heads, but maximal projections in the specifier of the genitive expression. The structures of prenominal genitives in German and English are given in (10).

(10) a.



Peter -s

b.



the boy -s castle

The structural difference between English and German is motivated by the well-known observation that English prenominal genitives can consist of maximal projections. The prenominal genitive morpheme, which is identical to the German one, attaches to phrases no matter how complex, cf. (11).

(11) a. [my neighbour]'s new appartment
b. [my recently moved in neighbour]'s new appartment
c. [my neighbour [who never introduced himself]]'s new appartment

We follow one of Abney's (1987) proposals for the structure of the English genitive phrase in its sentential aspect and assume that the English prenominal genitive morpheme is base-generated in the D-head of the genitive expression. i.e. in the same position as in German. Since the English prenominal genitive is phrasal, and therefore does not adjoin to D^0, the bound morpheme cliticises to the maximal projection in SpecDP.

Semantically, we follow Partee and Borshew (1998) in analysing the prenominal [D+*s*]-complex in the German (10a) as denoting a functor of type <et,e>, which is also the type of definite determiners.[2] It takes the property denoted by the NP as argument and yields an individual. The logical types in (10b), on the other hand, indicate that the difference in the syntactic structure of prenominal genitives in German and English is accompanied by different lexical entries for the s-suffix. This is so because the meaning of the s-suffix in in (10b) first combines with the NP denotation (type <e,t>) and then with the denotation of the DP in SpecDP (type <e>). In other words, the argument orders of the s-suffixes in German and English form a mirror image.[3] We present the formal analysis of prenominal genitives, modeled after Partee and Borshev (1998.4):

(12) Sarahs Verein ('Sarah's club')
a. [[-s]] = $\lambda y \lambda P . \iota x$ [P(x) & R(x, y)]
b. [[Sarahs]] = $\lambda P . \iota x$ [P(x) & R(x, sarah')]
c. [[Sarahs Verein]] = ιx [club'(x) & R(x, sarah')]

(12c) contains a free relation variable 'R'. The content of the variable R is determined by a relation which is salient in the context. This accounts for the free relation between the genitive expression and the head-noun. The genitive expression permits many different interpretations, see (8a). Given the assumption that prenominal genitives are heads, they do not have to be case-marked. Therefore, the prenominal morphology is not a syntactic case-marker, but the morphological realisation of the free variable R. Since this variable expresses a semantic relation, prenominal genitive is semantically motivated, hence an instantiation of what we call "semantic genitive".

The definiteness effect observable with prenominal genitive constructions is reflected in the iota-operator whose effect is illustrated in the following examples. They show that prenominal genitives only appear in positions where definite articles can also occur.

(13) a. Peters zwei / viele / wenige Freunde
b. die zwei / vielen / wenigen Freunde
'Peter's / the two / many / few friends'

(14) a. Peters liebstes Hobby
b. das liebste Hobby
'Peter's / the dearest hobby'

(15) a. zwei von [$_{DP}$ Peters Freunden]
b. zwei von [$_{DP}$ den Freunden]
'two of Peter's / the friends'
c. *zwei von einigen/vielen Freunden
*'two of some / many friends'

(16) a. *Peters jeder Freund
b. *der jeder Freund
*'Peter's / the every friend'

(17) a. *Peters alle Freunde
b. *die alle Freunde
*'Peter's / the all friends'

The examples in (13) to (17) show that the distribution of the prenominal genitive and the definite article is complementary. The prenominal genitive is possible in exactly those contexts which allow for a definite determiner. Such contexts are before weak quantifiers (13), superlatives (14), and the embedded DP in a partitive construction (15). As (15c) illustrates, weak quantifiers as some and *many* are excluded from such embedded DPs. (16) and (17) show that both prenominal genitives and definite determiners cannot cooccur with strong quantifiers.

Our analysis correctly predicts that the prenominal genitive is restricted to referential D^0-categories in German under the assumption that proper names are D-heads due to their referentiality. Interestingly, in the few cases where a prenominal genitive is phrasal, it receives a name-like interpretation (e.g. as kind name). In (18a), the prenominal genitive can only refer to the species of blue whales, resulting in a generic statement. In (18b), the specific DP cannot be interpreted as a kind name and is ungrammatical in prenominal position. (18c)

would be well-formed only if it was true that blue whales lived exclusively between New York and Boston.

(18) a. Des Blauwals Lebensraum ist der Ozean.
the$_{GEN}$ blue.whale-GEN habitat is the ocean
'The habitat of the blue whale is the ocean.'
b. *Des vor Boston gesichteten Blauwals Lebensraum ist der Ozean.
the$_{GEN}$ near Boston detected bw-GEN habitat is the ocean
c.?*Des Blauwals Lebensraum erstreckt sich von New York bis Boston.
the bw-GEN habitat extends REFL from New York to Boston

Thus, prenominal genitive is only possible with "DPs" which (may) act as kind names. These DPs are reanalysed as words, i.e. the article and the noun together form a D-head. The process of reanalysing syntactic phrases as words was first proposed by Di Sciullo and Williams (1987, 78-88). In their spirit, we argue that the prenominal "DPs" are actually D-heads. The trigger for reanalysis for the case at hand seems to lie in the fact that the DP denotes a kind name. Our analysis is illustrated for the subject of the example in (18a).[4]

(19) [$_{DP}$ [$_{D}$ [$_{D}$ des [$_{N}$ Blauwals]] –s] [$_{NP}$ Lebensraum]]

To summarise the results of this section, prenominal genitives in German are heads located in the determiner position of the genitive expression. This analysis accounts for the restriction of prenominal genitives to proper names. The fact that this restriction is not found in English leads us to conclude that English prenominal genitives are maximal projections located in SpecDP instead. Semantically, prenominal genitive is the manifestation of a free semantic relation between the prenominal expression and the head-noun of the genitive expression. Therefore, English and German prenominal genitives are both instances of "semantic genitive."

4 Postnominal Genitives

The second position of adnominal genitive in German is the postnominal position. Our analysis takes up ideas developed in Partee (1983/97), Partee and Borshev (1998), and to a certain extent in Bhatt (1989). The basic idea is the following: There are two ways for a postnominal genitive to enter a semantic relation with its head-noun, depending on the semantic nature of the latter. If the head-noun is a R(elational)-noun (a *transitive common noun* (TCN) in Partee and Borshev's terms), it can take the postnominal genitive as its semantic argument. In this case, the genitive licenses the argument syntactically. If the head-noun is a P(roperty)-noun (Partee and Borshev's *common noun* (CN)),

which does not have relational content, the relation is brought along by the postnominal genitive, which modifies the head-noun. In this case, genitive has semantic content. It provides a free relation variable whose value is supplied by the context.

4.1 Postnominal genitive arguments: syntactic genitive

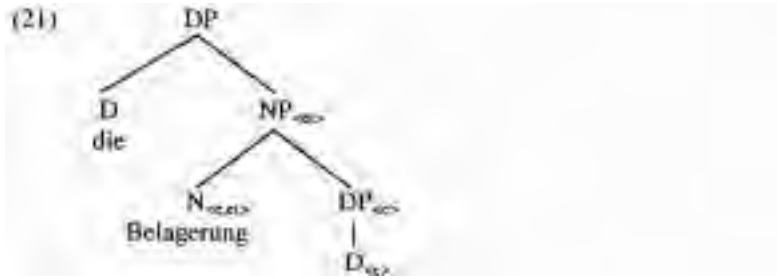
German postnominal genitives can be either proper names or phrases. In example (20), both of them may appear postnominally.

(20) die Belagerung [$_{DP}$ Roms] I [$_{DP}$ der Stadt]
the siege Rome_{GEN} the_{GEN} city_{GEN}
'the siege of Rome 1 of the city'

The head-noun of the genitive expression in (20) is relational (''R-noun''); it requires a first argument of type **<e>**. This argument can be provided by a postnominal proper name or a full DP, since both are of the appropriate type. The argument is licensed by genitive case assigned by the head-noun. Genitive case on postnominal arguments has no semantic impact. It only licenses the argument of the R-noun syntactically. Therefore, we call it 'syntactic genitive'.

The structure of syntactic genitive constructions is given in (21). The relational head-noun selects the postnominal genitive as its argument. The postnominal genitive argument is a DP which can contain either a full maximal phrase, or, in case the postnominal genitive is a proper name, just the D-head. This latter case is illustrated below.

(21)



Leningrads

The syntactic argument in (21) is interpreted as the internal argument for reasons of compositionality. It does not allow the same variation concerning the semantic relation to the head-noun as prenominal genitives (and postnominal genitive modifiers, cf. section 4.2).

The compositional semantic analysis of postnominal genitive arguments is given in (22).

(22) Hitlers Belagerung Leningrads

a. [[Belagerung]] = $\lambda z \lambda e.\exists x[\text{siege'}(e,x,z)]$[5]

b. [[Belagerung Leningrads]] = $\lambda e.\exists x[\text{siege'}(e,x,\text{Leningrad'})]$[6]

c. $[[\text{Hitlers}_{\text{prenominal}}]] = \lambda P.\iota e[P(e) \,\&\, R(e, \text{Hitler'})]$

d. [[Hitlers Belagerung Leningrads]]

$= [\lambda P.\, \iota e[P(e) \,\&\, R(e, \text{Hitler'})]](\lambda e.\exists x[\text{siege'}(e,x,\text{Leningrad'})])$

$= \iota e \exists x\, [\text{siege'}(e,x,\text{Leningrad'}) \,\&\, R(e, \text{Hitler'})]$

(22d) expresses the unique event e such that there is some person x such that e is a siege of Leningrad by x, and Hitler stands in some relation to e. Note that it does not follow from the semantic representation that Hitler is the agent argument. The semantic representation just says that there is some relation between Hitler and the event of the siege of Leningrad. The reading as subject genitive is only pragmatically suggested.

4.2 Postnominal genitive modifiers: semantic genitive

Genitive modifiers predominantly appear with property denoting nouns **("P-**nouns"). They modify the head-noun by predicate modification. Like **PP-**modifiers, they are of type <e,t> and denote a relation variable indicated by the genitive. Genitive modifiers thus express "semantic genitive". As with prenominal genitives, this relation variable is free. Its value is contextually determined, causing their free interpretation.

(23) $[_{\text{DP1}}$ der Verein $[_{\text{DP2}}$ der Prasidentin]]

the club the_{GEN} president-FEM_{GEN}

'the club owned by the president / for which the president plays / which the president supports ...'

Syntactically, the postnominal genitive modifiers are adjoined to the NP of the genitive expression. The semantic derivation of postnominal genitive modifiers is given in (24). As **(24b)** shows, the genitive denotes some relation.'

(24) der Verein der **Präsidentin**

a. [[die Prasidentin]] = $\iota y[\text{president'}(y)]$

b. $[[\text{GEN}_{\text{mod}}]] = \lambda z \lambda x.R(x,z)$

c. $[[\text{der Präsidentin}_{\text{mod}}]] = \lambda x.R(x, \iota y[\text{president'}(y)])$

d. [[Verein der Präsidentin]] = $\lambda x.\text{club'}(x) \,\&\, R(x, \iota y[\text{president'}(y)])$

e. [[der Verein der Präsidentin]] = $\iota x.\text{club'}(x) \,\&\, R(x, \iota y[\text{president'}(y)])$

(24e) denotes the unique club which stands in some contextually salient relation to the president.

4.3 Postnominal modification with R-nouns

Our system correctly predicts that optional modification with postnominal genitives should be possible with R-nouns when forced by the context. This prediction is borne out, as witnessed by (25):

(25) a. Die Übersetzung des Artikels des Redakteurs wurde gelobt.
the translation the_{GEN} $\text{article}_{\text{GEN}}$ the_{GEN} $\text{editor}_{\text{GeN}}$ was praised
'The translation of the article by the editor was praised.'
b. die Beschreibung des Polizisten
the description the_{GEN} $\text{policeman}_{\text{GEN}}$
'the description by the policeman'

(25a) features the co-occurrence of a postnominal genitive argument and a postnominal genitive modifier. The grammaticality of (25a) is not predicted by purely syntactic accounts of genitive expressions, which assume only one postnominal position for genitive case assignment. In (25b), the postnominal genitive can be interpreted either as internal argument or – under contextual pressure - as modifier of the head noun despite the fact that the head noun is an R-noun. In the latter case, the internal argument position must be occupied by an empty pronoun which is interpreted as the implicit internal argument. For further discussion, cf. Hartmann and Zimmermann (2001).

5 English

Turning to English again, we would like to argue that English only has semantic genitive. Morphological genitive in English always expresses a free relation. It appears exclusively in positions designated for semantic genitive, i.e. prenominal or as a postnominal genitive modifier. Postnominal arguments are never marked with genitive case. They are case marked by the semantically empty preposition of (cf. Chomsky 1981).

Regarding prenominal genitives, it was shown in (10) that English and German prenominal genitives do not differ semantically, but syntactically.

Regarding postnominal genitives, we find that English P-nouns can combine with postnominal modifiers. These are obligatorily genitive marked for semantic reasons (26). The lack of genitive marking leads to ungrammaticality (27).

(26) a. the trip of Peter's
b. the team of Mary's

(27) a. *the team of Mary
b. *the trip of Peter

With respect to postnominal genitives with R-nouns, our hypothesis that English lacks syntactic genitive makes the following prediction: If the argument

of an R-noun is expressed, genitive marking is not licensed. The postnominal argument must be syntactically licensed by the preposition of. Our hypothesis is corroborated by the following contrast.

(28) a. the siege of Rome
b. the siege of the city

(29) a. *the siege of Rome's
b. *the siege of the city's

Genitive marking in English always indicates semantic genitive, i.e. a free relation. It is therefore not licensed on postnominal arguments. One could raise the question why the modifier interpretation is totally excluded, as shown by the ungrammaticality of the genitive expressions in (29). Note, though, that the only natural interpretation of the relation between the modifier and the head-noun in (29) is the theme interpretation. We conjecture that (29ab) are ungrammatical because the theme interpretation is reserved for the implicit, existentially bound internal argument.

In those cases where the modifier can have a natural non-theme interpretation (e.g. agent), postnominal genitive modifiers are possible with R-nouns (30a)/(31a). As expected, the lack of genitive marking leads to an obligatory interpretation of the postnominal DP as an internal argument (30b)/(31b).

(30) a. the execution of McVeigh's
'McVeigh executes somebody' / NOT: 'McVeigh is executed'
b. the execution of McVeigh
'McVeigh is executed' / NOT: 'McVeigh executes somebody'

(31) a. a treatment of Peter's
'Peter treats somebody' / NOT: 'Peter is treated'
b. a treatment of Peter
'Peter is treated' / NOT: 'Peter treats somebody'

6 Conclusion

We proposed an asymmetric treatment of genitives in German and in English, which, we think, accounts for the many syntactic and semantic differences between pre- and postnominal genitives more adequately than the varieties of the Symmetric Analysis.

With respect to German prenominal genitives, we took their restriction to proper names as evidence that they are complex determiners consisting of the proper name and the prenominal genitive morpheme. English prenominal genitives. on the other hand, can be phrasal, which suggests that they are rather located in SpecDP of the genitive expression. The semantics of prenominal genitives is identical in both languages. Its denotation contains an iota operator

which accounts for the definiteness effect associated with the prenominal genitive. Apart from this, the relational variable R accounts for the free semantic relation which prenominal genitive expresses.

As for the postnominal genitives, we distinguished genitive arguments, which are selected by relational nouns, from genitive modifiers occurring with property denoting nouns. We also showed that two postnominal genitives can cooccur, in which case the first genitive must be interpreted as the internal argument and the second as a modifier. Genitive modifiers serve to express a free relation which must be contextually supplied. Comparing our findings to English, we observed that English lacks postnominal genitive arguments altogether. This is due to the fact that English cannot express syntactic genitive. In English, pre- and postnominal genitives are semantically symmetric since they always indicate a relation.

Notes

[1] In section 4.3. it will emerge that (7) marginally allows for an alternative, modifier reading.

[2] We follow the treatment of definite determiners in Heim and Kratzer (1998).

[3] For an alternative analysis which reconciles the assumption of different syntactic structures for English and German prenominal genitives with a unified semantics for the *s*-suffix, cf. Hanmann and Zimmermann (2001).

[4] The reanalysis of DPs as kind names extends to function descriptions which denote a set of cardinality one. This is the case for title and position holders, for dignitaries and deities.

(i) a. des Kaisers neue Kleider
the emperor-GEN new cloths
'the emperor's new cloths'

b. des Kanzlers Ansehen
the chancellor-GEN reputation
'the chancellor's reputation'

[5] In analogy to passive constructions, the external argument in ung-nominalisations (as *Belagerung*) is existentially bound. Passive constructions as well as ung-nominalisations allow the optional realisation of the external argument as a *von / durch*-phrase (*by*-phrase).

(i) Leningrads Belagerung von durch Hitler

[6] Since the expression of the internal argument is not obligatory with ung-nominalisations (as it is also the case with some transitive verbs, e.g. *essen* 'to eat'), the variable corresponding to the unexpressed internal argument ('z' in the above formula) is also existentially bound if no postnominal argument is realised, cf. (i).

(i) [[Hitlers Belagerung]] = ιe∃z∃x [siege'(e,x,z) & R(e, Hitler')]

[7] Semantic, relation-denoting genitive also occurs on another class of modifiers. namely on genitive adverbials. Consider the synonymous (iab). In (ia). the adverbial phrase is marked for genitive.

(i) a. Abends waren wir schwimmen.
evening$_{GEN}$ were we swimming
'In the evening we went swimming.'

b. Am Abend waren wir schwimmen.
in.the evening were we swimming

Like other adverbial phrases, genitive adverbials are best treated as event modifiers which add a property to the event denoted by the VP. In (ib). the genitive adverbial has been replaced by a relation-denoting PP. The preposition denotes a relation IN which holds between an event of swimming by us and its location in time (evening). On the null hypothesis, the same relation is expressed by the genitive in (ia). Some further examples of genitive adverbials are given in (ii):

(ii) montag-s 'on Monday' jedenfall-s 'in any case' größtenteil-s 'for the most part'
Monday-CEN *any.case-GEN* *largest.part-GEN*

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Markedness Among CV Syllables

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1 Summary

The consonant-vowel (CV) syllable structure has been argued to be the least marked among syllable types (Greenberg 1978, Clements 1988). In selecting for a CV, however, which C is least marked? Using a sonority feature system developed by Clements (1988), Smolensky (1995) proposes a set of Alignment constraints which account for markedness among CV structures, the CV with the steepest sonority cline being optimal. This presentation will examine and modify this Alignment formulation and apply it to forms found in reduplication and first language acquisition data. There is evidence to support the idea that there are considerations of markedness among CV structures; the selection of one CV syllable over another can be traced to an unmarked ranking of constraints which include an Alignment constraint. These constraints select for the optimal syllable, a CV with the steepest sonority cline from onset to nucleus.

2 Background

Sonority sequencing has been under discussion for over a hundred years. This paper will use a modified version of the feature system proposed by Clements (1988a, 1988b, 1990); the modification includes the voicing and continuance distinctions noted by Whitney (1887) and Jespersen (1904).

2.1 Sonority sequences

(1) Whitney (1887)
Voiceless stops
Voiced stops
Fricatives
Nasals

Liquids and glides
Vowels

(2) Jespersen (1904)

Voiceless stops, Voiceless fricatives
Voiced stops
Voiced fricatives
Nasals, Laterals
r-sounds
High vowels
Mid vowels
Low vowels

(3) Clements (1988a, 1988b, 1990)

Obstruents
Nasals
Liquids
Glides
Vowels

Sonority Sequencing Principle:

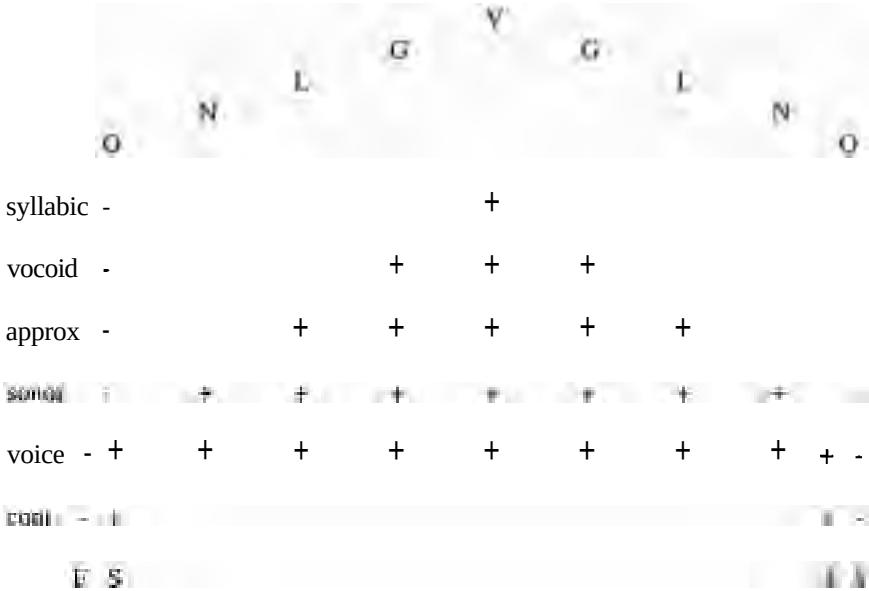
Between any member of a syllable and the syllable peak, only sounds of higher sonority rank are permitted.

(4) Sonority from Features (Clements 1988a)

	O	N	L	G	V
syllabic					+
vocoid				+	+
approximant	-		+	+	+
sonorant		+	+	+	+

(5) Sonority profile of a syllable

V	=	vowels
G	=	glides
L	=	liquids
N	=	nasals
O_v	=	voiced obstruents
O_{-v}	=	voiceless obstruents
F	=	fricatives
S	=	stops



2.2 Sonority from Alignment

(6) Align ($[_{\sigma}$, $[_{C}$) = Onset low in sonority
The left edge of every syllable must coincide with C;
C represents minus values of features (Smolensky 1995)

The Alignment constraint performs two functions: first, the constraint ensures that syllables will have onsets, since the constraint aligns consonants, which are C, to the left; second, using Clements' feature system to define C, the constraint ensures that those consonants aligned left will provide the steepest sonority cline from the edge of the syllable to the nucleus. As shown below in (7), there is alignment of all minus values at the left edge in the optimal syllable.

(7) **Align** ($[_{\sigma}$, $[_{C}$) = Align -syllabic
Align -vocoid
Align -approximant
Align -sonorant
Align -voice

Partial Structures (input missing)	Align ([σ , [c		
	O_{-V}	V	
syllabic	[-]	[+]	
vocoid	[-]	[+]	
approximant	[-]	[+]	
sonorant	[-]	[+]	
voice	[-]	[+]	
	O_V	V	
syllabic	[-]	[+]	
vocoid	[-]	[+]	
approximant	[-]	[+]	
sonorant	[-]	[+]	
voice	[+	I	*
	N	V	
syllabic	[-]	[+]	
vocoid	[-]	[+]	
approximant	[-]	[+]	
sonorant	[+	]	*
voice	[+	I	
	L	V	
syllabic	[-]	[+]	
vocoid	[-]	[+]	
approximant	[+	1	*
sonorant	[+	I	*
voice	[+	I	*

3 Constraints and Cancellation Lemma

(10) **Faithfulness Constraints:**
Correspondence Theory (McCarthy and Prince 1995): Given two strings S1 and S2, correspondence is a relationship Y from the elements of S1 to those of S2. Segments α of S1 and β of S2 are referred to as correspondents of one another when αYβ.
Max-IO

Every segment of the input has a correspondent in the output.
(No phonological deletion.)

Max-BR
Every segment of the base has a correspondent in the reduplicant.
The general schema is every segment of S1 has a correspondent in S2. Domain (Y) = S1

(Right,Left)-Anchor(S1,S2)
Any element at the designated periphery of S1 has a correspondent at the designated periphery of S2.

(11) Markedness Constraints:

*Complex (No complex onsets or codas.)
No more than one C or V may associate to any syllable position node.
(Prince and Smolensky 1993)

NoCoda
Syllables do not have codas.
(Prince and Smolensky (1993).

Align ([$_{\omega}$ [C)
The left edge of every syllable must coincide with C, and C represents
minus values for features (adapted from Smolensky 1995).

(12) Cancellation Lemma
Suppose two structures S_1 and S_2 both incur the same mark *m. Then to determine whether $S_1 > S_2$, we can omit *m from the list of marks of both S_1 and S_2 ('cancel the common mark') and compare S_1 and S_2 solely on the basis of the remaining marks. Applied iteratively, this means we can cancel all common marks and assess S_1 and S_2 by comparing only their unshared marks.
(Prince and Smolensky 1993)

	Constraint

Candidate A	X *! *
Candidate B	
A Candidate C	

4 Reduplication

4.1 Full **and partial reduplication in Gbe**

The **Gbe** languages can differ from each other in the type of reduplication chosen to perform the same grammatical function. They may use either full reduplication in which the entire syllable is copied or partial reduplication in which only part of the syllable is selected for copying. ***Peci,*** for example, reduplicates [lya] as [lalya] with a CV reduplicant, but ***Awlan, Waci, Aja&Gen, Pela, Phla&Fon*** use [lyalya] with a full copy CCV as the reduplicant. Data are from Capo (1991).

(13)

"to climb" ***Peci, Awlan, Waci, Aja&Gen, Pela, Phla&Fon***
/ lya / 6 **/ lalya/** / lya / 6 / lyalya /

"to tie" ***Peci, Gen,*** and ***Awlan Aja&Waci,*** and ***Agbome***
/ bla / 6 **/ babla /** / bla / 6 **/ blabla /**

(14) Reduplication in *Peci* for CG syllables

/ lya / 6 / lalya /	*Complex	Align ($[_\sigma$, $[_C$)	Max-BR
lyalya	**!	***	
☞ lalya	*	***	*
yalya	*	****!	*
alya	*	****!*	**

Other **Gbe** languages also make use of [lya] and reduplication for the same

grammatical function; however. the optimal reduplicated form in these languages is a copy of the entire syllable. Thus, [lya] is reduplicated as [lyalya]. In these languages, it is more important to be faithful to the base in selecting the reduplicant.

(IS) Reduplication in *Awlan, Waci, Aja&Gen, Pela, Phla&Fon* for CG syllables

	Align ($[_\sigma$, $[_C$)	Max-BR	*Complex
☞ lyalya	***		**
lalya	***	*!	*
yalya	****!	*	*
alya	****!*	**	*

4.2 Partial reduplication in Sanskrit

The Gbe languages contain sonority sequences on all onset clusters. Is the constraint Align ($[_\sigma$,$[_C$) doing any work which LeftAnchor could not do? In the Gbe languages, either constraint might work; however, reduplication in Sanskrit shows that an Alignment formulation is necessary. Sanskrit contains clusters in onsets which can be a sonority sequence or a reversal; the constraint Align ($[_\sigma$,$[_C$) ensures that the onset lowest in sonority will be selected, regardless of its position in the onset. The Sanskrit data are from Burrow (1955) and Gonda (1966).

(16) "spread"
/ prat^h / 6 / paprat^{h}a* /

"to stand"
/ st^{h}a- / 6 / tist^{h}a- /

(17) Selecting CV from Sonority Clines

a. Using Alignment: Reduplicated forms of O_{-V} LO_{-V} - /prath/ "spread"

/ prat^h / 6	*Complex	NoCoda	Align ($[_\sigma$, $[_C$)	Max-BR

/ paprat^{h}a* /				
prat^{h}prat^h	**!	**		
Apaprat^h	*	*		*
rat^{h}prat^h	*	**!	***	*
at^{h}prat^h	*	**!	*****	**
raprat^h	*	*	*!**	
aprat^h	*	*	*!****	

*tableau does not include suffixal /a /

b. Using Left-Anchor: Reduplicated forms of O$_{-V}$LO$_{-V}$- /prath/ "spread"

/ prat^h / 6 / paprat^{h}a* /	*Complex	NoCoda	Left-Anchor	Max-BR
prat^{h}prat^h	**!	**		
Apaprat^h	*	*		*
rat^{h}prat^h	*	**!	*	*
at^{h}prat^h	*	**!	*	**
raprat^h	*	*	*!	
aprat^h	*	*	*!	

*tableau does not include suffixal /a /

(18) Selecting CV from Sonority Reversals

a. Using Left-Anchor: Reduplicated forms of O$_{-V}$ O$_{-V}$ V-/st^{h}a/"to stand"

/ st^{h}a- / 6 / tist^{h}a- /	*Complex	Left-Anchor	Max-BR
st^{h}ast^{h}a	*!		
A sist^{h}a			*

tist^{h}a		*!	*
ist^{h}a		*!	**

*tableau does not account for shifts to [i] in the reduplicant and to retroflex [s] and [t] in the base

b. Using Align ([σ , [C) : Reduplicated forms of O.vO.vV- /st^{h}a/"to stand"

/ st^{h}a- / 6 / tist^{h}a- /	*Complex	Align ([σ , [C)	Max-BR
st^{h}ist^{h}a	*!	*	
sist^{h}a		*!	*
A tist^{h}a			*
ist^{h}a		*!****	**

*tableau does not account for shifts to [i] in the reduplicant and to retroflex [s] and [t] in the base

To summarize this section, the Alignment constraint can select from both sonority reversals and sonority clines in the base to produce the optimal CV structure in the reduplicant. It has been demonstrated in this section that selecting the first segment with a Left-Anchor constraint predicts the onset in the reduplicant only when the base contains a cluster with a sonority cline. Anchoring makes an incorrect prediction for a base with a sonority reversal.

5 Child Language Forms

5.1 Monosyllabic selections

Early child language forms also provide truncation of words and reductions of clusters. These forms provide evidence for the view that markedness constraints outrank faithfulness constraints (Gnadesikan 1995, Hironymous 1995). As shown below, the markedness constraints *Complex, NoCoda and Align ([σ,[C) are ranked above the faithfulness constraint Max-10. The constraints *Complex and NoCoda seek a CV, and the constraint Align ([σ , [C) seeks a particular type of C. If only one syllable can be selected from a target form, the syllable will be a CV structure containing the steepest sonority cline available from the target. For example, data

from Dutch, Italian, Chinese, and English speaking children (Demuth 1995, **Fikkert** 1995, Hironymous 1995) show that fa is the syllable selected from the target form **"elephant/olifant.≅**

(19) *fa* is selected from *o:li:fant*:

input 6 /o:li:fant/	*Complex	NoCoda	Align ([σ , [C)	Max-IO
A fa			*	*****
o:			**!***	******
li:			**!*	*****
fan		*!		****
fat		*!		****
fant	*!	*		***

5.2 Disyllabic selections

The following forms from early child language show that when children use disyllabic truncations, the stressed syllable is most often selected but that the second syllable of the disyllabic **form** can be either the rightmost syllable or one formed from the rightmost rime and another onset occurring in the target, one low in sonority. Child language data are from Pater and **Paradis** (1995) and Hironymous (1997)

(20)

	Target Word	Child Form
	broccoli	[baki] [bakχ]
	buffalo	[bχfo]
	camera	[kæmχ]
	chocolate	[tʃχkχt] [tʃχtʃɛt] [tʃχkɪt] [kakχ]
	Christopher	[krɪsfχ]
	favorite	[fevɪt]
	furniture	[fχtʃχ]
	Margaret	[margst] [margɪt]
	spatula	[bætʃχ]
	tricycle	[twaikχ]

Using Right-Anchor constraints proposed by Pater and **Paradis (1995),** we expect to see the rightmost syllable selected, as is the case with [efan] from **Aelephant.≅**

(21) **Ae-fan≅** selected from **Aelephant≅**

Aelephant≅	Stress-Faith	Right-Anchor
e **lχ**		*!
lχ fan	*!	
A e fan		

Under this analysis, however, we should expect to see selection of the forms marked * in the third column below; this is not what children generally produce.

(22) Child language disyllabic truncations

broccoli	[baki] **[bakχ]**	*[bali]
buffalo	**[bχ fo]**	*[bχ lo]
camera	[kæmχ]	*[kæra]
chocolate	[tʃχkχt] [tʃχtʃɛt] [tʃχkɪt] [kakχ]	*[tSχlχ]
favorite	**[fevɪt]**	*[fe rɪ]
margare	**[margɛt] [margɪt]**	*[ma rχ]
spatula	[bætʃχ]	*[bælχ]
tricycle	**[twaiklχ]**	*[traiχ]

Further, there are two winning candidates under the Pater and Paradis analysis since the Right-Anchor constraint says nothing about which onset should be selected. The constraint says only that any element at the right edge of the Input has a correspondent at the right edge of the Output.

(23) Two forms selected from Abroccoli≅ with Right-Anchor

/ brakχli /	Stress-Faith	Right-Anchor
bra kχ		*!
kχ li	*!	
A ba li		
∧ ba ki		

The target Abroccoli≅ is reanalyzed below with Align ([σ , [C) which selects for the CV with the steepest sonority cline, even if that CV must take its onset from the medial syllable and its rime from the rightmost syllable.

(24) Selection of the optimal syllable from Abroccoli≅

/ brakχli /	Stress-Faith	Align ([σ , [C)	Right-Anchor
ba kχ			*!
kχ li	*!	***	
ba li		*!**	
A ba ki			

To summarize this section, the Alignment constraint can select an optimal syllable, the CV with the steepest sonority cline, in child language in much the same way as it operates in reduplication. It has been demonstrated in this section that in monosyllabic and disyllabic forms in early child language, sonority as determined by Alignment and not just Anchoring determine the optimal form of the non-stressed syllable selected.

7 Conclusion

The Alignment constraint developed by Smolensky (1995), which uses the feature system for sonority proposed Clements (1988a, 1988b, 1990). can account for the selection of a CV syllable from among other possible CV syllables. The application of the Alignment constraint to analyses of cluster simplification in reduplicants and truncated forms in early child language provides insight into the role of sonority in selection of a CV syllable structure; the CV with a steep sonority cline from onset to nucleus emerges as optimal.

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"Unsplit" Split Antecedents*

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1 Introduction

It has been argued that Japanese has an option which combines discontinuous elements into a single constituent, as discussed in Saito (1994), Sohn (1994). Takano (1999), among others. Example (1b) is an instance of this phenomenon.

(1) a. *John-wa [$_{NP}$[$_{IP}$ sono hon-o naze katta] hito]-o sagasiteiru no
John-Top that book-Acc why bought person-Acc looking-for Q
'Q John is looking for [the person [that bought book why]]'
b. ??John-wa [$_{NP}$[$_{IP}$ nani-o naze katta] hito]-o sagasiteiru no
John-Top what-Acc why bought person-Acc looking-for Q
'Q John is looking for [the person [that bought what why]]'
(Saito 1994:204)

In (1a), wh-adjunct naze 'why' is within the Complex NP island and LF movement of naze results in the violation of the ECP. If we replace *sono* hon-o by the wh-argument *nani-o*, the sentence becomes more acceptable. Saito (1994) argues that naze adjoins to nani-o, which makes a complex wh and then the complex wh moves out of the island together without violating the ECP at LF. The idea is that the wh-adjunct can get a free ride to [Spec, CP] by adjoining to another wh-phrase which moves to [Spec, CP].

Sohn (1994) shows that making a complex phrase by adjunction takes place at overt syntax, based on the data given in (2).

(2) a. *Naze$_1$ John-wa [[Mary-ga t_1 sono hito-o uttaeta toiu] uwasa-o
why John-Top Mary-Nom the man-Acc sued that rumor-Acc
kiita no
heard Q
'Why, did John hear [the rumor [that Mary sued the man t_1]]?'

b. ?(?)[Sono hito-o_1 naze$_2$] John-wa [[Mary-ga [t_2 t_1] uttaeta toiu]
the man-Acc why John-Top Mary-Nom sued that
uwasa]-o kiita no
rumor-Acc heard Q (Sohn 1994:317)

According to Sohn (1994), in (2a), *naze* undergoes extraction out of the island, which violates the ECP and Subjacency. On the other hand, if *naze* is extracted with the argument *sono-hon-o* 'the man-Acc', the sentence becomes more acceptable. Sohn argues that in (2b) *naze* adjoins to *sono-hon-o,* and then the whole NP undergoes movement without violation of the ECP. *Naze* can get a free ride by adjunction to *sono-hon-o,* in the same way as (1b).

Takano (1999) argues that making discontinuous elements into a single constituent takes place in cleft constructions as well.

(3) a. Mary-ni ageta no-wa John-ga hon-o da
Mary–Dat gave NM-Top John-Nom book-Acc is
'It is John, books that gave to Mary.'
b. *It is [John the book] that gave to Mary

Example (3a) is an instance of cleft constructions in Japanese, where the element between the topic marker *wa* and the copular *da* is focused. What is of interest is that Japanese cleft constructions allow multiple foci, unlike English. As (3b) shows, English does not allow multiple foci in cleft constructions. In (3a), in contrast, the two elements, *John-ga* 'John-Nom' and *hon-o* 'book-Acc' occur in the focused position, which appears to be inconsistent with the common assumption that subjects and objects do not make a constituent. Given that elements which occur in the focused position must form a constituent, some explanation for (3a) is needed. Takano claims that *John-ga* 'John-Nom' adjoins to *hon-o* 'book-Acc' in the course of the derivation. In other words, movement makes the two discontinuous elements into a single constituent. In this paper, I call this type of movement "adjunction to arguments", which is involved in (1b), (2b), and (3a). In contrast, English does not allow adjunction to arguments and hence (3b) is ungrammatical.

The goal of this paper is to provide another instance of adjunction to arguments, based on split antecedents in Japanese. The organization of this paper is as follows. In section 2, I show that some anaphors allow split antecedents in Japanese, unlike English. In section 3, I would like to claim that the fact that some anaphors allow split antecedents in Japanese is due to the fact that Japanese allows adjunction to arguments. In section 4, 1 show that adjunction to arguments exhibits clause-boundedness in the case of split antecedents as well. In section 5, I derive the clause-boundedness effect from the Proper Binding Condition. In section 6, I sum up the paper.

2 Split Antecedents in Japanese

English anaphors do not allow split antecedents, as discussed in Higginbotham (1983:400), Lasnik and Uriagereka (1988:131), among others. The relevant example is given in (4).[1]

(4) *John$_1$ asked Mary$_2$ about themselves$_{1,2}$ (Lasnik and Uriagereka 1988:131)

Surprisingly, ***karera-zisin,*** which is a Japanese counterpart, behaves differently from ***themselves*** with this point. This is shown in (5).[2]

(5) John-ga$_1$ Tom-ni$_2$ karera-zisin-ni-tuite$_{1,2}$ hanasi-o sita
John -Nom Tom-Dat they-self-Dat-about talk-Acc did
'John$_1$ told Tom$_2$ about themselves$_{1,2}$.'

In (5), ***karera-zisin*** 'they-self' takes ***John-ga*** and ***Tom-ni,*** which are discontinuous, as its antecedent. Before going to give an explanation to (5), it is necessary to consider the validity of the assumption that ***karera-zisin*** is an anaphor like ***themselves.*** One might say that ***karera-zisin*** is a pronoun. If so, it would be natural that ***karera-zisin*** allows split antecedents in (5). This is because pronouns allow split antecedents in English, as shown in (6).

(6) John$_1$ told Bill$_2$ that they$_{1,2}$ should leave (Lasnik and Uriagereka 1988:131)

However, ***karera-zisin*** behaves as an anaphor like ***themselves.***

(7) a. *[Bob to Ken-ga]$_1$ [Mary-ga karera-zisin-o$_1$ hihansita to] itta
Bob and Ken-Nom Mary-Nom they-self-Acc criticized that said
'[Bob and Ken]$_1$ said that Mary criticized themselves$_1$.'
b. *[Bob to Ken-no]$_1$-hahaoya-ga karera-zisin-o$_1$ hihansita
Bob and Ken-Gen-mother-Nom they-self-Acc criticized
'[Bob and Ken's]$_1$ mother criticized themselves$_1$.'

The ungrammaticality of (7a) shows that ***karera-zisin*** is a local anaphor. In other words, ***karera-zisin*** cannot take an NP in the higher clause as its antecedent. As (7b) shows, antecedents of ***karera-zisin*** must c-command it. With this point, ***karera-zisin*** behaves like anaphors in English.

(8) a. *[Bob and Ken]$_1$ said that Mary criticized themselves$_1$.
b. *[Bob and Ken's]$_1$ mother criticized themselves$_1$.'

Based on the discussion so far, in this paper, crucially, I assume that ***karera-zisin*** is an anaphor. In what follows, I would like to claim that the fact that ***karera-zisin***

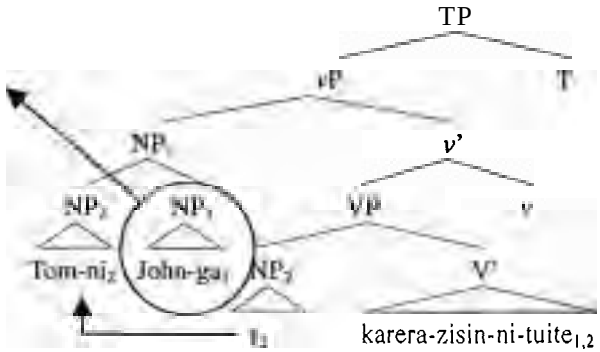
allows split antecedents is naturally explained by assuming that Japanese has an option which combines discontinuous elements into a single constituent.[3]

3 A proposal

In this section. I would like to propose that Japanese has an option of combining split antecedents into one single constituent, that is, a single antecedent, by movement at overt syntax. In Japanese, this option is independently motivated by the phenomena given in (1-3a) other than split antecedents. In contrast, English does not have this option. Following Takano (1999), I assume that the relevant movement is scrambling. Under this proposal, (9a) has the derivation given in (9b).

(9) a. John-ga$_1$ Tom-ni$_2$ karera-zisin-ni-tuite$_{1,2}$ hanasi-o sita
John -Nom Tom-Dat they-self-Dat-about talk-Acc did
'John, told Tom$_2$ about themselves$_{1,2}$.'

b.



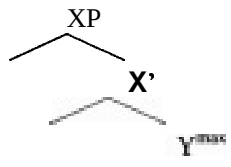
karera-zisin-ni-tuite$_{1,2}$ hanasi-o sita

c. Tom-ni$_2$ John-ga$_1$ karera-zisin-ni-tuite$_{1,2}$ hanasi-o sita

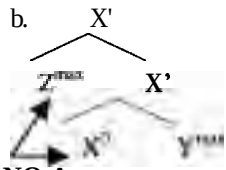
In (9b), ***Tom-ni*** undergoes movement and adjoins to ***John-ga,*** which is in [Spec, *v*P]. This type of adjunction is used in other constructions, as has been discussed in (1-3a). The whole NP binds anaphor ***karera-zisin,*** and hence Binding Condition A is satisfied.[4] Then, ***John-ga*** undergoes scrambling.[5] In (9b), ***John-ga*** does not have to undergo scrambling because scrambling is an optional movement. If ***John-ga*** is not scrambled, then the sentence in (9c) will be derived.

Let us consider why Japanese allows cases where a given NP can adjoin to another NP while English does not. I suggest that this parametric difference is derived from the presence or absence of Spec-head agreement in these languages, under Fukui's (1986, 1995) Relativized X-bar theory.[6] Under Fukui's Relativized X'-theory, a projection is closed when there is an agreement relation between a

head and a maximal projection in some specific configuration, like (10a). In contrast, if there is no agreement relation, a projection is not closed, like (10b).

(10) a. 

Agree ent

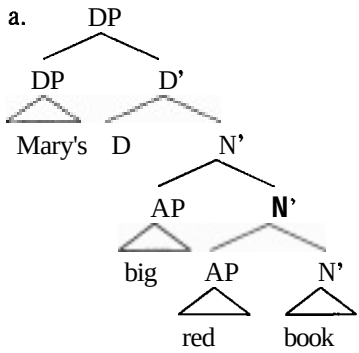
b. 

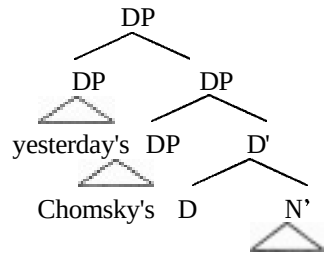
NO Agreement

Under the assumption that only functional categories induce agreement, it follows that maximal projections of lexical categories are always X' like (10b) while maximal projections of functional categories which induce agreement are like (10a). Fukui assumes that free recursion of X' is allowed but recursion of XP is not allowed. Under Fukui's theory. there is only one element which induces agreement with a head. This captures the contrast between (I 1a) and (I1b).

(I I) a. Mary's big red book
b. *yesterday's Chomsky's lecture (Fukui 1995:14-15)

What (I 1a) shows is that more than one adjective which modifies a head N can occur. The ungrammaticality of (I 1b) shows that agreement inducing phrases cannot occur multiply. Under Fukui's theory, the examples in (I I) should be analyzed as shown in (12), respectively.

(12) a. 

b. 

As (12) shows, recursion of a single-bar projection is allowed. In contrast, recursion of double-bar projection, which is DP in (12), is not allowed.

Let us turn to our main concern, that is, cases where an argument adjoins to another argument. Under the assumption that English D induces an agreement, the projection of D is closed. If a given argument adjoined to another argument, DP recursion should take place necessarily, on a par with (12b). In contrast, Japanese

D does not induce agreement and hence the projection of D is not closed. Japanese allows adjunction to arguments because DP recursion will not take place.

I have claimed that the adjunction of an antecedent to another antecedent takes place at overt syntax. Here, I examine an alternative possibility that this process of adjunction takes place at LF. However, this possibility has a problem. Remember that I have assumed that an antecedent is scrambled and adjoins to another antecedent. It is generally assumed that Japanese has no scrambling at LF. In (13a), the universal quantifier does not take wide scope over the existential quantifier but in (13b), the wide scope of the scrambled quantifier is possible.

(13) a. Dareka-ga **dono** gakusei-ni-mo denwasita (*every> some)
someone-Nom every student-Dat-Prt called
'Someone called every student.'

b. **Dono gakusei-ni-mo**$_1$ dareka-ga t_1 denwasita (every> some)
every student-Dat-Prt someone-Nom called
'Someone called every student.'

If scrambling took place at LF, (13a) would have the reading where the universal quantifier takes wide scope over the existential quantifier on a par with (13b). However, this is not the case. That is why it is hard to claim that scrambling takes place at LF.

4 Locality

In this section, I would like to consider locality of adjunction to arguments. Sohn (1994) proposes that discontinuous elements which are combined by adjunction should be in the same clause, based on the ungrammaticality of (14).

(14) ***Dare-o**$_1$ **naze**$_2$ **kimi-wa** [Mary-ga t_2 [John-ga t_1 sukida to] omoteiru
who-Acc why you-Top Mary-Nom John-Nom like that think
to iu **uwasa]-o** kiita no
that rumor-Acc heard Q
'Q You heard [the rumor that Mary thought [John liked whom] why]'
(Sohn 1994:318)

In (14), ***dare-o*** 'who-Acc' and ***naze*** 'why' are in the different clause. Even if ***dare-o*** 'who-Acc' were extracted with *naze* 'why', (14) is still unacceptable. The ungrammaticality of (14) shows that movement which combines two elements is clause-bounded.

Koizumi (1995) observes that multiple foci construction also exhibits clause-boundedness.

(15) a. Mary-ga Tom-ni [John-ga ringo-o tabeta to] itta
Mary-Nom Tom-Dat John-Nom apple-Acc ate that said
'Mary said to Tom that John ate apples.'

b. *Mary-ga John-ga tabeta to itta no wa ringo-o
Mary-Nom John-Nom ate that said-NM Top apple-Acc
Tom-ni da
Tom-Dat is
'It is apples, to Tom that Mary said that John ate.'

As shown in (15b), it is not possible to cleft the matrix argument along with the argument in the embedded clause. Under the analysis that the two elements which appear in the focus position are combined into a single constituent, the ungrammaticality of (15b) shows that the relevant movement should be also clause-bounded.

Let us turn to our main concern, that is, the case of split antecedents. If the present analysis is correct, then (16) is predicted.

(16) Prediction: Antecedents of ***karera-zisin*** should be in the same clause.

In the reminder of this section, I examine whether this prediction is borne out. However, it seems to be impossible to test this prediction because ***karera-zisin*** is a local anaphor, in the first place.

(17) a. NP_1 .....[$_{CP}$ .....NP_2.....karerazisin$_{1,2}$.....]

b. [NP_2 NP_1] ...[$_{CP}$...t_2.....karerazisin$_{1,2}$.....] --- > *Binding Condition A

Suppose that one of the antecedents of ***karera-zisin*** is in the same clause as it and the other antecedent is in the higher clause, as shown in (17a). It seems that if NP_2 is scrambled and adjoins to NP_1 and the resulting sentence is ungrammatical, the prediction is bone out. However, the configuration regarding binding in (17b) violates Binding Condition A independently because ***karera-zisin*** and its antecedent are not in the same clause. In other words, Binding Condition A is violated, regardless of the locality of the movement of NP_2 in (17b).

To avoid this circumstance, I put the anaphor in the subject position of the embedded clause. It is well known that Japanese anaphors do not exhibit what is called Nominative Island Condition (NIC) effect. Even local anaphors like ***karera-zisin*** can take an antecedent in the higher clause, as shown in (18).

(18) [Bob to Ken-gal$_1$ [karera-zisin-ga$_1$ Tom-o hihansita to] itta
Bob and Ken-Nom they-self -Nom Tom-Acc criticized that said
'[Bob and Ken]$_1$ said that themselves$_1$ criticized Tom.'

Furthermore, as (19) shows, ***karera-zisin*** can allow split antecedents in the higher clause.

(19) Bob-ga$_1$ Ken-ni$_2$ [karera-zisin-ga$_{1,2}$ Tom-o hihansuru bekidatta
Bob-Nom Ken-Dat they-self -Nom Tom-Acc criticize should -have
to] itta
that said
'Bob$_1$ said to Ken$_2$ that themselves$_{1,2}$ should have criticized Tom.'

As (20) shows, ***karera-zisin*** cannot take split antecedents without movement.

(20) *Bob-ga$_1$ [karera-zisin-no-titioya-ga$_{1,2}$ John-o$_2$ hihansuru
Bob-Nom they-self –Gen-father-Nom John-Acc criticize
bekidatta to] itta
should-have that said
'Bob$_1$ said that themselves's father $_{1,2}$ should criticize John$_2$.'

Crucially, even if ***John-o*** 'John-Acc' undergoes scrambling, the sentence does not improve. This is shown in (21).

(21) *[[$_{NP1}$ [$_{NP2}$ John-o$_2$][$_{NP1}$ Bob-ga$_1$]] [karera-zisin-no-titioya-ga$_{1,2}$ t_2
hihansuru beki datta to] itta]

In (21), ***John-o*** 'John-Acc' undergoes movement across the clause boundary and adjoins to the matrix subject ***Bob-ga*** 'Bob-Nom'. However, the sentence does not improve. The ungrammaticality of (21) shows that the relevant movement is clause-bounded. In other words, the prediction given in (16) is bone out.

5 Deriving the Clause-Boundedness[7]

In the previous section, I have argued that making split antecedents into a single antecedent exhibits the clause-boundedness. In this section, I would like to suggest that this clause-boundedness effect is derived from the Proper Binding Condition (henceforth PBC). Before going to the clause-boundedness. let me go back to the tree given in (9b) to consider the trace which ***Tom-ni*** leaves behind. Note that in (9b), the scrambled NP, ***Tom-ni*** fails to c-command its trace.[8] It must be the case that this leads to the violation of the PBC. I would like to propose that movement of ***Tom-ni*** does not leave a trace and hence the PBC is satisfied. This proposal involves two crucial assumptions. The first assumption is that clause internal scrambling can be A-movement.

As noted by Tada (1990), Saito (1992). among others, clause internal scrambling

can be A-movement.

(22) a. ?*[sono tyosya]-ga$_1$ dono hon-ni-mo$_1$ keti-o tuketa
its author-Nom which book-to-even gave-criticism
'Its author criticized every book.'
b. Dono hon-ni-mo$_1$ [sono tyosya]-ga$_1$ t_1 keti-o tuketa
which book-to-even its author-Nom gave-criticism
'Every book, its author criticized.' (Saito 2001: 5)

As (22b) shows, the clause internally scrambled element, ***dono hon-ni-mo*** 'which book-to-even' can be a binder of the bound pronoun. With this point, clause-internal scrambling behaves like NP-raising in English.

(23) Everyone$_1$ seems to his$_1$ mother [t_1 to be smart]

In contrast to clause-internal scrambling, long distance scrambling cannot be A-movement.

(24) ?*Dono hon-ni-mo$_1$ [sono tyosya]-ga [Hanako-ga t_1 keti-o tuketa]
which book-to-even its author-Nom Hanako-Nom gave-criticism
to itta
that said
'Every book, its author said that Hanako criticized.' (ibid.: 6)

In (23), ***dono hon-ni-mo*** is scrambled to the sentence initial position, crossing the clause boundary, but cannot bind the bound pronoun. The contrast between (22b) and (24) shows that clause internal scrambling can be A-movement while long distance scrambling is A'-movement.

In this paper, I have assumed that adjunction to arguments is scrambling. With this assumption, it is concluded that if adjunction to arguments takes place clause internally, it can be A-movement. However, if this operation takes place, across the clause boundary, it must be A'-movement.

The second one is Lasnik's (1999) assumption that A-movement does not leave a trace.

(25) a. (it seems that) everyone isn't there yet (every>Neg, Neg>every)
b. everyone$_1$ seems [$_{TP}$ t_1 not to be there yet] (every>Neg, *Neg>every)
(Lasnik 1999: 194)

In (25a), negation can take scope over ***everyone*** but in (25b), the interpretation is not possible. Based on this fact, Lasnik (1999) claims that A-movement does not leave a trace.

Given the two assumptions above, the clause-boundedness in question is

naturally derived. If adjunction to arguments takes place clause internally, the movement does not leave a trace and the PBC is satisfied. In contrast, if the relevant operation takes place across the clause boundary, it leaves a trace because it is long distance scrambling, which is A'-movement. Consequently, the PBC is violated. Therefore, adjunction to arguments must be clause-bounded.

6 Summary

In this paper, I have provided further evidence for the existence of making discontinuous elements into a single constituent in Japanese, based on split antecedents. In addition, I have shown that this operation is clause-bounded and proposed that the clause-boundedness is derived from the Proper Binding Condition.

Notes

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[1] Note that "picture-noun reflexives" allow split antecedents in English. as pointed out by Helke (1970) and Bouchard (1982: 35). The relevant example is given in (i).

(i) John_1 showed Mary_2 pictures of $\text{themselves}_{1,2}$. (Bouchard 1982:35)

I thank Norvin Richards (personal communication) for bringing my attention to this fact The grammaticality of (i) seems to be due to the pronominal-like property of "picture-noun reflexives". which behave like pronouns rather than anaphors with many points. For example, "picture-noun reflexives" do not have a syntactic antecedent as shown in (ii).

(ii) This is a picture of myself which wa. taken years ago.

The property of "picture-noun reflexives" is beyond of the scope of this paper.

[2] Originally, Fukui (1984:24) and Katada (1990:72) observe that some anaphors allow split antecedents in Japanese.

(i) a. John-ga_1 Mary-ni_2 [Bill-ga $\text{zibun-tati-o}_{1,2}$ waruku itteiru] to siraseta (koto)
John-Nom Mary-Dat Bill-Nom self-PI-Acc badly is saying that reported
'John_1 reported to Mary_2 that Bill was speaking ill of $\text{them}_{1,2}$.'

b. Gaku-tyoo-ga_1 Gakubu-tyoo-ni_2 [aru gakusei-ga kinoo $\text{zibun-tati-o}_{1,2}$
President-Nom dean-Dat some student-Nom yesterday self-PI-Acc
kokuso sita] to tugeta (koto)
accusation did that told
'The president_1 told the dean_2 that some student sued $\text{them}_{1,2}$ yesterday.' (Fukui 1984:24)

(ii) Taroo-ga$_1$ Ziroo-ni$_2$ zibun-tati/zibun-tati-zisin/karera-zisin$_{1,2}$-no keikaku-o hanasita
Taroo-Nom Ziroo-Dat self-Pl/self-Pl-self/they-self/-Gen plan-Acc told
'Taro told Ziro about their plan.' (Katada 1990:72)

A word is in order. Fukui (1984) presents (i) as one of the instances of pronominal-like property of zibun. As (i) and (ii) show, *zibun-tati* also allows split antecedents but *zibun-tati* exhibits different behavior from *themselves*. Specifically. *zibun-tati* allows long distance binding and exhibits subject orientation.

(iii) a. [John to Mary]-ga$_i$ [Bill-ga zibun-tati-o$_i$ waruku itteiru] to itta
John and Mary-Nom Bill-Nom self-Pl-Acc badly is saying that said
'John and Mary$_i$ said that Bill was speaking ill of them$_i$.'
b. *Bill-ga [John to Mary]-ni$_i$ zibun-tati-no$_i$ syasin-o ageta
Bill-Nom John and Mary-Dat Self-Pl-Gen picture-Acc gave
'Bill gave [John and Mary]$_i$ pictures of themselves$_i$.'

In this paper. I restrict myself to discussion about *karera-zisin*. I will not discuss *zibun-tati* because it has more complicated properties than *karera-zisin*. I will leave this issue for future research. See Kawasaki (1988) for *zibun-tati*.

[1] In this paper. I assume that Japanese anaphors are subject to the same mechanism of licensing anaphoric expressions as English ones. In principle, however, there is another possibility that English and Japanese have quite different systems for licensing anaphoric expressions, as Naoki Fukui (personal communication). I leave examining this possibility for future research.

[4] In this paper, I assume that an antecedent of anaphors must be a single constituent. Of course, this assumption should be given a principled explanation. In this paper. I adopt Lebeaux's (1983) "anaphor raising" approach. I assume that anaphors raise to the local domain of antecedents for licensing. Under this type of approach, if antecedents of anaphors are split, it must be the case that an anaphor moves to more than one syntactic position. However, this is impossible. See also Hornstein (2001) for a different approach to why anaphors do not allow split antecedents.

[5] Makoto Kadowaki (personal communication) points out to me that the following sentence is problematic to the present analysis.

(i) *John-ga$_i$ karerazisin-no$_{1,2}$ hahaoya-ni Tom-ni-tuite$_2$ hanasi-o sita
John-Nom they-self-Gen mother-Dat Tom-Dat-about talk-Acc did
'John$_1$ told themselves'$_{1,2}$ mother about Tom$_2$.'

Under the present analysis, (i) would have the following derivation.

(ii) a. John-gal karerazisin-no$_{1,2}$ hahaoya-ni Tom-ni-tuite$_2$ hanasi-o sita
b. [Tom-ni-tuite$_2$ John-ga$_i$] karerazisin-no$_{1,2}$ hahaoya-ni t_2 hanasi-o sita
c. [karerazisin-no$_{1,2}$ hahaoya-ni]$_3$ [Tom-ni-tuite$_2$ John-gal] t_3 hahaoya-ni t_2 hanasi-o sita
d. John-ga$_i$ [karerazisin-no$_{1,2}$ hahaoya-ni]$_3$ [Tom-ni-tuite$_2$ t_1] t_3 hahaoya-ni t_2 hanasi-o sita

Under the present analysis, there is nothing wrong with the derivation given in (ii). I leave this issue for future research.

[6] Takano (1999) makes a similar proposal for the parametric variation of cleft constructions between English and Japanese.

[7] I am thankful to S.-I. Takahashi (personal communication) for discussion about the issue in this section.

[8] In this paper. I adopt the following definition of "c-command.

(i) Node A c(onstituent)-commands node B if neither A nor B dominates the other and the first branching node which dominates A dominates B. (Reinhart 1976: 32)

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The Consequences of Richness of the Base for Glottalization of Nuu-chah-nulth Obstruents*

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1 Introduction

Nuu-chah-nulth is part of the Southern Wakashan branch of the Wakashan language family and constitutes a string of dialects spoken along the west coast of Vancouver Island, Canada.[1] Drawing upon my own fieldwork on Nuu-chah-nulth, this study investigates glottalized obstruents and the pervasive phonological process known as "glottalization". Glottalization is a phonological phenomenon where a plain consonant becomes its glottalized counterpart. The triggering factor for this process in Nuu-chah-nulth has been considered to **be** an adjacent glottal stop /ʔ/ (Sapir 1938, Rose 1976).

The patterns observed in Nuu-chah-nulth are significant because glottalization is relatively rare in the world's languages and because the particular patterns of glottalization in this language exhibit some rather unique properties. Previous studies (Sapir 1938, Rose 1976, Gamble 1977, Howe & Pulleyblank 2001) deal with only some properties of glottalization in Nuu-chah-nulth. The goal of this research is to provide a complete account of characteristics of glottalized obstruents and glottalization in Nuu-chah-nulth within Optimality Theory (McCarthy & Prince 1993b, 1995, Prince & Smolensky 1993, Pulleyblank 1996 among others).

Section 2 illustrates the examples at issue, and section 3 discusses the problems raised by the Nuu-chah-nulth data. In section 3, I provide an account of the issue, introducing the basic mechanisms used for the analysis. Section 4 summarizes the key ideas of this study.

2 Data

The inventory of phonemic consonants in Nuu-chah-nulth exhibits not only the fact that glottalized consonants are independently phonemic but also which kinds of consonants are affected in terms of glottalization. In this section, therefore, I provide the phonemic inventory and then the data.

2.1 The consonant inventory of Nuu-chah-nulth

Consonants show contrasts in extensive places of articulation in Nuu-chah-nulth. The consonant chart in (1) shows that each stop (except for the uvular and the labio-uvular stops), affricate, and sonorant has a glottalized counterpart whereas a fricative does not.[2]

(1) The phonemic consonant inventory of Nuu-chah-nulth

	Labial	Alveolar	Palatal	Lateral	Velar	Labiovelar	Uvular	Labio-uvular	Pharyngeal	Glottal
Stops	p	t			k	k^w	q	q^w		
Glottalized	$\dot{p}$	$\dot{t}$			$\dot{k}$	$\dot{k}^w$			ʕ	ʔ
Affricates		c	č	ƛ						
Glottalized		$\dot{c}$	$\dot{č}$	$\dot{ƛ}$						
Fricatives		s	š	ɬ	x	x^w	χ	$χ^w$	ħ	h
Sonorants	m	n	y			w				
Glottalized	$\dot{m}$	$\dot{n}$	$\dot{y}$			$\dot{w}$				

The evidence that Nuu-chah-nulth has underlying glottalized consonants comes from Nuu-chah-nulth morphological and phonological structures. In Nuu-chah-nulth, every root begins with one and only one consonant, and only one consonant can occupy onset position in the syllable (Haas 1969). Given the requirement that an onset is limited to a single consonant, the presence of root morphemes which begin with a glottalized consonant show that a glottalized consonant is not a consonant cluster but a single consonant with a glottal constriction.

2.2 Data

In morphologically complex Nuu-chah-nulth words, some suffixes trigger glottalization of an immediately preceding consonant. (3) exemplifies both the glottalizing suffix *-ʔap* 'CAUS' and the non-glottalizing suffix *-ʔiš* '3sg/IND'.[3]

(3) yaaʔak-ʔap-ʔiš John yaaʔakaṗʔiš John.
care-CAUS-3sg/IND 'She likes John'

When a glottalizing suffix attaches to a stem, an immediately preceding plain obstruent becomes glottalized. However, there are asymmetries between osbstruents: stops/affricates vs. fricatives. In the following sections, the data are given to motivate the phonetic aspects.

2.2.1 Stops/affricates

In Nuu-chah-nulth, the glottal element of a glottalizing suffix always causes a preceding stop/affricate to be glottalized as follows: voiceless stops such as /p, t, k/ become their glottalized counterparts /ṗ, t̓, k̓/, as shown in (4a-c), and voiceless affricates such as /ƛ, c/ become glottalized into /ƛ̓, c̓/, as shown in (4d-e):

(4) a. wik-stup-ʔaqƛ → wikstuṗaqƛ
not-thing-inside 'nothing inside'

b. hapt-ʔaaʔa → hapt̓aaʔa
to hide-on the rock 'hiding (among) the rocks'

c. tupk-ʔaqƛ → tupk̓aqƛ
black-inside '(something) black inside'

d. maƛ-ʔaaʔa → maƛ̓aaʔa
tied-on the rock 'being tied to the rock'

e. čiic-ʔas → jiiCas
to fish-to go s.w. to do s.t. 'going s.w. to fish'

2.2.2 Fricatives

While stops/affricates never fail to be glottalized when immediately preceding a glottalizing suffix, fricatives are only glottalized in certain lexical items as in (5a) and (5c); in fact, they become glottalized glides: a coronal fricative becomes a coronal glottalized glide /y̓/, and a non-coronal fricative a velar glottalized glide /w̓/. On the other hand, when a stem-final fricative is not affected by a glottalizing suffix, the surface form is a plain fricative followed by a glottal stop as in (5b) and (5d).

(5)a. t̓uḥ-ʔaqƛ → t̓uw̓aqƛ
head-insidetconsuming 'eating (fish) head'

b. ƛ̓iḥ-ʔaqƛ-y̓ak → ƛ̓iḥʔaqƛ-y̓ak
driving-inside-instrument 'shirt'

c. k̓ʷis-ʔic → k̓ʷiy̓ic
snow-eating 'eating snow'

d. ciyapuxs-ʔic → ciyapuxsʔic
hat-eating 'biting a hat'

The data above raise the following questions:

1. How do we distinguish the glottal element of a glottalizing suffix from that of a non-glottalizing suffix?
2. How do we explain the consistent glottalization of stops/affricates, and the variable glottalization of fricatives?
3. How do we explain the emergence of a glottalized glide, not a glottalized fricative, when an underlying fricative is affected by a glottalizing suffix?

3 Analysis

In this section, I discuss the issues raised at the end of section 2. Sections 3.1 discusses the first issue; sections 3.2 discusses Richness of the Base, which provides an account of the remaining issues.

3.1 A floating feature [Constricted Glottis]

In Nuu-chah-nulth, glottalization occurs only between morphemes. However, as shown in (6), repeated from (3), only some suffixes with a glottal stop triggers glottalization:

(6) yaaʔak-ʔap-ʔiƛ John → yaaʔak̓ap̓ʔiƛ John.
care-CAUS-3sg/IND 'She likes John'

Therefore, we need to distinguish each glottal element in these two kinds of suffixes: glottalizing, and non-glottalizing. I propose that for a glottalizing suffix, trigger is not the glottal stop /ʔ/ itself, but that a glottalizing suffix includes a floating feature [Constricted Glottis] (henceforth [C.G.]). A non-glottalizing suffix, on the other hand, has a glottal stop (Shaw 1989, Howe 1996, Zoll 1996). They are represented as in (7). and thus (6) can be represented as (8), using this distinction.

(7) a. Glottalizing Suffix: [C.G.]VX b. Non-glottalizing Suffix: ? VX

(8) yaa?ak- [C.G.] ap-?iš John → yaa?akap?iš John
like-CAUS-3sg 'S/he likes John.'

In (7a), the floating feature of a glottalizing suffix needs a root node in order to appear on the surface: as glottalization on a preceding segment or as a full glottal stop, depending on the phonological context. On the other hand, a feature already linked to a root node, as shown in (7b), does not have to link to another root node, which is why a glottal stop of a non-glottalizing suffix does not affect a preceding sound.

3.2 Obstruents in glottalization

The data in section 2 show that there are asymmetries between obstruents with respect to the phonemic inventory and glottalization. Stops/affricates have plain-glottalized pairs, and plain stopslaffricates never fail to be glottalized when preceding a glottalizing suffix. On the other hand, fricatives do not have glottalized counterparts and there is alternation between fricatives in terms of glottalization: only some stem-final fricatives are affected when preceding a glottalizing suffix, surfacing as a glottalized glide.

In this section, I will discuss why obstruents behave in such a different way in glottalization and how to treat these phonological asymmetries.

3.2.1 Stops/affricates

Noted as early as Sapir (1938), a very large number of American indigenous languages have glottalized stopslaffricates (ejectives), whereas glottalized fricatives are very rare (also, see Wang 1968, Greenberg 1970, Lindau 1984, Maddieson 1984).[4] Besides, glottalization of a plain stoplaffricate triggered by a glottalizing suffix is a common phenomenon in this area (Steriade 1997, Caldecott 1999, Howe & Pulleyblank 2001).

In Nuu-chah-nulth, a plain stoplaffricate has a glottalized counterpart and it never fails to be glottalized when preceding a glottalizing suffix. That is, an underlying glottalized stoplaffricate maintains its property of glottalic constriction on the surface, and an input floating [C.G.] is realized on an immediately preceding stoplaffricate. These two phonological properties are guaranteed by ranking a faithfulness constraint MAX[C.G.], (9a), over a markedness constraint *[Cons][C.G.], (9b).

(9) a. MAX[C.G.]:[C.G.] in the input must have a correspondent in the output.

b. ***[Cons][C.G.]**: [Cons] and [C.G.] cannot cooccur.

Another faithfulness constraint **DEPPATH[C.G.], (10),** must be violated when the [C.G.] feature appears on the surface, whether as glottalization on a preceding consonant or as a glottal stop, in order to obey the higher-ranked constraint **MAX[C.G.]**:

(10) **DEPPATH[C.G.]**: Any output path between [C.G.] and an anchor must have a correspondent path in the input.

Finally, we need the Contiguity constraint, (11). This is also highly ranked to restrict the anchor to which the floating feature links.

(11) CONTIGUITY: The adjacency relationship between elements in the input is consistent with that of the output.

(12) is the ranking of these constraints:

(12) **MAX[C.G.],** CONTIGUITY >> **DEP[RootNode]** >> **DEPPATH[C.G.],** *[Cons][C.G.]

The following tableau shows how these constraints work, causing a plain stop to surface as a glottalized stop (for reasons of space, I will only provide discussions of derived glottalized consonants):

(13) tupk–**[C.G.]aqƛ̓** tupk̓aqƛ̓
black-inside/consuming '(something) black inside'

Tableau

tupk[C.G.]aqƛ̓	MAX[C.G.]	CONTI-GUITY	DEP[R-Node]	DEPPATH [C.G.]	*[Cons] [C.G.]
☞ a. tupk̓aqƛ̓				*	*
b. tupk?aqƛ̓			*!	*	
c. tup̓kaqƛ̓		*!		*	*
d. tupkaqƛ̓	*!				

In Tableau (13), where a **glottalizing** suffix is attached to a stop, candidate d violates the highly-ranked constraint **MAX[C.G.],** which disallows the input feature [C.G.] to be deleted in the output. Candidates c is ruled out by violating the constraint CONTIGUITY, which requires that the adjacency relationship

between elements in the input be consistent with that of the output. The feature [C.G.] is immediately adjacent to the vowel /a/ in the input, but there is an intermediate segment, /k/, between them in the output. The DEP[RootNode] constraint determines candidate a as an optimal output. Candidate b violates this constraint by inserting a root node.

In sum, Nuu-chah-nulth grammar requires that when the target consonant in the glottalization process is a stop or an affricate, it must be glottalized.

3.2.2 Fricatives

Nuu-chah-nulth has fricatives with a relatively bigger set of contrasts in extensive places of articulation: from alveolar to glottal (see the consonant chart (1)). On the other hand, fricatives are the only set without a glottalized counterpart in this language. Also, when a fricative precedes a glottalizing suffix, it is not glottalized; instead, it surfaces either as a plain fricative followed by a glottal stop or as a glottalized glide depending upon lexical items.

First of all, the absence of glottalized fricatives in Nuu-chah-nulth can be treated in terms of an articulatory mechanism of sound production. When a fricative is produced, an air tunnel is formed, by which frication of air energy is made. On the other hand, a glottalic sound is produced by a combination of constriction and rapid vertical movement of the glottis and air compression in a small chamber in the mouth. Consequently, if a fricative is produced accompanied with the constriction of the glottis, there is a lack of enough continuous air movement for a fricative. This makes it difficult to make a glottalized fricative (Wang 1968, Greenberg 1970, and Lindau 1984). This articulatory difficulty in the production of glottalized fricatives may lead to the fact that glottalized fricatives are very rare cross-linguistically (cf. Maddieson 1984). The following markedness constraint, which is highly-ranked in Nuu-chah-nulth as well as cross-linguistically in general, disallows a glottalized fricative to surface.'

(14) ***[Cons][Cont][C.G.]:** [Cons], [Cont] and [C.G.] cannot cooccur

Another unique aspect of Nuu-chah-nulth fricatives with respect to glottalization is that only some stem-final fricatives are affected by a glottalizing suffix; they become a glottalized glide when preceding a glottalizing suffix. I repeat part of the relevant data in (15) for convenience:

(15) a. t̓uɬ-[C.G.]aqɬ → t̓uw̓aqɬ
head-inside/consuming 'eating (fish) head'

b. x̌iɬ-[C.G.]aqɬ-y̓ak → x̌iɬʔaqɬy̓ak
driving-inside-instrument 'shirt'

In (15a) the stem-final fricative becomes a glottalized glide, while the phonetically identical sound in (15b) does not change even though it precedes the same suffix. Therefore, it can be said that this alternation is not determined by phonetic factors.

The question is how to phonologically distinguish a fricative that is affected by a glottalizing suffix and one that is not. I suggest that the alternation between the same sets of fricatives is due to the principle that features as phonological primitives can be combined freely: Richness of the Base (Prince & Smolensky 1993, Smolensky 1996), but subject to the Grounding Conditions (Archangeli & Pulleyblank 1994). Certain well-formed ones from a rich set of feature combinations surface as an output form.

3.3 Combination of features: fricatives

For plain fricatives, I provide the combinations of the features [Cons] and [Cont], whose specific values are essential in order for a fricative to surface: I only provide features and their combination relevant to my discussion. (16) shows four possibilities of the two features' combination:

(16) Feature combinations of [Cons] and [Cont]

a. [Cons] [Cont] b. [1 [Cont] c. [Cons 1 [ ] d. [1 [ ]

Each combination realizes a sound on the surface, which can be a fricative or some other sound. The presence of both features [Cons] and [Cont] is essential for a fricative on the surface. If both features are already combined in the input as in (16a), a fricative will surface straightforwardly. In order to realize a fricative from the other combinations, however, we need a phonological mechanism by which either [Cons] or [Cont] or both are added to an input feature combination. This process can be done by Have[α] constraints (cf. Padgett 2001). Those constraints take effects depending on cross-linguistic or language-specific markedness status of the feature of interest.

Of the possibilities of feature combinations in (16), (a) and (b) only lead to the realization of a plain fricative (see Kim 2001 for detailed discussion). (17) represents the Nuu-chah-nulth input fricatives.

(17) Nuu-chah-nulth input fricatives:

a. /s/ [Cons] [Cont] b. /S/ [ ] [Cont]

A plain fricative is derived from both possible input types by Nuu-chah-nulth grammar. A Nuu-chah-nulth output fricative is derived from either (17a),

which obeys the faithfulness constraints **MAX[Cons]** and **MAX[Cont]**, or from (17b) by the default status of [Cons] in Nuu-chah-nulth, in addition to the faithfulness constraint **MAX[Cont]** (See Kim 2001).

In the end of the previous section, I raised the question of how to phonologically distinguish a fricative that is affected by a glottalizing suffix and one that is not. The two possible representations for a fricative in (17) will provide the answer in section 3.4.

3.4 **Fricatives in glottalization**

When a fricative precedes a glottalizing suffix, it surfaces either as a plain fricative followed by a glottal stop or as a glottalized glide. The alternation between the same set of fricatives in gottalization is due to the two input representations for a single output fricative.

The following faithfulness constraint, along the phonological properties of fricatives. causes this alternation between the same set of fricatives:

(19) **MAX[Cons]**: [Cons] in the input must have a correspondent in the output.

Whether the feature [Cons] is specified or not for an input fricative is an important factor in determining an output form. If [Cons] is specified in the input, it never fails to appear on the surface. **MAX[Cons]** is, therefore, highly ranked in Nuu-chah-nulth, playing a crucial role in selecting an optimal output form of an input fricative.

(20) shows a revised partial Nuu-chah-nulth grammar including (19):

(20) **MAX[C.G.], MAX[Cons]** >> ***[Cons][Cont][C.G.]**, CONTIGUITY
>> **DEP[RootNode]** >> **DEPPATH[C.G.], *[Cons][C.G.]**

The following tableaux show how the phonological properties are treated by the constraints and their language-specific ranking: (21) is a case where the stein-final fricative /ƛ/ is unspecified for [Cons] in the input, and (22) is a case where the fricative /ɬ/ is specified for [Cons] in the input.

(21) t̓uɬ-[C.G.]aqƛ → t̓uẇaqƛ
head-inside/consuming 'eating (fish) head'

Tableau

t̓uɬ+[C.G.]aqƛ			
[Cont]		*	DEP PATH [C.G.]
☞a. t̓uẇaqƛ [Cont]			

b. t̓uḥʔaqx̌ [Cons] [Cont]					*!	*
c. t̓uˀḥaqx̌ [Cons] [Cont]				*!		*
d. t̓uḥˀaqx̌ [Cons] [Cont]			*!			*
e. t̓uḥaqx̌ [Cons] [Cont]		*!				
f. t̓uy̓aqx̌ [Cont]						*

(22) x̌̓iḥ–[C.G.]aqx̌-y̓ak ➔ x̌̓iḥʔaqx̌y̓ak
driving-inside/consuming-instrument 'shirt'

Tableau

x̌̓iḥ+[C.G.]aqx̌ [Cons] [Cont]	MAX [Cons]	MAX [C.G.]	*[C.G.] [Cons] [Cont]	CONTI-GUITY	DEP[R-Node]	DEPPA TH[C.G.]
☞ a. x̌̓iḥʔaqx̌ [Cons] [Cont]					*	*
b. x̌̓iˀḥaqx̌ [Cons] [Cont]				*!		*
c. x̌̓iḥˀaqx̌ [Cons] [Cont]			*!			*
d. x̌̓iḥaqx̌ [Cons] [Cont]		*!				
e. x̌̓iy̓aqx̌ [Cont]	*!					*
f. x̌̓iẇaqx̌ [Cont]	*!					*

In tableau (21), every candidate obeys MAX[Cons] vacuously. Candidate e

violates the highly-ranked constraint MAX[C.G.], which requires the [C.G.] to appear on the output. In candidate d, the features [Cons], [Cont], and [C.G.] are linked under the same root node, violating *[Cons][Cont][C.G.]. Candidate c violates the constraint CONTIGUITY. Candidate b violates DEP[RootNode] by inserting a Root node. Consequently, candidate a is selected as an optimal output form.

In tableau (22), on the other hand, candidates e and f violate MAX[Cons] by deleting the input [Cons] feature. The violation of the MAX constraint is fatal. This is the decisive factor why an input fricative specified for [Cons] cannot surface as a glide, unlike an unspecified one. Candidate d does not obey MAX[C.G.] by deleting the input [C.G.] feature. Candidate c violates the constraint *[Cons][Cont][C.G.]. Candidate b violates CONTIGUITY. Consequently, candidate a is selected as an optimal output. Note that DEP[RootNode] does not play a significant role: now that candidate a obeys all the high-ranked constraints, the violation of this constraint is not a barrier in it being selected as the optimal output.

In sum, the Nuu-chah-nulth grammar determines either glottalization or no-glottalization in the case of fricatives, depending on an input value of a fricative in terms of [Cons].

4 Conclusion

The process of glottalization and the phonemic inventory of glottalized consonants in Nuu-chah-nulth exhibit the following unique properties:

i. Glottalizing suffixes: only some suffixes cause glottalization.

ii. Richness of the Base: rich combinations of features, along with the interaction between markedness and faithfulness constraints, lead to alternation between the same set of surface consonants in terms of glottalization in Nuu-chah-nulth.

iii. Nuu-chah-nulth grammar: a simple set of universal constraints and their language-specific ranking, along with phonological properties of a consonant, determine the surface form.

iv. Suppression of the marked: whenever a fricative is affected by a glottalizing suffix, a glottalized glide appears on the surface rather than a glottalized fricative, which is cross-linguistically marked.

Notes

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[1] Nuuchah-nulth consists of 13 dialects: Ahousaht, Ehattesaht, Hesquiat, Kyuquot, Mowachaht. Nuchatlaht, Ohiaht, Opetchesaht. Tseshaht, Tlaoquiaht, Tcquaht. Uchuklesaht, and Ucluelet. Nootka, another name for the language. is disliked by the people, so even though Nuu-chah-nulth refers to Ditidaht as well. another Southern Wakashan, I use Nuu-chah-nulth only to indicate Nootka for the purpose of this study. The data for this study are from the Ahousaht dialect, which is spoken on Flores Island.

[2] In the process of glottalization, a pharyngeal stop /ʕ/ behaves as a glottalized counterpart of a uvular/labio-uvular stop.

[3] Abbreviations used in this paper are: CAUS=causative, IND=indicative, LOC=locative, NEG=negative, NEU=neutral, POSS=possessive, SEG=sequential, sg=singular, s.t.=something, s.o.=someone, s.w.=somewhere.

[4] Dakota (Shaw 1980) has glottalized fricatives Is', S' , x' I, and Mazahua (Spotts 1953) and Huautla Mazatec (Golston & Kehrein 1997) have a glottalized fricative /s'/, which are marked cases cross-linguistically.

[5] Languages with glottalized fricatives such as Dakota, Mazahua. and Huautla Mazatec may have this markedness constraint lower-ranked in their grammar.

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The Korean Topic Marker nun in Conversation: Formulating Upshot in Orientation to the Immediate Context*

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1. Introduction

This paper presents an analysis of the Korean topic marker nun (and its variant un) from a conversation analytic perspective (Sacks et *al.* 1974). Instead of analyzing the function of nun at the sentential level, this study concerns itself with describing and capturing the systematic and methodic basis of the use of nun as manifested in the sequential structure of spontaneous conversation. Systematic attention is paid to grasping the interactional motivations underlying the use of nun by way of examining how the user of nun is demonstrably oriented to the preceding context and what interactional import nun has toward the subsequent context (Heritage 1984).

One salient functional feature of nun-utterances is that focus is given to the predicate while the nun-marked referent tends to be given or presupposed (Hwang 1987). This information structure of nun is distinct from that of the subject-predicate construction where the referent is marked by the nominative case marker *ka* (and its variant *i)* which gives focus to the referent (cf. Thompson 1978). Consider the constructed sentences in (1) and (2), where the focused part is underlined:

(1) ne-nun cengmal coh-un chinkwu-ya. "You're really a good friend."
(2) chelswu-*ka* o-ass-eyo. "~he% came."

In (1), the nun-marked referent 'you' is situationally given and focus is given to the information in the predicate. In (2), the main issue is to identify the referent per se with reference to the predicate 'came' with the ka-marked referent being given focus. These two distinct focus structures manifested by nun and *ka* have been characterized as 'contrastive focus/thematic reading' and 'focus of contrast/exhaustive reading' respectively (cf. Kuno 1973).[1]

There are a number of studies looking at the construct of 'topic' in terms of such notions as 'aboutness' (Reinhart 1982), 'givenness' (Clark and Haviland

1977), or 'domain-setting' (Chafe 1976). While these notions could be mobilized to account for some partial aspects of the Korean topic marker nun, we need a more coherent view of the Korean topicality grounded on empirical analyses of nun occurring in authentic discourse context. In this respect, Lee (1986) attempts to account for the functions of nun in a more unified way by proposing a speaker-oriented definition of nun based on the analysis of spoken and written narratives. Drawing upon Givón's (1982) notion of backgrounded presupposition, Lee characterizes nun as a device of setting a presuppositionally backgrounded, unchallengeable domain, which yields different degrees of contrastiveness by virtue of marking a thematic break in discourse. The thematicy and contrastiveness, two distinct meanings traditionally accorded nun, are reanalyzed as different degrees of contrastiveness determined by the scope of thematic shift marked by nun.

Lee's analysis raises an important question of what motivates speakers to use nun to establish a presuppositionally backgrounded unchallengeable domain. In naturally occurring conversational discourse, for instance, the use of nun is often motivated by the need to address the preceding context, as in countering or disagreeing with the interlocutor's prior utterance (Kim 1993). In the present paper, this context-shaped aspect of nun is further examined in spontaneous conversational data. It will be suggested that the context-shaped aspect of nun constituting a counteractive act to the preceding context can be accounted for with reference to its context-renewing aspect that has distinct sequential implications for the subsequent context (Heritage 1984).

The data examined in this study mainly consist of spontaneous face-to-face conversations between graduate students studying in the United States and their families, which were recorded in the early 1990s. Also analyzed are fragments of overheard conversation that have been written down immediately after the given conversation was heard. Whenever necessary, constructed examples were also used to complement the analysis of authentic fragments.

2. Formulation of Upshot Relevancy

Consider example (3). This conversation takes place as part of the story-telling sequence in which H is telling N about an accident involving a boy who bumped his head on a steel chair while chasing birds:'

(3) (N & H)

1 H: *keki* khone-eyta pak *-ass -e* khwak *kunyang*
there corner-LOC bump-PST-IE ONOM head on
"He bumped his head right on the edge of that."

2 (4.0)

3 N: ay *-tul-i* *ta kule* -ci -yo *ta* tachi
child-PL-NOM all do like that-COMM-POL all get hurt
4 *-myense* khu -nun -ke *-ci.*
-SIMUL grow-ATTR-NOML-COMM
"All children are like that. They're always getting hurt somehow. It's part of growing up."
5 (2.0)
→ 6 H: kuntey kay *-nun* ttuy-e *-ka-l* *-ttay* aph *-ul*
but that child-TOP run-CONN-go-ATTR-when front-ACC
7 an po -a.
NEG see-IE
"But that kid, he doesn't watch where he's going when he's running."
8 N: *uhuhuh*
9 H: *ku kh//un-- kuce* ile *-kwu,* ((making gestures))
that big just do:like:this-CONN
"With that big--, he just goes like this."
10 N: *hahahaha*

In his nun-utterance in line 6, H describes the running habit of the child, who is marked by nun. Note that this nun-marked referent (*kay* 'that kid') is being contrasted with or being highlighted against the previously mentioned referent *aytul* 'children' in N's preceding turn (line 3), where N says that all children are the same and getting hurt is part of growing up. We might stop here and rest content with the claim that the nun-utterance in (3) is a case illustrating the contrast-marking function of nun. However, if we look at the sequential context more closely, we find that the nun-utterance is not produced as a mere factual description in which the child's unique running style is being contrasted with that of other children. Rather, the observation of the child's running style is formulated as an action supporting or constituting the upshot of the given discourse, i.e. reasserting the newsworthiness of H's story. Two observations are in order.

First, we can see that H's use of nun is motivated by the need to strengthen the upshot of his preceding story in response to N's comment trivializing its import ("All children are like that...") (lines 3 and 4).[3] It is in response to this non-aligning response of N that H produces the nun-utterance in line 6 whereby H asserts that this particular child is different and unique, saying that he does not watch where he is going when running. That is, it is the lack of a collaborative uptake by N that interactionally motivates the production of H's nun-utterance reasserting the point of his story.

Second, as noted above, the nun-utterance formulates the observed event as the action of reasserting the upshot of the story. The upshot of H's story is strengthened and reformulated in order to be more readily acceptable to N. An important intersubjective property of nun, in this respect, is that the post-nun space serves as a domain in which the hearer is oriented ahead toward the upshot-being-

progressively-explicated. That is, the hearer is progressively led to monitor the speaker's post-nun utterance in-progress and collaborate with the speaker's action by way of demonstrably co-orienting to its upshot relevance being explicated. With the hearer's attention being channeled to the discourse upshot being progressively explicated, the speaker of nun would be able to go about performing an action obliquely in addressing the preceding context, such as dealing with a non-cooperative hearer and pursuing a collaborative uptake.

The collaborative act by the hearer often allows the speaker of nun to take an extended turn to explicate the projected upshot. For instance, note in (3) that H's nun-utterance leads to further production of an affectively loaded description, which includes the use of intensifiers (ku ***khun*** 'that big', kuce **'just'),** accompanied by dynamic gestures vividly describing the child's unique running style (line 9). H's continued description, **further** explicating the upshot of the story, keeps N oriented toward **H's** action of explicating the evoked **upshot.**[4]

Also consider example **(4),** where the nun-utterance initiates a story:

(4) (After Dinner)
((S and R have been talking about *S's* cushion covers.))

1	R:	***mantul-e*** ***-cwu-ess*** -na ***-pwu-ci?***
		make **-CONN-give-PST-DUB-see -COMM**
		"Someone made them for you, right?"
2	S:	***sa -n*** -ke *-eyyo.*
		buy-ATTR-thing-COP:POL
		"I bought them."
3		(1.0)
→ 4	S:	song ***mihi -ssi -nun*** ***ttak*** ichen wen-ey
		Song Mihi-Ms.-TOP exactly two thousand won-LOC
5		mak ***camba-lul*** ip ***-kwu*** tani -te
		ONOME jacket **-ACC** wear-CONN go **around-RETROS**
6		***-lakwu*** -yo ***(ceng//mal)*** na ***cwuk-keyss*** -e.
		-QUOT-POL really I die -MOD-IE
		"Ms. Song Mihi, she bought a jacket made of the same material for 2,000 won, and I saw her wearing it. It's so **funny."**
7	R:	hhh
8	S:	***wuli cip -eyse pangsek-ulo*** ssu-nun ***-ke*** ***kac -ta***
		our home-LOC cushion-INSTR **use-ATTR-thing-ACC** take-TRANS
9	R:	***//hhh***
10	S:	***ca(h)mb(h)a-lwu*** ip ***-kwu t(h)an(h)i-nikka.***
		jacket **-INSTR** wear-CONN go around-CONN
		"Because materials that we use for cushion covers, she wears as a jacket!" ((S talks while laughing))

In the preceding context, R noticed new cushion covers on S's sofa and in line 1 she asks S if someone made them for her. In line 2, S responds that she bought them. After a second-long pause (line 3), S initiates a story by introducing a discourse-new referent (Ms. Song ***Mihi***) marked by nun.

Even though S's turn-initial reference to the discourse-new referent is quite disjunctive, it is being grounded in the current discourse by virtue of the use of nun guiding the hearer's attention to the projected upshot-relevance of the referent and the action being currently initiated. The recipient of nun collaboratively orients herself toward the speaker's disjunctively initiated action of story-telling and progressively monitors the story for its upshot-relevance by virtue of relating it to the content of the preceding turn-by-turn talk about cushion covers. With the hearer taking the position of a story-recipient allowing the speaker to hold an extended turn, the turn-by-turn talk is interactively transformed into a story-telling sequence (Sacks 1992, vol. 2: 222). Note that the disjunctive relation with the preceding turn-by-turn talk is obliquely addressed by virtue of orienting the hearer forward toward pursuing the upshot-relevance of the story being told through the post-nun utterances.

The two-way interactional process that the use of nun triggers with respect to the following and preceding contexts is realized in various ways in turn-by-turn talk. In some contexts, the nun-utterance addresses the immediate context in such a way that it serves as the background for another utterance located in the surrounding context. Consider example (5):

(5) (TA Meeting)

1 J: pak kiho ***-ssi mal -taylo manhi*** sse-ya. -ci mwe
Pak Kiho-Mr. saying-following a lot use-NECESS-COMM what
"Just as Mr. **Pak** Kiho said, all we can do is use it (=computer) a lot."

2 W: *hh*

3 S: yey ***kuke-n kulay -yo.***
yes that -TOP **like:that-POL**
"Right. That's correct."

→ 4 J: echaphi computer ***kaps//-un na//li -e -ka-nuntey,***
anyway computer price -TOP go down-CONN-go-CIRCUM
"Given that computer prices are going down anyway,"

5 W: ***manhi (sse)***
a lot use
"(use) it a lot."

6 S: ***nalyeka -ki malyeni -ntey***
go down-NOML **naturally-CIRCUM**
"Given that it is bound to go down."

7 **( ): *ung.***
yes
"Right."

8 S: nalyeka -nun -key computer kap *-pakkey* ep
go down-ATTR-NOML:NOM computer price-outside not:exist
9 -nun *-ketkat-te* *-la* i *seysang-eyse ku -ci.* uhhh
-ATTR-seem -RETROS-IE this world -LOC that-COMM
"It looks like computers are the only thing in this world whose prices are going down. uhhh"
10 W: amwuthun, mak nalyeka *-lkke* *-eyo* (ttay -nun)
in any case drastically go down-MOD-POL time-TOP
"In any case, it will go down drastically (when)."

In this context, the participants are discussing whether they should wait until computer prices go down further. In line 1, J implies that, regardless of the computer price, one should go ahead and buy one when required. In response to H's laughter and S's uptake (lines 2 and 3), J continues his assessment by producing a nun-utterance describing the generic tendency of computer prices to go down. Note that this utterance serves to highlight the point he made in his prior statement in line 1 ("all we can do is use it a lot") as its supporting background.

While serving as the background for the preceding (or sometimes succeeding) context, this type of generic nun-utterance also marks a highly resourceful upshot-relevant point requiring joint attention from the participants. For instance, in (5), the nun-utterance initially produced as a background detail supporting the prior utterance is subsequently topicalized and reconstituted as the foregrounded upshot-relevant point to be collaboratively oriented to and co-assessed on its own (lines 6-10). Note how the other interlocutors display their collaborative orientation as co-assessors to J's evaluation and interactively develop it as the upshot of the current discourse. In lines 6 and 8, S collaborates with J by upgrading the point of J's observation, and in line 10 W chimes in with her own prediction compatible with it.

As suggested in (5) as well as in the other preceding examples, a crucial aspect of the upshot evoked by nun is that it is often constituted by an action conveying non-referential information (Ochs and Schieffelin 1989), e.g. the speaker's attitudinal or affective stance. Consider example (6):

(6) (TA Meeting)
((Jasked Kfor a copy of answer keys.))
1 K: *tuli* *-lkkey* -yo *cey-ka* tap.
give:HONOR-MOD-POL I -NOM answer
"I'll give you the answers (for the lab worksheet) now.
2 (2.0)
→ 3 W: *hangsang kim sangho -ssi-nun cwunpi* *-ka* toy *-e*
always Kim Sangho-Mr.-TOP preparation-NOM become-CONN
4 *-iss* -e. (1.0) ttak meli sok -ey *iss* -nun *-key*
-exist-IE precisely head inside-LOC exist-ATTR-thing:NOM

5 ttak mwe *-ka* nao -a hangsang.
precisely something-NOM come out-IE always
"Mr. Kim Sangho (K) always has things ready in his mind. He always hands out something at the right moment."

This conversation takes place during an informal TA meeting. In the preceding context, J asked K, the head TA, for a copy of the answer keys for practice materials. In line 1, K responds to J's request right away by engaging in the search for the copy. It is in response to this behavior of K that W, another co-present TA, produces the nun-utterance as a compliment directed to K, where K's name (Kim Sangho) is marked by nun. That is, the use of nun is motivated by the speaker's observation of an aspect of the immediate context, i.e. the on-going behavior of one of the co-participants.

Note that K's observed behavior is formulated by W's nun-utterance as an upshot-relevant complimentary action to be jointly oriented toward and appreciated by the co-present interlocutors. The upshot in this case concerns highlighting the category to which the nun-marked referent (K) belongs. This evoked category is presented as being generically and normatively implicated by K's observed behavior of handing out the requested material right away, which is formulated as a category-bound activity, i.e. as an activity uniquely bound to the evoked category at issue (Sacks 1972). This feature of nun framing a category-bound activity is exploited for initiating a variety of affectively loaded actions, such as complimenting, rebuking, joking, and so on (also see (3), (4), and (5)).

Nun is sometimes used in a topic-initial question, which is not preceded by any observable event or talk in the immediately preceding context. Consider (7):

(7) (N & H)
→ 1 H: kim hongki-*ssi* apeci-nun *ka-si* -*ess* *-tay?*
Kim Hongki-Mr. father-TOP go-HONOR-PST-QUOT
"Has Mr. Kim Hongki's father left?"
2 N: onul achim *-ey* new york *-ulo* ka-si -*ess* *-tay* *-yo.*
today morning-LOC New York-DIR go-HONOR-PST-QUOT-POL
"They say that he left for New York this morning."

In line 1, H introduces a nun-marked referent (*Mr.* Kim Hongki'sfather) topic-initially in the context of inquiring about an event involving the referent. The upshot of the question is constituted by the action it performs, i.e. proffering a topic as something to be further developed by the hearer (N). The interactional import of such a topic-proffering question lies in orienting the hearer toward his projected role as a co-teller who will interactively establish the topic with his upcoming response to the question (Button and Casey 1984).

It is important to note that, while inviting the hearer's orientation toward the upshot shaping his role as a collaborative topic-developer, the topic-initial *nun-*

question lends itself to addressing the immediately preceding context in such a way that a shared interactional history is evoked. By giving the sense that the nun-marked referent is retrieved from the shared domain of knowledge and experience, the use of nun in the topic-proffering question furnishes the participants with the means of collusively resuming or sustaining a conversation about a shared referent and topic. Indeed, evoking a shared interactional history would be a highly oblique way of dealing with the preceding context, which crucially draws upon the speaker's act of constituting the hearer as the prospective topic developer who is already acquainted with the given referent.

3. Exploitation of Nun

The function of nun formulating an event as an upshot-relevant action is resourcefully exploited in a variety of grammatical positions. For instance, nun can be attached to an adverbial clause. The type of adverbial clauses or contexts in which nun can be used, however, is limited, which further supports the proposed function of nun. For the purpose of illustration, let me examine the use of nun with the clausal connective -taka. Known as the 'transferentive', this particle marks a transition from one event to another. Example (8) shows a constructed sentence containing a taka-clause:

(8) halwucongil TV-man po -taka (*-taka-nun) sihem-ul po-ass -*ta*.
all day TV-only see-CONN -TOP test -ACC see-PST-DEC
"I took the test after watching TV all day."

Without nun, the message we obtain is a factual description of two sequentially occurring events: the TV-watching event interrupted and followed by the test-taking event following. However, if the taka-clause is marked by nun, we have an ungrammatical sentence. This suggests that the use of nun is not compatible with a factual description.

In some contexts, the taka-clause serves as the ground for warning the hearer about the consequence of the event described in the clause. The use of nun is totally compatible with such a context. Consider example (9):

(9) *kulehkey* halwucongil TV-man po -taka/-taka *-nun* sihem *mangchin-ta*
like that all day TV-only see-CONN -TOP test flunk -DEC
"If you only watch TV all day like that, you'll flunk your test."

Unlike the case in (8), the taka-utterance in (9) has a strong interlocutor-impinging illocutionary force, warning the hearer about the negative consequence of the currently (or repeatedly) observed event (i.e. watching TV all day). With nun attached to the taka-clause, the sense of urgency associated with the

warning increases. With nun, the observed event described in the taka-clause is formulated as the ground for initiating the action of alerting the interlocutor as to its negative consequence whose upshot is to be seriously oriented to by the hearer. Such a function of nun upgrading the imminence or urgency of the speech act is widely observed in adverbial clauses in general.'

It is also to be noted that, even though example (9) is a constructed sentence, we can readily imagine that such a nun-utterance would be most likely to be used when the speaker is responding to some specific immediate context (e.g. immediate setting or preceding context), hence being compatible with a deictic adverb such as *kulehkey* 'like that*.This suggests that, even when nun is used in an adverbial clause, its use is motivated by the need to address some specific aspect of the immediate context.

As noted above, the process of indexing the upshot triggered by a nun-marked referent orients the hearer's attention ahead to the post-nun utterance procedurally explicating the projected upshot in the subsequent context. This forward-looking process triggered by nun is often exploited for the purpose of mitigating the degree of assertion countering the prior context (cf. example (I)). Consider example (10) below, which shows a dialogue between a professor and a student at a colloquium. In the context preceding this segment, the professor made a comment about the student's presentation of her thesis proposal:

(10) (Overheard Conversation)

1	Professor:	sayngkakhay-po-n	*-cek iss -eyo?*
		think	-see-ATTR-time exist-POL
		"Have you thought about it?"	
→ 2	Student:	sayngkakhay-po-n	*-cek* -un eps *-upnita.*
		think	-see-Am-time-TOP not:exist-FPOL
		"I've never thought about it."	
3	Professor:	nacwung-ey hanpen	sayngkakhay-po-*sey -yo.*
		later -LOC once	think -see-HONOR-POL
		"Think about it later."	
4	Student:	*ney.*	
		yes	
		"Okay."	

'In line 1, the professor asks the student whether she has thought about the point he has brought up in his comment. In line 2, the student uses nun as she repeats the temporal noun phrase used by the professor (*sayngkakhay-po-n-cek* 'the time when I thought about it') and responds negatively, i.e. by saying that she has not thought about it. The literal translation of the nun-utterance takes the form of the nun-marked NP ([The time when I thought about it] + nun) followed by the predicate ep-supnita 'does not exist'.

It has been widely observed that, in cases like (10) where the nun-marked entity closely draws upon or is built upon the prior utterance, it projects the negation of the prior utterance by shifting its polarity (cf. Kim 1993). An important point, in this respect, is that such a nun-marked phrase projecting the negation of the prior utterance is oriented to by the hearer as what may be called a 'pre-elaboration' marker mitigating the negative response. So, in (10), by attaching nun to her temporal clause, the speaker signals that she may provide further elaboration of her answer, which will retroactively warrant and support her apparently face-threatening response to the hearer.

This practice is organized as an on-going interactional achievement by virtue of the hearer's collaborative orientation to the speaker's projected not-yet-fully-materialized upshot explication. In (10), the student's use of nun in her response, by way of projecting further upshot-relevant explication, draws the hearer's attention away from the disjunctive relation to the preceding utterance. Even though the student ends up not producing further materials elaborating the projected upshot of her response, the use of nun still orients the hearer progressively toward what is projected to be the further elaboration of her response. This serves as a strikingly effective politeness strategy mitigating the extent to which the student's response confronts the professor's question. If nun were deleted from the student's response, the utterance would constitute a frontal challenge to the professor, a seriously impolite response directly countering his question. This would be so because, without nun diverting the hearer's attention to further upshot elaboration projected to be forthcoming, the hearer's attention would stay focused on the negative illocutionary force of the utterance per se, with the consequence that the disjunctive and dispreferred relation to the preceding question is highlighted.

4. Conclusions

The preceding observations suggest that the use of nun triggers a two-part interactional process which has the significant import of enlisting the hearer's collaborative co-orientation toward the upshot-relevance of the current and subsequent utterances.

The first part concerns the function of nun evoking and constituting the upshot of the current discourse as a point of further elaboration and mutual orientation. Unlike the case of a factual description of an event, such as the one marked by the nominative case marker *ka* (cf. Kuno 1973), the nun-utterance *formulates* an event as an interlocutor-impinging action constitutive of the upshot to be co-oriented toward by the hearer. The nun-marked referent projects a space serving as a 'domain' (Chafe 1976) or 'stage' (Maynard 1987), where the hearer's co-orientational shift is elicited toward intersubjectively sharing the upshot of the current discourse being progressively elaborated in the post-nun utterance. The

hearer is thus led to monitor the post-nun utterances in-progress with reference to its upshot-relevancy; he/she is guided toward intersubjectively sharing the speaker's perspective by way of collaboratively engaging in the reciprocating act of inferring, understanding, and appreciating the relevance that it has toward the evoked upshot as formulated by the speaker.

The second part of the process, reflexively intertwined with the first part, concerns the interactional motivation underlying the function of nun orienting the hearer to the evoked upshot. The formulation of upshot-relevant point constitutes an action addressing some aspect of the immediate context (e.g. the preceding context). Such an action addressing the immediate context is performed in a highly oblique fashion, as nun tends to solicit the hearer's collaborative uptake by leading his/her attention away from the potentially disjunctive relation with the immediate context toward the not-yet-fully-explicated upshot in the subsequent context.

Given this analysis, we can note that nun-marked referents are grounded in the current interactional context by way of being warranted by the hearer's collaborative inferential effort to orient himself/herself to (i) the upshot of the current discourse and (ii) its retroactively motivated import toward the immediate context. Nun-utterances thus serve to generate the sequential commitment for the hearer to orient toward the evoked upshot and its motivated relation with some aspect of the immediate context. By orienting the hearer to the upshot of the current context, the use of nun furnishes the speaker with a means of progressively (re)formulating his/her upshot-relevant point, while retroactively addressing the immediate context in an oblique fashion.

In future research, the sensitivity of nun to thematic shifts (Lee 1986) and discourse structure needs to be further examined. In particular, the observed tendency of nun to be associated with the background suggests itself as an important researchable area in terms of its dynamic features of constituting another utterance as the foreground. Other related issues such as the association of nun with generic sentences could also be accounted for in terms of their background features having a particular kind of affective value as well as in terms of the status of the described event as the category-bound activity (Sacks 1972). In addition, the examination of how the context-shaped and context-shaping aspects of nun interact with each other will shed light on various ways in which the nun-marked referent is grounded, e.g. grounded as the particular cases instantiating the discourse upshot (cf. Ochs and Schieffelin 1983). Furthermore, it will help us deepen our understanding of how the discourse messages of contrastiveness and thematicity are *procedurally* constituted by the use of nun locating the evoked upshot in orientation to some aspect of the immediate context.

Notes

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[1] Also note that the nun-utterance in (1) performs the action of complimenting the hearer, whereas the *ka*-utterance in (2) concerns producing a factual description.

[2] The transcription notation used for this paper were adapted from Sacks *et al.* (1974):

//	Interruption	=	Contiguous utterances	--	Cut-off
(0.0)	Intervals	(.)	Micro-pause	( )	Words/identities unclear
.	Falling intonation	,	Continuing intonation	?	Rising intonation
(( ))	Transcriber's remarks				

[3] That N is not collaborating with H is further evidenced by the presence of the 4 second-long gap (line 2) preceding his utterance, which projects that some dispreferred response, such as disagreement or non-alignment, is forthcoming (Sacks 1987).

[4] Note, in this respect, that H's description following the *nun-marked* referent manages to elicit from N a more collaborative uptake in the form of laugh tokens (lines 8 and 10). This evidences a rather drastic change of stance on N's part, given the non-aligning stance he displayed in his preceding response to H's story (lines 3 and 4).

[5] Consider the case of purpose clauses:

pwukhan -i kyengcey mwuncey-lul haykyelha-kiwihase -nun ... (a)/*(b)
North Korea-NOM economy problem -ACC solve -in order to-TOP
"In order (for North Korea) to solve its economic problems,"

(a) *sepang seykey-uy ciwen -i pwulkaphi-ha-ta.*
western world-POSS assistance-NOM inevitable do-DEC
"Assistance from the Western world is a must (=North Korea must receive assistance from the Western world).

(b) *sepang seykye-wa hyepsang -ul ha-koiss -ta*
western world -with negotiation-ACC do-PROG-DEC
"North Korea is negotiating with the Western world."

If *nun* is attached to the purpose clause and combined with utterance (a), it upgrades the sense of urgency associated with the speech act of assertion/warning conveyed in (a). However, *nun* cannot be used when the purpose clause is followed by (b), which is a factual description of a state of affairs.

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Is It Duration or Pitch?
A Study of Japanese Mora*

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1 Introduction

This study investigates how pitch-accent' on a long vowel is maintained in fast speech. Pitch-accent is one of the key elements of Japanese phonology. For instance, Pierrehumbert and Beckman (1988) propose that Japanese utterances can be represented in a hierarchical structure: word – accentual phrase – intermediate phrase – intonational phrase – utterance, and that the intermediate phrase is the domain of downstep or catathesis, which is triggered by pitch-accent. Cutler and Otake (1999) find strong evidence that accentual information influences the activation and selection of candidates for spoken-word recognition. In Tokyo Japanese, words are either accented or unaccented; a word containing a sequence of a high and a low tone (HL) is considered to be an accented word and to have pitch-accent. Each tone is assigned to a mora, the minimal tone-bearing unit in Japanese is the mora. The position of the tone sequence HL changes the lexical meaning of the word. For example, in Tokyo dialect, *kaki-ga* (HLL – with an accent on the first mora) means 'oyster-NOM,' *kaki-ga* (LHL – with an accent on the second mora) means 'fence-NOM,' and *kaki-ga* (LHH – without a pitch-accent) means 'persimmon-NOM.' When a long vowel in a word is accented, H is assigned to the first mora of the long vowel and L to the following mora (McCawley 1968:134) as in (1) below:

(1) /beru/ 'bell' /beeru/ 'veil'
| | | | |
HL HLL

The Japanese pitch-bearing unit, the mora is often referred to as a timing unit of spoken languages. The mora also plays a very important role in Japanese phonology. The foot structure of Japanese is said to be bimoraic (Poser 1990, It6 1990), and the versification of classical Japanese poems is based mora count (Kawakami 1973, Kozasa 2000). The number of mora changes the syllable

weight, and Japanese vowels are frequently used to explain the notion of the mora (Gussenhoven and Jacobs 1998, Kenstowicz 1994, Ladefoged 1993, Shibatani 1990, Poser 1990, Spencer 1997). For example, a short vowel in a Japanese word such as *su* 'vinegar' carries a single mora, and a long vowel in the word *suu* 'number' carries two moras. Therefore, Japanese is typologically classified as a 'mora-timed' language (Trubetzkoy 1969, McCawley 1968). It has been said that all Japanese moras have the same duration and are perceived as being of equal in length (Ladefoged 1993, Bloch 1950). However, the *isochronous* distribution of the mora has been challenged by a number of researchers (Han 1962, Homma 1981, Port et al. 1987, Sato 1993, Warner and Arai 2001a). The strong evidence against isochrony comes from the fact that the duration of each segment is intrinsically different. For instance, the physical duration of the syllable /sa/ is longer than the duration of /ri/. Also, the duration of moraic consonants (the first element of geminate consonants such as /s/ in /nissan/ and a coda nasal such as /n/ in /honda/) is shorter than the duration of a vowel. Consequently, some scholars claim that they find no convincing evidence to support the phonetic reality of the Japanese mora as a timing unit (Beckman 1982, Warner and Arai 2001a). Furthermore. it is not difficult to assume that the duration of the mora should vary depending on speech rate and/or speech style.

Despite this durational variability, casual observation suggests that Japanese native speakers rarely misperceive long vowels no matter how fast the words are uttered. In contrast, it seems difficult for English speakers to produce Japanese words containing a long vowel. They are able to lengthen the duration of vowels, yet occasionally their long vowels are perceived as short vowels by native speakers of Japanese. It is of course possible to determine the vowel length from the context of the utterance. There may be some phonological factors that distinguish the vowel length besides the physical duration.

The main purpose of this paper is to illustrate how Japanese speakers control pitch-accent to produce accented long vowels correctly in fast speech. Since the duration of long vowels is not stable, the Japanese speakers use the pitch fall to distinguish the vowel length.

2 Experiment

21 Materials

The material of this experiment consists of 40 sentences. Minimal pair words in long and short vowels were chosen for each of five Japanese vowels (see Appendix). The words chosen for this experiment are all disyllabic and accented, and so H is on the first mora of the word and L is on the following mora. The majority of studies on mora duration seem to have used a single

frame sentence for all target words, such as ***ima _____ to iimashita.*** *'I* said _____ now,' which might make the participant to read the sentences mechanically or subconsciously to put some kind of emphasis on the target word. In order to prevent the participants from getting into such situations, a different frame sentence was composed for each pair, such as ***kono biru ga takai*** 'this building is tall' versus ***kono biiru ga takai*** 'this beer is expensive' and ***sono kado fuite*** 'please wipe that corner' versus ***sono kaado fuite*** 'please wipe that card.' The sentences used for this experiment are grammatically acceptable, and there is no ambiguity either syntactically or semantically[2] in the sentences. Therefore, the participants were able to read each sentence with a normal intonation pattern; that is, they did not need to put any emphasis on particular words or pause in the middle of the sentences.

2.2 Participants

The participants for this experiment were four native speakers of Tokyo dialect. They were in their mid-30s at the time of the experiment. All had been in an English speaking society for about ten years; however, their recordings do not have any indication of an English accent in their Japanese. Rather, their awareness of speaking "standard" Japanese seemed very high. Participant K was a male Ph.D. student at the University of Hawai'i who had been teaching Japanese as a lecturer on the same campus. Participant T was another male student studying International Business Management at Kapi'olani Community College in Honolulu. Female participant Y was a professor in linguistics at the University of Hawai'i who has two years experience teaching Japanese to adults in Tonga as a Japanese Peace Corps member. Participant N was a female Ph.D. student at the University of Hawai'i who was doing discourse analysis of Japanese written literature.

2.3 Procedure

Individual sentences were written in normal Japanese orthography (i.e., a mixture of ***kanji, kana,*** and Roman alphabet) on separate index cards. All sentences were read in three different speech styles – careful speech, normal speed and fast speech, and for the analysis the two extreme speech rates (fast and careful speech) were used. The desired reading style was written at the comer of each card in smaller letters in Japanese, ***ishiki shite hakkiri-to*** 'intentionally carefully.' ***futsuu no hayasa-de*** 'in normal speed,' and ***dekiru dake hayakuchi-de*** 'as fast as you can'. There was occasionally a comma or a space in a sentence, which made it easier for the reader to read. The order of sentences and the speech styles were randomized. Each card was put in an 8 x 4 photo holder; one to a page.

The participants turned the pages by themselves as they read the sentences, so that they were able to read them one by one at their own pace. Prior to the recording, each reader was asked to read without any pauses in a sentence, which forced the readers to read each sentence with a single intermediate phrase. The intermediate phrase is the domain of **downstep** in Japanese, and it is said that the pitch range is reset at the intermediate boundary (**Pierrehumbert** and **Beckman** 1988). If the reader put a pause in the middle of a sentence, the sentence may contain multiple intermediate phrases, which would change the pitch contour of the sentence. Therefore, in order to minimize the variables, each sentence was produced with a single intermediate phrase. The recordings were made in a recording studio on the University of Hawai'i at **Mānoa** campus.

The recorded materials have been digitized with an 11025 Hz sample rate and analyzed by **Macquirer®** and **PitchWorks®.** The vowel duration was determined by the existence and movement of the second and third formants. As for the pitch fall, the maximum pitch value was taken from the first vowel and the minimum pitch value was from the vowel in the following syllable as in Figure 1.

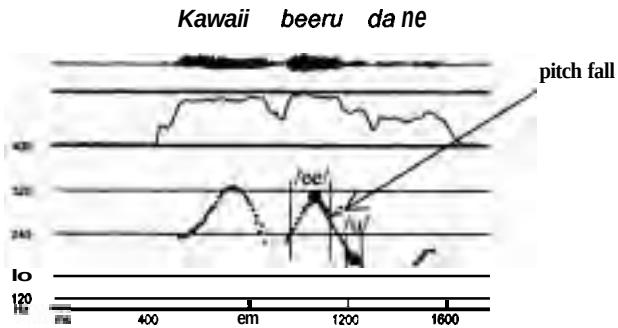

FIGURE 1: **Measurement points**

3 Results

A striking finding from this experiment is that the ratio of the length of the short vowel to that of the long vowels is almost 1:2 in careful speech. If we consider a vowel as a single mora, we could say that mora is indeed isochronously distributed. However, this measurement does not include the onset consonant; therefore, each mora does not have the same duration in natural speech. Since the duration of the mora is not a direct issue of this study, the duration of each mora was not measured; nevertheless, we can assume that the ratio of the

duration between the two syllables, for example, /su/ and /suu/ are not 1:2, the duration of /su/ must be longer than the duration of a half of /suu/.

As for the effect of speech rate on vowel durations, an analysis of the variances shows that there is a significant effect of speech rate on the duration of the vowel [$p > .0001$] as in Figure 2. Both short vowels and long vowels were significantly reduced in fast speech compared with careful speech. Furthermore, the long vowels are shortened in fast speech to a greater degree than the short vowels. That is, although the durations of the long and short vowels are significantly different in both careful speech and fast speech, the duration by itself is lack of invariance and not completely reliable for making a distinction between long vowels and short vowels.

	Careful Speech			Fast Speech		
	Short (ms)	Long (ms)	Ratio	Short (ms)	Long (ms)	Ratio (ms)
K	100.10	187.25	1:1.9	65.75	107.75	1:1.6
T	81.78	163.11	1:2.0	65.37	126.28	1:1.9
N	86.15	164.80	1:1.9	68.55	131.80	1:1.9
Y	84.35	158.35	1:1.9	72.55	121.50	1:1.7
Total	88.26	168.51	1:1.9	68.18	121.60	1:1.8

TABLE 1. Mean duration of vowels

FIGURE 2. Mean duration of vowels

In contrast, speech rate does not have a significant effect on the pitch fall. The pitch fall is significantly different between short vowels and long vowels in both fast speech [$p < .0001$] and careful speech [$p < .0001$]: Pitch falls deeper in long vowels than in short vowels regardless of speech rates. Furthermore, this pitch distinction is not affected by speech rates [$p = .1729$]. Therefore, it seems plausible to say that Japanese speakers use pitch information to distinguish accented long vowels from short vowels, as pitch information is more reliable than the duration of the vowels.

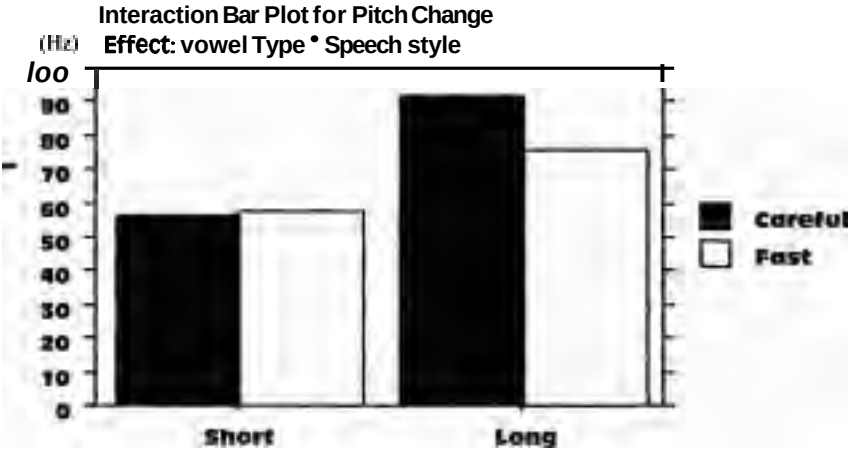

FIGURE 3. Mean Pitch range in Careful Speech and Fast Speech

4 Discussion

The results of this experiment support most previous studies on the Japanese mora. First we can say that the mora on the vowel is relatively timed in our speech; however, if we consider the onset consonant, the Japanese mora is not exactly isochronically distributed, and so the word duration may not be predictable from the mora count. Moreover, there are several kinds of moras in Japanese; therefore. the duration of each individual mora is not equal at all. As Warner and Arai (2001b) suggest that which makes the Japanese mora be perceived as regular should not be just its duration. The second finding shows us that Japanese pitch-accent varies phonetically depending on the type of the accented vowel. In other words, all accented words have the sequence of high and low tone melody (HL), yet a word with a long vowel has a deeper pitch fall

than a word with a short vowel. Therefore, the tone melody HL in the word *biiru* 'beer', for example, has deeper pitch fall than the one in *biru* 'building'.

The final finding, which is the main purpose of this study, indicates that the pitch fall is not affected by speech rate. Although each melody's depth is different between the short vowel and the long vowel, native speakers of Japanese are able to produce words with an accurate pitch fall, which seems to be an important cue particularly to distinguish an accented short vowel from a long vowel.

5 Conclusion

The mora is important in Japanese phonology. It is a timing unit; however, we have seen in this study that the mora is fragileas a timing unit: it varies depending on the segmental features as well as the speech rate. Duration by itself cannot be the sole cue for speakers to distinguish the length of Japanese vowels. Rather, it seems that pitch-accent is the more salient cue for speakers to distinguish between short vowels and long vowels.

To gather further support for this study, it will be essential to see how unaccented long vowels are produced in fast speech, since the speaker must rely only on the duration, the reduction of the duration of the vowel should be smaller than the reduction of an accented long vowel. Also, perception tests which independently manipulate duration and pitch may provide us another piece of evidence to support the finding of this study.

Note

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1 In this paper. I use the term 'pitch-accent' referring to a realization of a tone melody HL, a high . pitch followed by a low pitch. I will use this term with a hyphen in order to distinguish the term 'pitch accent' used in Intonational Phonology. which refers to "a local feature of a pitch contour which signals that the syllable with which it is associated is prominent in the utterance" (Ladd 1996:45-46).

2 I would like to thank Naoko Takahashi and Michiko Nakamura for their help selecting the frame sentences.

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Appendix **1:** Material

さっき 有ると言いました。
sakki **aru** to iimashita
'I said ***aru*** while ago'

私は なすが好きです。
watashi-wa nasu ga sukidesu
'I like egg-plants'

その角 ふいて。
sono kado fuite
'can you wipe that corner'

このビルが高い。
kono biru-ga takai
'this building is high'

あの地図が欲しい。
ano chizu-ga hoshii
'I want that map'

2・3が6と答えた。
nisan-ga roku-to kotaeta
'I said that two times three is 6'

君を‘ゆき’と呼ぼう。
kimi-o Yuki to yoboo
'Let's call you ***Yuki'***

あの人が ゆかさんです。
ano hito-ga Yuka san desu
'that person is ***Yuka'***

ジョンが スリにやられた。
Jyon-ga suri ni yarareta
'John got hit by a pickpocket'

今 来ると言いました。
ima kuru to iimashita
'I said come now'

さっき Rと言いました。
sakki aaru to iimashita
'I said ***aaru*** while ago'

私は ナースが好きです。
watashi-wa naasu ga sukidesu
'I like a nurse'

そのカード ふいて。
sono kaado fuite
'can you wipe that card'

このビールが高い。
kono biiru-ga takai
'this beer is expensive'

あのチーズが欲しい。
ano chiizu-ga hoshii
'I want that cheeze'

兄さんが6と答えた。
niisan-ga roku-to kotaeta
'my brother said six'

君を‘ゆうき’と呼ぼう。
kimi-o Yuuki to yoboo
'Let's call you ***Yuuki'***

あの人が ゆうかさんです。
ano hito-ga **Yuuka** san desu
'that person is ***Yuka'***

ジョンが 数理にやられた。
Jyon-ga suuri ni yarareta
'John failed in Math theory'

今 クールと言いました。
ima kuuru to iimashita
'I said cool now'

きれいな茎だね。
kireina kuki da ne
'it's a pretty stem, isn't it?'

これは 'け'です。
kore-wa ke desu
'this is ke'

かわいいべルだね。
kawaii beru da ne
'it's a cute bell isn't it'

私が レジに行く。
watashi-ga reji-ni iku
'I will go to the cash register'

去年も瀬戸を訪ねた。
kyonen-mo Seto-o tazuneta
'I went to *Seto* last year too'

たくさん絵が見たい。
takusan e-ga mitai
'I want to see a lot of paintings'

山道をロバが歩いている。
yamamichi-o roba-ga oruiteiru
'a donkey is walking in a path'

これが 土器の桜です。
kore-ga doki-no sakura desu
'this is earthen cherry blossom'

その鳥です。
sono tori desu
'(it is) the bird'

それが恋のあらわれです。
sore-ga koi-no araware desu
'that is the beginning of love'

きれいな空気だね。
kireina kuuki da ne
'it's clean air, isn't it?'

これは 'K'です。
kore-wa kee desu
'this is a K'

かわいいベールだね。
kawaii **beeru** da ne
'it's a pretty veil, isn't it'

私が 零時に行く。
watashi-ga reeji-ni iku
'I will go there at midnight'

去年も生徒を訪ねた。
kyonen-mo **seeto-o** tazuneta
'I visited a student last year too'

たくさん映画見たい。
takusan ee-ga mitai
'I want to watch a lot of movies'

山道を老婆が歩いている。
yamamichi-o rooba-ga oruiteiru
'an old lady is walking in a path'

これが 同期の桜です。
kore-ga dooki-no sakura desu
'this is my former schoolmate'

その通りです。
sono toori desu
'that is right'

それが好意のあらわれです。
sore-ga kooi-no araware desu
'that is **her/his** kindness'

The Acquisition of Stative Verbs in Japanese: An Analysis of Child Narratives

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1 Introduction

In Japanese, stative verbs appear in a sentence construction in which the dative case particle ni. or the nominative case particle ga, marks the experiencer subject and the nominative case particle ga, marks the experienced object or stimulus. These constructions are also known as inversion constructions because the case marking is reversed from the canonical case marking as indicated in the following sentences.

(1)	Taro	ga	Hanako	o	mi-ta.
	Taro	NOM	Hanako	ACC	see-PAST
	'Taro saw Hanako.'				
(2)	Taro	ni/ga	Hanako	ga	mie-ta.
	Taro	DAT/NOM	Hanako	NOM	visible-PAST
	'Hanako is visible to Taro.'				

Pinker's (1984) concept of "linking rules" in his innate knowledge model predicts that young Japanese children will have difficulty constructing stative verb sentences since the construction denotes the non-canonical mapping form. Clancy (1986) also posited late acquisition of case markings in stative verb sentences, as they involve "exceptional case marking". Bowerman (1990). on the other hand, observed the simultaneous emergence of both canonical and non-canonical syntax in her longitudinal spontaneous speech data from two English-speaking children and argued that the emergence of specific constructions was related to context. Similarly Demuth (1985, 1989, 1990) observed that Sesotho speaking children acquire passive earlier in comparison with English speaking children due to its pragmatic salience in Sesotho. Morikawa (1997) analyzed the longitudinal data of a Japanese child from 1;11 to 3;3 and concluded that there is no particular sign of confusion with the variable marking of subjects and

objects based on the predicate types, specifically, the accusative marking of non-stative transitive objects and the nominative marking of stative transitive objects. Thus the question of whether or not "non-canonical" linking patterns should cause problems for language acquisition remains controversial.

Foley and Van Valin (1984) have argued that there is no universally consistent relationship between thematic and syntactic roles and a child simply LEARN linking between thematic and syntactic roles and subcategorization of verbs. Van Valin (1991) has argued that functionalist linguistic theories, in particular Role and Reference Grammar (RRG), have much to contribute to theories of language acquisition because they view syntax as ***relatively motivated*** by ***semantic, pragmatic and cognitive concerns.*** Rispoli (1990, 1991) has shown Japanese children's mastering of basic ***Aktionsart*** verbal classes by at the age two. By making particular reference to RRG, he has demonstrated that Japanese children use aspectual inflections and a specific type of question sentence in the input as cues to the subcategorization of verbs, and construct logical structures (LSs), the formal representation of ***Aktionsart,*** before the acquisition of case markings. The implication of these facts is that all verbs are consistent with linking rules, and therefore we should not expect any asymmetries in the acquisition of one type of verb over the other.

In this paper. I will test Pinker's claim that linking rules are innate against the theory of RRG, which assumes that children learn these linkages in the context of interaction and discourse. I will do so by collecting narratives from children (ages 3-6) and adults while they are telling a story based on a picture book constructed for this study. Specifically, there are some pictures in the book that. in the context of the overall story line, are predicted to elicit stative verb constructions from adults, and others that are predicted to elicit non-stative constructions from adults. The adult results will, then, be compared to the child narratives to see whether or not children also produce stative verb sentences for the target pictures. If they, especially the youngest children, do not, then Pinker's contention that these constructions are less canonical and therefore should be learned later will be verified. However, if even the youngest children produce stative verb constructions in reaction to the appropriate pictures, this will provide strong support for the RRG claim, as well as Bowerman and Rispoli's claims, that how canonical a sentence structure is is relative to pragmatics.

This paper is organized in the following manner. In Section 2, I elaborate Rispoli's research on the acquisition of morphosyntax in Japanese. Section 3 describes both the method of the narrative task experiment--the materials, subjects and procedure--and how the data will be analyzed. Section 4 discusses the findings of the experiment. The examination of my experimental data attempts to answer the question: are the linking rules innate or learned?

2 The Acquisition of Japanese Morphosyntax

Rispoli (1987, 1990, 1991) opposes Pinker's idea of the inborn knowledge of linking rules by making reference to RRG, where such innate knowledge is not required.

For example, Rispoli (1990) observed natural conversations between three Japanese children and their mothers. These children were observed and audio-taped from the age of 1;10 to 2;0. He demonstrated that Japanese children use verb inflections such as ***-r(u)*** "non-past", ***-ra*** "past", ***-nai*** "non-past negative", and ***-te iru*** "continuative" in input as cues to allow them to construct logical structures of basic ***Akrionsart*** verb classes. He argued that when a verb is inflected by the progressive marker ***-te iru,*** the interpretation of the inflection depends on the basic ***Aktionsart*** assignment of the verb. An activity verb such as ***hashir-"run"*** in Japanese expresses ongoing activity when it occurs with ***-te iru*** as in ***hashitreiru*** "is running". Whereas an achievement verb such as ***ochi-*** "drop" expresses a resultative state rather than an ongoing activity as in ***ochiteiru*** "has been dropped". The verbs that are inherently classed as accomplishments, such as ***ire-*** "put in" can have both readings for their ***-te iru*** form. Furthermore, state verbs such as ***ir-/ar-*** "be exist" and ***ir-*** "need" are never inflected with ***-te iru.*** For this type of verb. the simple present and past forms are interpreted as having ongoing states'.

Both in typical natural conversational Japanese and Japanese child-directed speech, the stative constructions are often spoken without an overt experiencer subject because simplified input often doesn't mention all arguments explicitly. In Japanese there is an enormous amount of ellipsis of explicit NPs when NPs are recoverable from context. This ellipsis occurs frequently not only with NPs but also with case markings. Unless the speaker is focusing on the experiencer, this NP is omitted and the sentence is interpreted as having a first person singular subject. Thus the following sentences are syntactically underspecified; however, they are typical of input sentences that Japanese children would hear (Rispoli 1991).

(3) Hanako-chan mie-ta
Hanako visible-PAST
'Hanako was visible (to me).'

(4) Hanako-chan mita
Hanako see-PAST
'(I) saw Hanako.'

Suppose the child were subcategorizing verbs according to the "canonical mapping" process, which is invoked by innate linking rules (Pinker 1984: 296-301). To what extent would the Japanese child know that sentence (3) is more

non-canonical than sentence (4) if they hear input sentences without the full complement of noun phrases most of the time? How can the Japanese child specify the correct number and type of thematic roles for the verb *mie-* "visible" and mi- "see" when their NP arguments are seldom accompanied by case marking? Rispoli (1991), in a study of input to Japanese children, found that among 450 action transitive input sentences in Japanese, only 11% had explicit mention of both causer and theme or patient NPs, and that only 1% had case-marked causer and theme or patient NPs. If the child were subcategorizing action verbs according to the "Canonical Mappings" and "Positive Distributional Evidence" of Pinker (1984) he or she would have a small chance of succeeding in producing two arguments to a transitive verb[2]. Two-year-old Japanese children do not have control over case marking particles; however they use specific classes of verbs in appropriate speech act contexts. Therefore Rispoli contends that the construction of LS begins before the acquisition of case marking. In sum, his study shows that explicit NP arguments with syntactic encoding play a minor role in the linking process; hence, he argues against the innate-linking rules hypothesis.

Rispoli's work have raised doubts on theoretical grounds about whether children need to be helped in acquiring language by an innate knowledge of linking rules. Rispoli agree with earlier proposals made by Foley and Van Valin (1984) and Rosen (1984), that children LEARN linking regularities within a particular language in order to set up phrase-structure rules and subcategorization frames for verbs. According to Pinker's linking rule, the Japanese stative verbs are non-canonical verbs. If children master the syntactic mapping of non-canonical verbs and constructions more slowly than the mapping of their canonical counterparts, the stative verbs in Japanese should appear less productively in the children's productions. Further, some degree of difficulty in assigning thematic roles to syntactic functions would be observed. Based on Rispoli's findings, I would predict that the degree of difficulty the Japanese children experience in assigning thematic roles to syntactic functions should be equal when we compare canonical vs non-canonical verbs. I would predict this because 1) stative verbs in Japanese appear frequently without any explicit NP subjects in natural communication settings 2) they are semantically distinct and perceptually/cognitively salient, and finally 3) as Rispoli has suggested, the semantic classification of verbs seems to occur before their syntactic specification.

3 Methodology

3.1 Subjects

My subjects were recruited from three-, four-, five- and six- year age groups –a total of 12 children from the Buffalo Japanese community. Two-year-olds were excluded because most of the 3-year-olds in Slobin and Berman's (1994) study failed to demonstrate knowledge of narrative structure even though they had shown good control over the lexicon and syntax of their native language. Thus, I assumed that at age three some children are capable of understanding and producing some syntax and, hence expressing grammar. Additionally, I obtained data from 12 Japanese adult native speakers for comparison. Five mothers and seven college students participated in my experimental study. Although some degree of exposure to English was unavoidable due to geographical location, I selected child subjects whose contact with English was limited. All of my subjects used Japanese at home with their family members and all of the younger children had lived in the United States less than ten months at the time of testing. Most of the younger subjects were recruited from the Japanese weekend school where I was employed as a pre-school teacher.

3.2 Materials

The source of my data is narratives elicited from young child and adult Japanese speakers. The narrative genre was chosen because narrative allows discourse to situate syntax contextually. The methodology was patterned after Berman and Slobin's (1994) crosslinguistic narrative study which used a wordless picture book called ***Frog, Where Are You?*** *I* created a picture book, which represents a typical Japanese children's story, with two main characters, a girl and a cat. The title of the book was ***Midori no Booken - Koneko o Sagashite*** - "Midori's Adventure - Looking for Her Lost Kitten". In the story, a girl named ***Midori*** looks for her lost kitten, ***Morno,*** whom she eventually finds after several adventures in a forest. The book does not include any words, other than the title, a bird vocalization *piyo piyo piyo piyo* "chirp chirp" in pictures 3 and 4, and Midori calling *"**Morno, Momo**"* in picture 15.

The picture book was designed to elicit the stative verb constructions under study by requiring the narrator to describe the thoughts and perceptions of the characters ***Midori*** and ***Morno. It*** is these pragmatic situations, within a discourse context, in which a speaker is most likely to use the stative construction. Thus, this was a more appropriate methodology than the elicitation of individual sentences out of context. The narrative was designed so that there would be a specific "focus of attention" in each picture. For each picture I was able to predict with some certainty which verb was the most likely to be selected and thus whether or not the stative construction would be used. Table 1 presents a description of each picture, as well as an indication of my prediction that a stative construction would be elicited; * = likely to elicit stative construction; ** = very likely to elicit stative construction.

Table I Description of Picture Book and Possible Utterance of Stative verbs

Picture #		Description of the picture scene
Title page		Midori is holding Momo. Momo is wearing a red ribbon around her neck. The title says "Midori's Adventure - Looking for Her Lost Kitten."
1		Midori is holding Momo with a big smile on her face.
2		Midori puts Momo into Momo's bed and Momo falls asleep.
3	*	Momo hears a bird chirping outside and she wakes up.
4	*	Momo sits on a stool to see what is outside the window. Momo sees many birds playing outside.
5		Momo leaves home to see the birds. Midori realizes that her cat is gone and begins to look for her.
6		Midori searches for Momo in the woods. She calls her cat's name, but Momo is not there.
7	**	While she is wandering around the wood she sees a red ribbon behind a big tree. She thinks it is Momo.
8		Midori sees it but it is not Momo. It is her friend who is also wearing a red ribbon.
9	**	Midori starts searching again. She sees a tail sticking out of a small cave.
10		However she sees that it is a different cat.
11	**	Midori starts searching again. This time she sees a cat's ears behind a log and again thinks it's Momo.
12		She is sad when she discovers it is a fox.
13	**	Again, Midori sees a cat's tail, this time, in a small hole.
14		Momo is playing around the hole. She puts her head in the hole and, then, takes it out of the hole.
15	*	Midori calls her name "Momo, Momo". Momo notices Midori's voice.
16		Midori and Momo see each other. They are very happy to be reunited and so they hug.

3.3 Procedures

In my experiment, the subjects were asked to tell a story based on the picture book just discussed. Each consultation took place at the subject's home or in the classroom of the Japanese weekend school. The experiment took approximately fifteen to thirty minutes per subject. All conversation with the subjects was carried on in Japanese. The experimental procedure was based on **Slobin's** narrative task experiment. Each child subject was asked to look through the entire book with the aid of the experimenter, and then to return to the beginning

of the book at which point the child's mother would enter the room and sit across from the subject. The subject would then begin telling the story while looking at the pictures. For the adult subjects, the same procedure was used except there was no third person involved in the experiment. The following instructions, with slight variations for the younger and older children, were given individually beforehand:

> ***Here is a book [read title of the book]. This book tells a story about a girl named Midori [point to picture on cover] and a cat named Momo [point]. First I would like you to look at all the pictures. Please pay attention to each picture that you see and later you will tell me and your mother (or father) the story.***

In order to avoid the influence of verbal feedback, parents were instructed to use only the following expressions; a) Silence, smile or nod of head b) ***Hai*** "Yes", ***Soo*** "I see" c) ***Hokaniwa*** "Anything else?") ***Sorekara*** "and then?". Nevertheless, different strategies were used depending on the child's age or personality. Some children needed more scaffolding than others, especially the younger age groups given their shorter attention span. Each session was recorded on audiotape and transcribed by the experimenter, with the help of a parent when needed.

3.4 Data and data analysis

From the transcribed narratives, I selected for further analysis only those sentences which contained a main predicate with a verb, since the verbs were the object of interest in this study. I excluded from further analysis utterances with adjectival predicates or predicates in subordinate clauses, as well as those which consisted simply of a noun phrase. Also excluded were self-repetitions. This process yielded 102 sentences from child narratives and 211 sentences from adult narratives that were eligible for analysis. For each sentence, the following analyses were performed:

i) Each verb was classified in terms of its transitivity (transitive, intransitive or stative), and into an Aktionsart category, according to the criteria outlined below.

ii) The presence or absence of overt arguments was coded for each sentence.

iii) The frequency and accuracy of the use of the two major case particles ***ga, o*** and the topic marker ***wa*** was counted.

The designation of the Aktionsart class for each verb was determined by reference to the diagnostic tests developed by Shirai (1993) for Japanese verbs. In order to further test my hypotheses regarding the effect of discourse and context on verb choice, I made a second selection of sentences within the data set to compare specifically in terms of their pictorial context. Recall that pictures #7, 9, 11 and 13 were those indicated as being the most likely to elicit

stative verb sentences because of the events being depicted in these pictures in the overall context of the story line (see Table I). In order to make a direct evaluation of the effect of context, I selected pictures #1, 2, 4 and 6 as those pictures that were least likely to elicit stative verbs because they are either setting up the characters or depicting overt action on the part of one of the characters. In the 'results' section below I will make several comparisons of the sentences elicited by pictures #7, 9, 11 and 13, which I will refer to as 'stative-target pictures (S-target)' (Child N=28, Adult N=48), and those sentences elicited by picture #1, 2, 4 and 6, which I will refer to as 'non-stative control pictures (N-S control)' (Child N=32, Adult N=51). I will now turn to a discussion of the results of the study.

4 Results and Discussion

All the children in my experimental study were able to describe the content of the story to different degrees. While one three-year-old showed difficulty in producing a story, other three-year-olds showed an advanced narrative competence. For other age groups, individual variation from one child to another was observed as well. Some children produced well-structured narratives, while others required constant prompting from both their parent and the experimenter. In such cases, their storytelling became more like a question and answer exchange. This section reports the results of three analyses of the selected sentences from the narrative data. The first is an analysis of the *Aktionsart* verbal classes, used by children and adults, both in general and under specific discourse contexts in the data. The second is an analysis of use of specific verbs, and overt actor and undergoer arguments of the sentences. The case markings of actor and undergoer macrorole arguments in the 102 sentences spoken by children were analyzed as well.

4.1 Analysis of verbal types

As discussed in the previous section, sentences were selected if an uttered sentence involved a verbal main predicate. There were 102 such sentences in the child data, which included 36 stative verbs, 19 activity verbs, 24 accomplishment verbs and 23 achievement verbs, as shown in Table 2. The stative verbs were certainly present across the age groups, and importantly they appeared frequently in one of the three-year-old's subject's narrative. Among 217 adult sentences, there were 70 state verbs, 71 activity verbs, 51 accomplishment verbs and 25 achievement verbs as indicated below.

Table 2 Frequency of Aktionsart Verbal Types in the Child and Adult Narrative Data

Child	State	Activity	Accomplish-ment	Achieve-ment	Total
NK (3;03)	5	2	1	3	11
KY (3;04)	1	2	0	0	3
WN (3;07)	1	0	2	0	3
MI (4;07)	0	3	1	2	6
MM (4;09)	6	1	4	4	15
MK (4;11)	1	2	2	1	6
HT (5;04)	4	2	0	1	7
MK (5;06)	6	2	1	0	9
MS (5;07)	4	2	3	2	11
YI (6;00)	1	1	3	6	11
AK (6;02)	4	0	5	3	12
TM (6;10)	3	2	2	1	8
Total	**36**	**19**	**24**	**23**	**102**
%	**35.3%**	**18.6%**	**23.5%**	**22.6%**	**100%**
Adult	**70**	**71**	**51**	**25**	**217**
%	**32.3%**	**32.7%**	**23.5%**	**6.4%**	**100%**

Next, I looked at results for just the four S-target pictures, #7, 9, 11. 13 and their matched N-S control pictures, #1, 2, 4, 6. The results are given in Table 3.

Table 3 Observed Sentence Pattern in Target pictures and Control pictures

	Child		**Adult**	
Verb type	S-target	N-S control	S-target	N-S control
Activity	1	15	0	35
Stative	21	4	37	3
Accomplishment	0	10	0	11
Achievement	6	3	11	2
N	28	32	48	51

This table clearly shows that verb selection for both children and adults followed the pattern predicted based on the pictoral context. The stative verbs

mie- "visible", *ir-/ar-* "exist" and the achievement verb ***rnitsuke-*** "find (transitive)" were observed both in child and adult data when the subject described the S-target pictures. The following sentences are examples of this verb use by the child subjects.

(5) a. Soshitara, shippo ga mietara... [NK3;03]
And then tail NOM visible-CONJ
'And then, the tail was visible....'

b. Mimi ga atte. [AK6;02]
ear NOM exist-LINK
'There weres ears.'

c. Shippo o {mitsuke..) mitsuketa [YI6;00]
Tail ACC find (tra)-PAST
'(She) found the tail.'

The total number of six occurrences of achievement verbs such as ***de-/detek-*** "come out" and ***mitsuka-*** "find (intransitive)" were produced by a few child subjects to describe S-target picture scenes. For adults, these verbs would be semantically incorrect if used with the target picture scenes. For example, in the case of the verb ***detek-*** "come out", it must refer to an entity that becomes visible to the perceiver and, further, this entity must be associated with some kind of movement when it becomes visible. In picture 11, the perceiver ***Midori*** is associated with movement – walking towards a log; however, the perceived entity ***ears*** are not associated with any kind of movement. As a result, the verb ***de-/detek-*** "come out" was never used by adults to describe the S-target picture.

In the case of the verb ***mituka-*** "find (intransitive)". it refers to the resultant state of its transitive counterpart ***mitsuke-*** "find (transitive)". ***Mitsuka-*** refers to an object which the actor was intentionally searching for. In picture 7, ***Midori*** happens to encounter the ribbon, so that the events lack the volitionality presupposed by this verb. Further, the narrator knows this ribbon is in fact not ***Momo***'s. Thus several adult subjects did use ***mituka-*** to describe the last picture scene where Midori finally finds Momo; however they did not use ***mitsuka-*** to describe the S-target pictures, #7, 9, 11 and 13. Nevertheless, it is semantically incorrect for these two intransitive verbs to appear in the target pictures. By Pinker's (1984) linking rules, intransitive sentences are considered to be canonical mappings since the links do not cross. Therefore the pragmatic inappropriateness of these canonically linked verbs such as ***mituka-*** "find (intra)" and ***de-/detek-*** "come out (intra)" are problematic for the hypothesis that these verbs are easier for children than non-canonically linked verbs.

4.2 Analysis of verbs - argument structures

As shown in Table 4, further analyses of the explicit NP arguments in the in/transitive non-stative and stative verb classes in the S-target and N-S control pictures offer no support for the hypothesis that children receive selective help from innate linking rules for verbs of one type of verbs over the other type. The four basic *Aktionsart* verbal classes were sorted out in this way in order to see the differences between canonically linked and non-canonically linked verbs. Only 25% of sentences with transitive non-state verbs had, simultaneously, an explicit actor and an explicit undergoer argument, while 86% of state verb sentences had an explicit undergoer NP when the referent appeared in the S-target picture, and 100% of intransitive non-state sentences appeared with explicit actor or undergoer NPs in the S-target pictures. Similar results were observed for transitive non-state verb and state verb sentences when the referent appeared in N-S control pictures. Only 7% of sentences with transitive non-stative verbs had, simultaneously, an explicit actor and an explicit undergoer argument, while 75% of state verb sentences had an explicit undergoer NP. However the frequency of the explicit NP arguments in the intransitive non-stative reduced from 100% to 50% in N-S control pictures. In sum, overall results still show that non-canonically linked verbs have a high frequency of the correct use of a macrorole argument NP as compared to canonically linked verbs in the child data.

Table 4 Frequency of explicit actor and undergoer NPs in the S-target pictures and the N-S control pictures in the child data

Sentence types	Frequency S-Target	%	Frequency N-S Control	%
Non-state Transitive				
-Actor NP, -Undergoer NP	0	0	7	50%
+Actor NP only	0	0	5	36%
+Undergoer NP only	3	75%	1	7%
+Actor NP, + Undergoer NP	1	25%	1	7%
Total	4	100%	12	100%
Non-state Intransitive				
+Actor NP	0	0	8	50%
+Undergoer NP	3	100%	0	0
-Undergoer or –Actor	0	0	8	50%
Total	3	100%	16	100%
State Transitive				
-Undergoer NP	3	14%	1	75%
+Undergoer NP	18	86%	3	25%
Total	21	100	4	100%
N	28		32	

I will now turn to the analysis of the distribution of the case particles in the child and the adult data. First, the sentences were sorted in terms of the three sentence types (transitive non-state, intransitive non-state, stative), and then they were coded for: (I) explicit actor, undergoer NPs, and (2) the case marking of these explicit NPs. The results of this analysis are presented in Table 5.

Table 5 Frequency of case particles in each sentence type in the child and adult data

Sentence types	Frequency Child	%	Frequency Adult	%
Non-stativeTransitive N=	24		67	
+Actor NP/+Undergoer NP	2		32	
+wa or ga/+o	I	4%	30	45%
+wa or gal-o	0	0	0	0
-wa or ga/+o	0	0	1	15%
-wa or gal-o	1	4%	0	0
+Actor NP only	3		10	
+wa or ga	I	33%	10	100%
-ga	2	67%	2	14%
+Undergoer NP only	8		10	
+o	7	88%	8	80%
-0	1	12%	2	20%
Intransitive N=	42		80	
+Actor/Undergoer NP	17		56	
+ga	14	33%	52	65%
-ga	3	7%	4	5%
Stative N=	36		70	
+DCA/+Undergoer NP	0		1	
+ga/+ga	0	0	I	1%
-ga/-ga	0	0	0	0
+Undergoer NP only	30		56	
+ga	26	72%	55	78%
-ga	4	18%	1	1%
	102		217	

Of the transitive non-state sentences in the child data, only one had simultaneously explicit actor and undergoer NP arguments marked by the correct case marking. Furthermore, only 33% (14) of the intransitive non-state sentences had an explicit actor or undergoer NP that was marked by the nominative case particle ga. However, 72 % (26) of state sentences had an explicit undergoer NP that was marked by the nominative case particle ga. The correct case marking of the macrorole NP argument of a stative sentence was

much more frequent than that of an intransitive non-state sentence and a transitive non-state sentence. Once again, Table 5 reveals no special support for the hypothesis that Japanese children have an advantage in learning the syntactic mapping of canonical verb sentences. In my data, the one case marking error was observed in a canonical verb sentence in which agent and theme were present.

5 Conclusions

In this paper I have compared two theories of the acquisition of verb constructions, by looking at data from a narrative task in Japanese. The first of these theories states that children have an innate knowledge of linking rules from thematic roles to syntactic functions (Pinker 1984), and thus any verb which requires a non-canonical mapping between roles and functions will be more difficult for children to learn than a canonical verb, and emerge later in their production. The second theory, Role and Reference Grammar, states that the linking patterns between thematic roles and syntactic functions are not necessarily innate, but they are learned in the context of interaction and discourse (Foley and Van Valin 1984, Van Valin 1991). The findings of my study regarding the acquisition of stative verb vs. non-stative verb constructions in Japanese support the latter theory, since non-stative verbs, which would be considered to have a non-canonical mapping in the first type of theory, were used as often and in the same contexts as adults in this study.

In the present study, children ages 3-6 and adults were asked to tell a narrative, based on a picture book, in which some pictures were designed to elicit the use of stative verb constructions and other were designed to elicit the use of non-stative verbs, for semantic/pragmatic reasons. My findings were, first, that there were a high number of stative verb constructions used in the children's narratives, in the same patterns as their use by adults. Second, there was a high frequency of the correct use of a macrorole argument NP in the stative verb sentences in the child data. Third, children used the correct overt case marking of argument NPs in stative verb constructions more often than in the non-stative transitive or intransitive constructions. All of these findings support the claim made by RRG that the stative verb constructions are no less 'canonical' than the other constructions, and because they are the most appropriate constructions in certain pragmatic settings, they will be learned as early as the other constructions, particularly in the context of these pragmatic situations.

These conclusions fit well with those of Bowerman (1990) for English, Rispoli (1987, 1990, 1991) for Japanese. and Demuth (1985, 1989, 1990) for Sesotho. These researchers found no support for the hypothesis that knowledge of linking rules is innate, and found support for the claims that they are learned in the context of their pragmatic usage. If the linking rules were innate, and non-

canonical mappings were thus more difficult than canonical mappings as suggested by Pinker, we would have expected to find that the stative verb constructions were used less and with less accuracy than the non-stative constructions by the children in the study; however, the opposite was found. Thus the RRG claim that such linking patterns are learned and patterns of their acquisition are related to contextual interaction and discourse pragmatics, are supported by the current study.

Note

[1] The progressive marker *–te iru* is often employed as a stativity test. Kindaichi (1976) claims that stative verbs never appear in the *-te iru* construction. Shirai (2000), on the other hand, does not believe that employing compatibility with progressive marking works as a stativity test. He argues that some Japanese stative verbs can also be combined with progressive marking and carry a dynamic situation (see (I-a) and b).

(I) a. *Sore wa chiga-te-iru.*
that TOP be different-LINK-ASP
'That's wrong.'

b. *Sore wa chiga-u.*
that TOP be different-NONPAST
'That's wrong.'

As a native speaker of Japanese, I agree with Shirai that stative verbs (except *ir-/ar-* "be exist" and *ir-* "need) can appear with the progressive marker because the temporariness of other stative verbs can be presented as dynamic.

The idea of 'default mappings' or 'paired thematic and syntactic hierarchies' is rejected in his later model (Pinker 1989). He instead treats all verbs as consistent with linking rules. However he continues to posit linking rules as innate and claims that children do not have to learn the linking rules at all. Pinker notes: "A linking rule links syntax and semantics. At the syntactic end, the actual spelling out of grammatical functions or argument types into surface syntactic devices is accomplished by lexical entries for prepositions and morphological case markers, and rules or principles pertaining to phrase structure. government, and case assignment...." (Pinker 1989 p248).

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Adverb Placement, Clitic Position, Verb Movement and Control with an Overt *Wh*-Complementizer

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1 Introduction

Kayne (1989) points out the grammatical difference in (1) with respect to control with an overt wh-complementizer, possible in Italian but not in French:

(I) a. *Marie ne sait pas si aller au cinéma.
know not if go to-the movies
'Marie doesn't know whether to go to the movies.'

b. Gianni non sa se andare al cinema.
not know if go to-the movies
'Gianni doesn't know whether to go to the movies.'

He shows that both French si and Italian se in a number of respects behave very much like English *if* rather than whether, the two exhibiting different properties with respect to control. A control complement is possible with whether, but not with *if*:

(2) a. John doesn't know whether to go to the movies.
b. *John doesn't know if to go to the movies.

He argues that if is a complementizer appearing in the C° position, while whether occurs in the SpecCP position. Thus, in the schematic structure in (3), *if*, but not whether, would govern the embedded PRO subject, violating the PRO-theorem barring governed PRO, a consequence of binding theory (Chomsky 1981):

(3) ... [$_{CP}$ whether [if [$_{IP}$ PRO ...

The problem now is how one is to account for the grammatical contrast in **(1)** given that both French si and Italian se occur in the C^{O} position. In addition, to achieve a certain degree of explanatory adequacy, one also needs to relate the contrast in (I) to some other difference between French and Italian.

I argue that while the ungrammaticality of the French example in (1a), as Kayne (1991) suggests, is due to PRO being governed by the overt wh-complementizer, violating the PRO-theorem, the reason why control with an overt wh-complementizer is possible in the Italian example in **(1b)** is not because the verb appears in a position where it governs PRO and hence prevents PRO from being governed by the overt wh-complementizer, as Kayne (1991) claims. In fact, I present empirical evidence showing that the infinitive verb cannot possibly govern the subject position. I claim that the grammatical difference in (1) is due to an independent difference between French and Italian with respect to postverbal subject.

2 Analysis

2.1 **Proclisis** vs enclisis and adverb placement

French differs from Italian in that object clitics generally precede the infinitive verb, while those in Italian follow it:

(4) a. **lui parler serait** une erreur.
him speak would be an error
'To speak to him would be an error.'
b. ***parler-lui serait** une erreur.

(5) a. **parlar-gli** sarebbe un **errore.**
speak-him would be an error
'To speak to him would be an error.'
b. ***gli parlare** sarebbe un **errore.**

Kayne (1991) suggests that quite generally pronominal clitics adjoin to a (possibly empty) functional head. In the infinitive, the verb first moves from its base-position in the VP to a functional head Infn. On the one hand, object clitics adjoin to the **V+Infn** in French, yielding proclisis in **(6a).** On the other hand, object clitics are in T in Italian, but the **V+Infn** complex moves across T to adjoin to T, yielding enclisis in **(6b):**

(6) a. ... T [$_{InfP}$ [**Cl+V_i+Infn** [$_{VP}$[t_i ... (F)

b. ... [T' [V+Infn]$_j$ [T' Cl+T [InfP [t_j [VP [t_i ... (I)

Thus, in a control complement as in (7b), the infinitive verb in Italian is close enough to SpecIP where PRO is located so as to induce a Minimality effect (Chomsky 1986, Rizzi 1990), preventing the overt wh-complementizer in C from governing PRO, while the infinitive verb in French occurs too low in the structure to induce such an effect:

(7) a. *... si [IP PRO [I° [InfP [V^O+$Infn^O$ ... (F)
b. ... se [IP PRO [I' V° [I' I° [InfP ... (I)

The structure in (7a) is therefore excluded as a violation of the PRO theorem since the overt wh-complementizer *si* in C governs PRO, just like English *if*.

There are several problems with Kayne's (1991) analysis. Conceptually, there is apparently no principled reason for pronominal clitics to adjoin to different syntactic positions (to the V+Infn complex in French but to T in Italian). The same problem arises for the position of the infinitive verb. It is not obvious why V occurs $Infn^O$ in French, and the V+ $Infn^O$ complex adjoins to T' in Italian. In fact, the enclisis vs proclisis distinction only bears on the relative ordering of V and the pronominal clitic, but says nothing about where they actually occur.

The same point holds for adverb placement in Italian. Thus, the relative ordering of the verb and the adverb does not actually reveal the position of the verb in the clause:

(8) senza (forse) invitarlo (*forse).
without perhaps invite him perhaps
'Without perhaps inviting him.'

Even if the adverb forse 'perhaps' can adjoin to TP but not to InfnP or VP (Kayne 1991), an assumption for which independent evidence is not easy to come by, it is difficult to determine whether the verb and the enclitic in (8b) have moved to an as high position as an T'-adjunct position. The example in (8) is entirely consistent with a structure in which the adverb is adjoined to TP, with the verb and the enclitic being located in a position somewhere below T°. We will return to the issue of the position of the infinitive verb in section 2.4.

Most problematic for Kayne's government-based account for the two structures in (7) is that if the structure in (7a) is excluded because PRO is governed (by the complementizer *si*), then the structure in (7b) should be excluded as well since PRO is also governed (by V).

2.2 Government of PRO and binding theory

Acknowledging that PRO is governed by the infinitive verb, Kayne (1991) argues that although an anaphor must be bound by a (c-commanding)antecedent in the smallest category containing PRO, a subject position, and the governor of

PRO, it is unreasonable to require an anaphor to be bound within a category containing no position that could contain a potential binder. Thus, in cases where PRO is governed internally to X^{max} as in **(7b),** the governing category for PRO qua anaphor will be the next category up containing a subject position. The problem with this explanation is that it will incorrectly admit overt anaphors in subject position. As illustrated by the English examples in **(9),** an anaphor may not seek an antecedent in a higher clause:

(9) a. John wonders whether
[IP **he/*himself** will win the race]
b. John believes that
[IP **he/*himself** will win the race]

Although the example in (I b) obviously differs from those in (9) with respect to the finiteness of the embedded clause. the difference does not bear on Kayne's analysis. In fact, the structure in (7b) for the example in (Ib) is identical to those in (9) in relevant respects, PRO in (7b) and the overt subject in (9) being in the same position. Now, if PRO in (7b) is governed by the infinitive verb of the embedded IP, and is allowed to find its antecedent outside its governing category since it contains no position that could contain a potential binder, then the same should be true the examples in (9) as well. This is so because the anaphors in (9), like PRO in **(7b),** are governed (by **I°,** a non-lexical category), internally to the embedded **IPs,** their governing categories, as evidenced by the fact that they can be bound in the embedded IP. But the embedded **IPs** in (9) do not contain a position that could contain a potential binder for the anaphors any more than the embedded IP in (7b) does. Nevertheless, the anaphors in (9) cannot find their antecedents outside their governing categories, exactly the opposite of what Kayne suggests for Italian in (Ib).

2.3 Adverb placement, ne-cliticization and government

Empirical evidence from ne-cliticization and adverb placement in Italian shows that the subject position of an infinitive cannot possibly be governed by the infinitive verb. The evidence is not direct, however. We first consider finite clauses with an adverb marking the position from which the finite verb cannot govern subject position, and then use the same adverb in the infinitive to show that the infinitive verb also does not govern subject position.

It is well-known that the **clitic** ne can be associated with an (underlying) object position (Perlmutter 1978). but with not with subject position or a position inside an adverbial **(Rizzi** and Belletti 1981):

(10) a. Gianni **trascorretà**
will spend
[tre settimane] a **Milano.**
three weeks in
'Gianni will spend three weeks in Milan.'

b. Gianni **ne**$_i$ **trascorretà**
of them spend
[tre t_i] a **Milano.**
three in
'Gianni will spend three of them in Milan.'

(11) a. **sono passate** tre settimane.
be pass three weeks
'Three weeks elapsed.'

b. tre settimane **sono passate.**
'Three weeks elapsed.'

c. **ne**$_i$ **sono passate** [tre t_i]
of them be pass
'Three of them elapsed.'

d. *[tre t_i] **ne**$_i$ **sono passate.**

(12) a. Gianni **è rimasto** tre settimane
be remain three weeks
a **Milano.**
in
'Gianni remained three weeks in **Milano.'**

b. ***Gianni ne**$_i$ **è rimasto** [tre t_i]
of them be remain three
a **Milano.**
'Gianni remained three of them in **Milano.'**

If the clitic ne moves from the position to which it is related, then the facts in (10)-(12) can be accounted for simply in terms of Huang's (1982) Condition on Extraction Domain, barring extraction out of ungoverned domains. As object position, but not subject or adverbial position, is governed by the verb, the contrast between **(10b)** and (I lc) on the one hand, and **(1**ld) and **(12b)** on the other now follows, since the clitic ne moves out of a governed domain in **(10b)** and **(1**Ic), but out of an ungoverned domain in (I **1d)** and **(12b).**

Cinque (1999) shows that the relative ordering of adverbs is fairly uniform cross-linguistically. Now, if the positions of the adverbs are fixed (for both finite and infinitive clauses) as he argues, then we can bring the positions of adverbs to bear on government of subject position. Specifically, if we can show that in the configuration in **(13),** the verb to the left of the adverb in **(13a)** does not govern subject position. then the verb to the right of the same adverb in **(13b)** does not govern subject position either, for the verb to the left of the adverb occurs in a higher position and is closer to subject position than the verb appearing to the right of the same adverb:

(13) a. ... [$_{IP}$ [... V Adv ...
b. ... [$_{IP}$ [... Adv V ...

As shown in **(14),** the finite verb may appear either to the left or to the right of the adverb intelligentemente 'intelligently', but ne-cliticization from subject position is impossible, regardless where the verb occurs (Cinque 1999) (the reflexive clitic *si* becomes se when it appears before the clitic ne):

(14) a. non so se [$_{IP}$ molti **studenti**
not know if many students
[(intelligentemente)si rifiutano
intelligently self refuse
(intelligentemente)di **firmare,** o no]]
intelligently sign or not
'I don't know if many students are intelligently refusing to sign, or not.'

b. ***non** so se [$_{IP}$[molti $_{i}$]
not know if many
[(intelligentemente)se **ne**$_{i}$ rifiutano
intelligently self of-them refuse
(intelligentemente)di **firmare,** o no]]
intelligently sign or not
'I don't know if many of them are intelligently refusing to sign, or not.'

Like the finite verb, the infinitive verb may also appear either to the left or to the right of the adverb intelligentemente 'intelligently':

(15) non so se [$_{IP}$ **PRO** [(intelligentemente)
not know if intelligently
rifiutar-mi (intelligentemente)
refuse-myself intelligently
di **firmare,** o no]]

sign, or not
'I don't know whether to intelligently refuse to sign, or not.'

What is particularly relevant to the issue of whether subject position is governed by the verb are the variant of (14) where the finite verb occurs to the left of the adverb, exactly the configuration in (13a), and the variant of (15) where the infinitive verb occurs to the right of the adverb, exactly the configuration in (13b). As the finite verb in (14) does not govern subject position as clearly shown by the impossible ne-cliticization in (14b), there is no reason to suppose that the infinitive verb to the right of the adverb in (15) governs subject position, for it appears lower in the structure, and hence farther from the subject position than the finite verb to the left of the adverb.

It is worth pointing out that in the variant of (15) with the infinitive verb appearing to the left of the adverb the infinitive verb may very well turn out to be in a position higher than the finite verb appearing to the left of the same adverb (cf. Belletti 1990). The infinitive verb may then govern the postverbal subject position in this case, which would be consistent with Kayne's claim that the infinitive verb induces a Minimality effect, preventing the overt *wh*-complement se from governing **PRO**. But the explanation for this variant of (15) does not extend to the variant of (15) where the infinitive verb occurs to the right of the adverb, where it clearly does not govern subject position, since the finite verb to the left of the same adverb does not govern it (cf. (14b)).

If the difference between French and Italian with respect to control with an overt wh-complementizer is not due to **PRO** being governed by the infinitive verb, i.e. PRO is governed by the infinitive verb in neither French nor Italian, then what other difference between French and Italian can be brought to bear on their difference with respect to control?

2.4 Postverbal subject and control

I claim that control with an overt wh-complementizer is possible in Italian precisely because the language independently allows postverbal subject, a possibility that does not exist in French. As shown in (16), French does not permit postverbal subject, especially when the subject position is not filled, in contrast with Italian:

(16) a. Jean a **mangé** la pomme.
have eat the apple
'Jean ate the apple.'
b. *a **mangé** la pomme Jean.

(17) a. Gianni ha mangiato la pasta.
have eat the pasta
'Gianni ate the pasta.'
b. ha mangiato la pasta Gianni.

Although it is not immediately clear where exactly the postverbal subject is located in Italian, facts regarding subject extraction indicate that it appears in a postverbal position close enough to the (finite) verb to be governed by it. The same point is also shown in (I Ic) where the clitic ne may be extracted out of the postverbal subject.

Rizzi (1982) argues that the apparent lack of the that-trace effect in Italian is due to the subject being extracted from the postfverbal position, a possibility that does not exist for English since it does not allow postverbal subject:

(18) a. **chi**$_i$ credi **che telefonerà** t_i?
who think that will telephone
'Who do you think will telephone?
b. ***Who**$_i$ do you think that t_i will telephone?

In terms of government, then, it must be that the postverbal trace of the *wh*-phrase chi 'who' in **(18a)** is governed by the verb, but the preverbal trace of who in subject position, **i.e. SpecIP,** in **(18b)** is not. Extraction of the preverbal subject leaving a trace ungoverned by a lexical category violates Chomsky's (1981) Empty Category Principle. Notice that in the schematic structure in (19) the cornplementizer also does not govern the postverbal position:

(19) **...** C [$_{IP}$ SpecIP [**...** [$_{VP}$ V^O **...** subject ...

If it did, then it should be able to govern the preverbal trace in subject position. which is closer to the **C°** position than the postverbal subject position is, and the example in **(18b)** should be grammatical, contrary to fact. In fact, given the Minimality effect induced by the verb, the complementizer cannot also govern the postverbal position since the verb already governs it.

If an overt subject may appear in the postverbal position, then there is no reason why a phonetically null subject PRO in principle cannot occur in the same position. By the same parity of reasoning, if an overt subject may not appear in the postverbal position, then PRO also may not. These two cases in French and Italian can be represented in **(20a)** and **(20b)** respectively:

(20) a. *... si [$_{IP}$ PRO [**... V° ...** **(F)**
b. **...** se [$_{IP}$ [**...** V^O **...** PRO **...** (I)

Clearly, then, PRO is governed by the wh-cornplementizer in French, but not in Italian. Control with an overt wh-complementizer is thus impossible in French

since government of PRO by the overt wh-complementizer induces a PRO theorem violation. The violation does not arise in Italian, as PRO can appear in the postverbal position, too far to be governed by the overt wh-complementizer.

In light of the fact that the postverbal position is governed by the finite verb in (19), cf. extraction of the postverbal subject in (18a), one may wonder if the infinitive verb in (20) would also govern the postverbal subject PRO as well. Two pieces of evidence suggest that while the finite verb may occur in a low position in the structure where it can govern the postverbal subject, the infinitive verb appears in a fairly high position, too far to govern it.

First, as we can see from the contrast in (5), the infinitive verb may, but the finite verb may not, appear to the left of an object clitic. If the position of the object clitic is fixed, then the infinitive verb occurring to the left of the clitic is structurally in a higher position than the finite verb appearing to the right. This is a surprising fact, if verb movement is triggered by the need to check some formal features (Chomsky 1995). The finite verb arguably needs to check the person and number features, but it is not obvious whether there is some formal features that the infinitive verb can check, it having no overt morphological markings for the person and number features.

Second, the finite verb in Italian may appear either to the left or to the right of the adverb ***francamente*** 'frankly', but the infinitive verb in the subject and complement clauses must appear to the left of the adverb (Belletti 1990, Cinque 1999) (cf. the preverbal adverb in the adjunct infinitive in (8)):

(21) Maria (francamente) **parla** (francamente)
Frankly talk frankly
a Gianni.
to
'Maria frankly talks to Gianni.'

(22) mi mette in imbarazzo, **(*francamente)**
myself put in embarassment frankly
disporre **(francamente)** di mezzi **così** limitati.
dispose frankly of means that limited
'It embarasses me frankly to have so limited means.'

In fact, the position of the infinitive verb is quite high in the clause in comparison with that of the finite verb. As shown in (23), the (bold) finite verb may follow a string of adverbs (Cinque 1999):

(23) a. francamente purtroppo evidentemente
frankly unfortunately clearly
mi ero **formato** una pessima opinione
myself have form a bad opinion

di voi.
of you
'Frankly I unfortunately had clearly formed a very bad opinion of you.'

b. Gianni purtroppo forse stupidamente
unfortunately perhaps stupidly
mica gli ha **più** telefonato.
not to him have any longer telephone
'Gianni unfortunately perhaps stupidly has not telephoned him.'

Consider now the example in (24) where the embedded subject is extracted:

(24) **chi**$_i$ credi **che** purtroppo forse
who think that unfortunately perhaps
stupidamente mica gli ha pih
stupidly not to him have any longer
telefonato t_i?
telephone
'Who do you think unfortunately perhaps stupidly has not telephoned him?'

If the embedded subject is extracted from the postverbal position, then it must be that the trace of the extracted subject is (properly) governed by the finite auxiliary (or the participle).

As it must precede the adverb francamente 'frankly' (cf. **(22)**), the infinitive verb clearly occurs in a position much higher than the position where the finite verb can appear. In the schematic strucutre in **(25)**, the infinitive verb occurs in a high position X preceding the adverb francamente 'frankly', and the finite verb may appear as low as the position Y after a string of adverbs (**Adv+** represents a sequence of at least one adverb):

(25) **...** X **...**francamente **Adv+ ...** Y **...** subject

If the positions of adverbs are fixed, then the fact that the finite verb in (25) may also appear in one of the positions in the **Adv+** sequence indicates that there are other head-positions to which the finite verb may move (Holmberg 1986, Cinque 1999). It is thus quite plausible that the infinitive verb in the position X in (25) does not govern the postverbal subject position, there being other intermediate head-positions within in **Adv+** sequence.

The conclusion we can now draw is that **PRO** in the postverbal subject position is governed neither by the overt wh-complementizer nor by the infinitive verb. It is precisely the possibility of having postverbal subject in Italian as we can see in (16) and the high position of the infinitive verb as we can see in (23) that

PRO can escape government; control with an overt wh-complementizer is therefore possible. By contrast, French does not allow postverbal subject, as we can see in the contrast in (16), PRO in subject position would then be governed by an overt wh-complementizer; control with an overt wh-complementizer is therefore excluded.

2.5 Control in some other varieties of Romance

Further empirical support for the account for the difference between Italian and French with respect to control with an overt wh-complementizer in terms of postverbal subject comes from other varieties of Romance. Like Italian, Spanish has postverbal subject; as expected, it also allows control with an overt ***wh***-complementizer (Butt and Benjamin 1988):

(26) a. ley6 el libro Inés.
read the book
'Inés read the book.'

b. Ints no sabe si leer el libro.
not know if read the book
'Inés does not know whether to read the book.'

Sardinian resembles Italian in permitting null subject, but differs from it in not having non-right-dislocated postverbal subject (Jones 1993). Control with an overt wh-complementizer is impossible (Kayne 1991):

(27) a. leghet su libru.
read the book
'He/she reads the book.'

b. ***est arrivata** a sa festa Maria.
be arrive at the festival
'Maria arrived at the festival.'

c. *no 'isco si **andare.**
not I-know if to-go
'I don't know whether to go.'

Occitan deserves further investigation, for it is like Sardinian with respect to null subject (Sauzet 1989) and control with an overt wh-complementizer (Kayne 1991):

(28) a. li ai parlat

to him have talk
'I have talked to him.'

b. *sabi pas se anar al cinema.
I-know not if go to-the movies
'I don't know whether to go to the movies.'

But I have not seen examples with non-right-dislocated postverbal subject in the published work that I have access to, and therefore cannot ascertain whether it is impossible.

3 Conclusion

In this paper, I argue that control with an overt wh-complementizer correlates with postverbal subject and the position of the infinitive verb. Thus, in a language like Italian or Spanish, an empty PRO, just like its overt counterpart, may appear in the postverbal subject position, which is too far for the overt *wh*-complementizer to govern. I argue that evidence from adverb placement shows that although the postverbal position is governed by the finite verb, but it is not governed by the infinitive verb. PRO can hence escape goverment in the postverbal position. By contrast, in a language like French or Sardinian that does not allow postverbal subject, PRO in the preverbal subject position, i.e. SpecIP, would be governed by the overt wh-complementizer, violating the PRO theorem.

On this view, the proclisis vs enclisis difference between French/Sardinian and Italian/Spanish can be related to their difference with respect to control with an overt wh-complementizer. We need not be specific as to what position the infinitive verb occurs in the respective language, for the relative positioning of the verb, object clitics and adverbs only bears on their relative ordering, not on their exact positions. More significantly, there is no need for complicating binding theory in allowing an anaphor to be bound outside its governing category, avoiding the empirical problem of incorrectly permitting an anaphor to find its antecedent in a higher clause.

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Scope Inversion and Focus Movements in Korean

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1 Introduction

It has been attested that languages, such as German. Japanese, or Korean, do not show scope inversion when two QPs are concerned in a neutral intonation and a regular word order. Krifka (1998) shows 'rise (/) – fall (\)' intonation induces inverted scope reading in German. Scope inversion is also possible in Korean with a scrambling of the lower QP or a morphological marking on the QP. In this work, I will show how the absence or the presence of the intended scope reading is predicted under the theory of overt focus movement in Korean.

First, I provide examples with the absence or the presence of an inverted scope reading in Korean (section 2). Introducing an alternative analysis to Beck and Kim (1997)'s "Intervention Effects" (section 3), I propose that a possible scope inversion in Korean is due to overt/covert (Contrastive) Focus movement (section 4).

2 The Absence or the Presence of Scope Inversion

2.1 The absence of scope inversion

In German, Japanese, or Korean, different from in English, inverted scopes are not possible when two QPs are concerned in a regular word order and a neutral intonation.' The following Korean sentence is unambiguous in that only the subject, motun *kyoswu* 'every professor', can take a wide scope. The second reading, where the second QP takes a scope over the subject, is not allowed in the sentence.

(1) [motun kyoswu-ka]$_{QP1}$ [(ceketo) han haksayng-ul]$_{QP2}$ chwuchenha-ess-ta.
Every professor-Nom at-least one student-Acc recommend-Past-Dec

i. 'for every professor x, there is y, y is a student, x recommended at least one y' (∀(∃))
ii. *'there is y, y is a student, for every professor x, x recommended at least y' *(∃(∀))

Shortly, in Korean, a surface order reflects the scope of QPs in a regular word order under a neutral intonation.

2.2 The presence of scope inversion

Krifka (1998) claims that the scope inversion is available under the rise-fall intonation contour.[2] Korean shows the same kind of scope inversion phenomena related to scrambling of the lower QP or an overt contrastive morpheme *–(n)un* on the QP.[3]

First, the sentence as in (1) becomes ambiguous between (i) and (ii) readings when the object (ceketo) han *haksayng-ul* '(at least) one student' scrambles over the subject, as shown in (2).

(2) Scrambling of QP_2
[(ceketo) han haksayng-ul]$_{QP2}$ [motun kyoswu-ka]$_{QP1}$ t_{QP2} chwuchenhaessta.
at-least one student-Acc every professor-Nom recommended
i. 'for every professor x, there is y, y is a student, x recommended at least one y' (∀(∃))
ii. *'there is y, y is a student, for every professor x, x recommended at least y' *(∃(∀))

There is another case where the scope inversion is attested. The surface word order of the following sentence in (3) is same as the sentence in (1). The only difference from the sentence in (1) is that the object is marked by the contrastive morpheme, *–(n)un*, not by the object case marker in (3). The wide scope of the QP_2 is available in this case:

(3) Overt Marking with *-(n)un*: ∃(∀), ∀(∃)
[motun kyoswu-ka]$_{QP1}$ [(ceketo) han haksayng-un]$_{QP2}$ chwuchenhaessta.
Every professor-Nom at-least one student-Cont recommend-Past-Dec

The overt contrast marking of *-(n)un* on QP_2 makes the sentence ambiguous.

In sum, in a regular word order, inverted scopes of QPs are not possible in Korean, different from English. However, a scrambling of the second QP or an overt *–(n)un* marking on the QP makes the scope inversion available. In the following section, I will argue that there are overt focus movements in Korean, providing a new possible solution to the so-called "intervention effects". Based

on the analysis, in section 4, I will give a uniform analysis to the absence/presence of an inverted scope reading.

3 "Intervention Effects": Focus Movement and Specificity

3.1 Challenge to "intervention effects"

It is well-known that the following sentence in (4) is not allowed in Korean (also see Hagstrom 1998 for German and Japanese). Beck and Kim (1997) argue that the sentence is not allowed since an NPI intervenes between the wh-phrase and its scope-marking operator, which is in [Spec, CP], preventing the wh-phrase from being in a minimal relation with its operator.

(4) **Amwu-to* mwues-ul ilk-ci anh-ass-ni?
Anyone what-Acc read-CI not do-Past-Q .
What did no one read?' (Beck and Kim 1997)

If the wh-phrase scrambles over the NPI as in (5), the sentence becomes acceptable. According to Beck and Kim (1997), the NPI does not intervene the wh-phrase and its operator anymore.

(5) mwues-ul$_i$ amwuto t_i ilk-ci anh-ass-ni?
what-Acc anyone read-CI not do-Past-Q
'What did no one read?' (Beck and Kim 1997)

Even though Beck and Kim's "intervention effects" can give a general explanation for the contrast between (4) and (5), however, there is a case where their analysis does not hold. Different from the sentence in (4), if a specific NPI precedes a wh-phrase, the so-called "intervention effects" do not occur.

(6) ku pan haksayng-tul *amwuto* mwues-ul ilk-ci anh-ass-ni?
The class student anyone what-Acc read-CI not do-Past-Q
'What did no one read?'

If the ungrammaticality of the sentence in (4) is affected only by a position of an NPI relative to a wh-phrase as Beck and Kim (1997) proposed, the contrast between (4) and (6) cannot be accounted for.

In M. Lee (2001a, b, e), I argue that the so-called intervention effects (mainly discussed in Beck 1996 and Beck and Kim 1997) are reanalyzed as "Specificity Effects". Following Gundel (1999) and Vergnaud and Zubizarreta (2000), I propose that every sentence has at least one Focus. Proposing Focus structure as in (7), M. Lee (2001a, b, e) claims that (Contrastive) Focus must be checked in

Syntax via overt movement of a focus element to the Focus Projection (and Contrastive Projection) when Focus is not marked morphologically (or prosodically).

(7) [CP [ContP [+Contrastive] [TopP* [FocP [+Focus] [VP V]]]]]

Underlying assumption of this proposal is that (i) Information Focus and Contrastive Focus element must overtly move to the functional projection(s); and (ii) non-focused NP cannot move out of the nuclear scope of a sentence (i.e., VP or FocP) if it is nonspecific (cf. Diesing 1992). Let's, then, consider the sentences with or without the "intervention effects" in detail under the proposed structure.

First of all, wh-phrases must be in [Spec, FocP] or in [Spec, ContP], leaving a trace at [Spec, FocP], at the overt syntax to check the information features. However, the word order in (8a) does not reflect the overt focus movement. Since an NPI cannot move out of the VP (or FocP). the wh-phrase lower than the NPI is also inside the VP and thus the [+Focus] feature in FocP is left unchecked, as illustrated in (8b).

(8) a. *Amwuto mwues-ul ilk-ci anh-ass-ni?
Anyone what-Acc read-CI not do-Past-Q
'What did noone read?'

b. *[CP [IP [FocP [+FOCUS] [VP anyone what-Acc V]]]]

As expected, an overt movement of the wh-phrase over an NPI makes the sentence intact. The focus structure of the sentence in (9a) is illustrated in (9b).

(9) a. mwues-ul$_i$ amwuto t_i ilk-ci anh-ass-ni?
what-Acc anyone read-CI not do-Past-Q
'What did noone read?'

b. [CP [IP [FocP what-Acc$_i$ [VP anyone t_i V]]]]

Different from the sentence in (8), the sentence in (10) is allowed since the subject is specific and thus interpreted as a Topic, undergoing an overt movement out of FocP, as represented in (10b).

(10) a. ku pan haksayng amwuto mwues-ul ilk-ci anh-ass-ni?
the class student anyone what-Acc read-CI not do-Past-Q
'What did noone of the students in the class read?'

b. [CP [IP/TopP anyone of the students$_i$ [FocP what-Acc$_j$ [VP t_i t_j V]]]]

In sum, I propose that overt Focus movement is obligatory in Korean since [+Focus] must be checked overtly in [Spec, **FocP]**. This oven movement interacting with the unavailability of nonspecific element moving out of a VP readily accounts for so-called "intervention effects". In the following subsection, we will discuss properties of the contrastive morpheme *–(n)un* and the effects of the morpheme on the requirement of an overt Focus movement.

3.2 Properties of *-(n)un* and the absence of the specificity effects

M. Lee **(2001c,** e) claims that an XP-nun in a nuclear scope (VP or **FocP)** is Contrastive Focus, but not a Topic, and it is both [+Contrastive] and [+Focus] (also see Suh **1996)**[4]**:**

(I **1)** a. Mira-ka nolay-nun cal ha-n-ta.
Mira-Nom song-Cont well do-Pres-Dec

b. **Mira-ka (*talun*** kes-un ani-relato) [nolay-lull$_P$ cal hanta.
Mira-Nom different thing-Cont not-though song-Acc well does
'Mira sings a song well (even though she doesn't do others **(e.g.** sports) well).'

The paraphrased sentence in (I lb) shows that an XP-nun in a nuclear scope contains both features.

When the overt marking with ***-(n)un*** denotes the proper interpretation for Contrastive Focus, the feature checking is procrastinated until LF (see M. Lee **2001e)**. Compare the following sentence in (12) with the ungrammatical one in **(8)**.

(12) a. Amwu-to **mwues-un/enu** chayk-un ilk-ci **anh-ass-ni?**[5]
anyone what-Conti which book-Cont read-CI not do-Past-Q
'What (regardless of the others) did **noone** read?'

b. LF: [$_{CP}$ [$_{Comp}$ what-un$_i$ [$_{TopP}$ [$_{FocP}$ t_i [$_{VP}$ anyone t_i V]]]]]

Summarizing section 3, an overt focus marking is obligatory in Korean. Overt focus marking is done by overt movement of a focus element or by a –nun-marking on the element. **Prosodic/morphological** marking is necessary when syntax cannot represent intended readings **properly.**[6]

4 Scope Inversion as Overt Contrastive Focus Movement

In this section, we will discuss how the analysis of overt Focus movements explains the absence/presence of the inverted scope interpretation.

4.1 The absence of scope inversion

4.1.1. Focus Movement as A-movement

Mahajan (1990) argues that a clause-internal scrambling can be an A-movement in Hindi. Many other literatures (including Saito 1992, Tada 1993, Bošković and Takahashi 1998, among others) on Japanese and Korean also distinguish clause-internal scramblings from long-distance scramblings in terms of A/A'-movement.

If the Focus Movement is to an A-position, it should be possible for the focus element to bind an anaphor. In the following sentences, each scrambled object antecedes an anaphor.

(13) a. John-ul$_i$ [caki-uy$_i$ emma-ka] t_i ttayli-ess-ta.
John-Acc self-Gen mom-Nom beat-Past-Dec
'His$_i$ mother beat John$_i$.'

b. [Mira-wa John-ul]$_i$ [kakca-uy$_i$ emma-ka] t_i ttayli-ess-ta.
Mira-and John-Acc each-Gen mom-Nom beat-Past-Dec
'Their$_i$ mother beat Mira and John$_i$.'

According to the proposal in section 3.1, the scrambled phrase over a nonspecific subject is usually Information Focus (see (9)). The S-structure and the LF structure of the sentence in (13a) is illustrated in the following focus structure.

(14) [$_{IP}$ [$_{FocP}$ John-Acc$_i$ [$_{VP}$ self s mother-Nom t_i beat]]]

Since John-Acc in FocP can bind the anaphora in the subject, I argue that a movement to FocP is an A-movement. This also fits into the general idea that a sentence-internal movement induces an A-chain.

4.1.2. The Scope Principle

Following Aoun and Li (1993). I argue that once a proper chain is formed, The Scope Principle determines a scope relation between QPs.

(15) The Scope Principle
A quantifier A may have scope over a quantifier B in case A c-commands a member of the chain containing B. (Aoun and Li 1993)

In addition to the Principle, I assume that only the same kind of chains is considered for scope interaction and only A'-chain is taken into consideration. Therefore, at LF, QR-chains of QPs only interact with chains by another A'-movement.

Let's discuss why the inverted scope reading is not obtained in a regular order under the analysis of focus movements and the Scope Principle. In a regular word order, only the wide scope reading of the first QP is available. The focus structure of the sentence is illustrated in (16). As we discussed briefly earlier (see (10), and M. Lee 2001b, e), objects are Information Focus in general when a subject is specific. A strong QP *motwu* is specific and thus can be a topic of the sentence.

(15) **motwu-ka** (ceketo) han haksayng-ul chuchenha-ess-ta. **(∀(∃), *∃(∀))**
everyone-Nom (at least) one professor-Acc recommend-Past-Dec
'Everyone recommended one professor.'

(16) a. S-structure
[$_{TopP/IP}$ everyone-Nom, [$_{FocP}$ one **student-Acc**$_j$ [$_{VP}$ t_i t_j V]]]

The chain (everyone$_i$, t_i) is induced by Topic movement and the chain (one *student*$_j$, t_j) is by Focus movement. Since both Topic and Focus movements induce A-chains, none of the traces by the movements is considered for a scope interaction at LF.[7] Only QR chains at LF are taken into consideration.

(16) b. LF
[$_{TopP/IP}$ everyone-Nom$_i$ [$_{TopP/IP}$ t_i [$_{FocP}$ one student-Acc$_j$ [$_{FocP}$ t_j [$_{VP}$ V]]]]]

The schema in (16b) is legal only for one reading such that everyone takes the wide scope over the one student. At LF, everyone c-commands one student but one student does not c-command any member of the chain containing everyone. According to the Scope Principle, therefore, this sentence is not ambiguous.

Another possible interpretation of the sentence in (15) is that the subject is understood as Information Focus. In this case, the scope is also easily predicted from the focus structure, as shown in the configuration below in (17).

(17) [$_{IP}$[$_{FocP}$ everyone-Nom$_i$ [$_{VP}$ t_i one student-Acc recommended]]]

Everyone c-commands one student but the alternative c-commanding option is not possible even after QRs and thus the wide scope of one student is not available in this configuration.

In short, in a regular word order, a subject is a Topic or an Information Focus undergoing an overt Topic or Focus movement, which is an A-movement, and a chain by either of the movements is not counted a proper chain for scope

interpretation. Therefore, in a regular word order a subject QP always scopes over an object QP in Korean and the inverted scope reading is not available.

4.2 The presence of scope inversion

4.2.1. Syntactic movement of contrastive focus

Different from Focus movement, I assume that Contrastive movement is **A'-**movement, which is compatible with the arguments given in many literatures such that a long-distance movement is A'-movement (Mahajan 1990, Saito 1992, Tada 1993, **Bošković** and Takahashi 1998, among many others).

The object scrambling in the following sentence is derived by feature checking of both [+Focus] and [+Contrastive] and thus the scrambled object is interpreted as Contrastive Focus.[8] The derivation of the sentence is illustrated in (19). Different from the structure of an Information Focus, a Contrastive Focus involves an extra long-distance movement derived by checking [+Contrastive]. The chain by this contrastive movement is the crucial factor for the inverted scope reading.

(18) (ceketo) han **haksayng-ul**$_i$ motwu-ka $\mathbf{t_i}$ chwuchenha-ess-ta. ($\forall(\exists)$, $\exists(\forall)$)
at-least one student-Acc every professor-Nom recommend-Past-Dec

(19) a. S-structure
[$_{CP}$[$_{Contr}$ one student-Acc$_j$ [$_{IP}$ everyone-Nom$_i$ [$_{Foc'P}$ t'_j [$_{VP}$ t_i t_j V]]]]

The chain (everyone$_i$, t_i) is created by Topic movement and the intermediate one (t'_j, t_j) is by Focus movement, as same as in (16). In addition to that, there is an extra chain (one student$_j$, t'_j) by the object, which is induced by Contrastive movement. Since both Topic and Focus movements are A-movement, they cannot create a proper chain for scope interpretation. On the other hand, Contrastive Movement can induce a relevant chain for scope interpretation along with chains by QRs at LF.

(19) b. LF
[$_{CP}$ [$_{Contr}$ one student-Acc$_j$ [$_{Contr}$ t_j [$_{IP}$ everyone-Nom$_i$ [$_{IP}$ t_i [$_{Foc'P}$ t_j [$_{VP}$ V]]]]]

Since at least one student c-commands everyone and, in turn, everyone c-commands a member (t_j) of the chain headed by at least one student, the sentence becomes ambiguous.[9]

One may wonder whether one student is interpreted just as an Information Focus not a Contrastive Focus. Even though a tendency for the dislocated object to be a Contrastive Focus is stronger, it may be just Information Focus. Still, the

important thing here is that the possibility to be a Contrastive Focus makes the sentence become scopally ambiguous.

4.2.2. LF movement of Contrastive Focus

Let us consider the Contrastive Focus marked by ***–(n)un***. In section 3, I proposed that feature checking in the morphologically marked Focus is done covertly at LF. This explains why we do not need an overt movement of the ***–(n)un***-marked phrase even though overt Focus and Contrastive movements are obligatory in other cases. As same in the scrambled object case, shown in **(18)**, when the object is marked by ***–(n)un***, the sentence becomes ambiguous.

(20) motwu-ka (ceketo) han haksayng-un chwuchenhaessta. ∃(∀), ∀(∃)
Everyone-Nom at-least one student-Cont recommend-Past-Dec

Both S-structure and LF can be illustrated as follows:

(21) a. S-structure
$[_{CP}\ [_{ContP}\ [+Cont]\ [_{InvTopP}$ everyone-Nom$_i$ $[_{FocP}\ [+Focus]\ [_{VP}\ t_i$ one student-un recommended]]]]]]

b. LF
$[_{CP}\ [_{ContP}$ one student-**un**$_j$ $[_{ContP}\ t_j\ [_{InvTopP}$ everyone-Nom$_i$ $[_{InvTopP}\ t_i\ [_{IncP}$ $t'_j\ [_{VP}\ (t_i)\ (t_j)$ recommended]]]]]]

LF structure of the sentence in **(21b)** is same as the S-structure in the scrambling case, which is shown above in **(19b)**. Again, at LF, the trace left by the Contrastive Movement enters into the scope relation and this explains the presence of an inverted scope reading in the sentence with a ***–(n)un***-marked object QP.

5 Concluding Remarks

Based on the analysis of overt focus movements, I provided a new solution for the absence and the presence of scope inversion in Korean. In a regular word order and a neutral intonation, the higher QP (mostly, subjects) always scopes over the lower QP and the inverted scope reading is not available, different from in English. However, an oven movement of the lower QP or an overt morphological marking on the QP makes a sentence scopally ambiguous. I proposed that the dislocated or ***–(n)un***-marked QP is Contrastive Focus and the inverted reading is possible by the **Contrastive** Focus movement, which is different from Topic or Information Focus movement.

As Krifka (1998) suggests, the analysis of scope inversion may give us a way to parameterize the derivation economy (Fox 1995, 2000 (cf. Sag (1976), Golan (1993). Reinhart (1994)).

(22) Parameterization of comparison classes for derivation economy
  a. **"fixed"** word order languages (e.g. English): comparison classes are determined by identity of interpretation
  b. "free" word order languages (e.g. German, Korean): comparison classes are determined by identity of overt (syntactic, morphological, or phonological) focus marking

6 Notes

[1] Krifka (198) claims that only the higher QP takes the wide scope in a neutral intonation in German.

(I) a. Jeder Student HAT mindestens einen Roman gelesen. ∀(∃); *∃(∀)
every-Nom student has at-least one-Acc novel read

b. Mindestens ein Student HAT jeden Roman gelesen. ∃(∀); *∀(∃)
at-least one-Nom student has every-Acc novel read

in each case, a subject QP scopes over an object QP. See Kim 1989, 1991 for Korean and Hoji 1985, 1986 for Japanese.

[2] Krifka (1998: 80) claims that an object in each of the following German sentences can take a wide scope over a subject in the case of rise-fall intonation contour.

(I) a. /JEDer Student hat mindestens \EINen Roman gelesen ∃(∀), ∀(∃)
every-Nom student has at-least one-Acc novel read

b. Mindestens /EIN Student hat \JEden Roman gelesen ∃(∀), ∀(∃)
at-last one-Nom student has every-Acc novel read

Also see Jackendoff 1972, Hohle 1991, Büring 1994, 1997, Jacobs 1997 for earlier observations and accounts.

[3] It is *-nun* after a vowel and *-un* after a consonant. This variation holds also for nominative and accusative case markers: the nominative marker is *-ka* (following a vowel) or *-i* (following a consonant) and the accusative marker is *-lul* (following a vowel) or *-ul* (following a consonant).

[4] Choe (1995) and C. Lee (1999) argue that non-initial *XP-nun* is Contrastive Focus and Contrastive Topic, respectively.

[5] For some people *–(n)un*-marking is not natural with *mwues* 'what' since it is not overtly specific. For those people, *enu chaky-un* 'which book-un' is perfectly fine. *enu chaky-ul* 'which book-Acc' still shows the 'blocking effects', which shows that the *–(n)un*-marking in (12) makes the difference.

(1) *Amwu-to enu chaky-ul ilk-ci anh-ass-ni?
anyone-Particle which book-Acc read-CI not do-Past-Q
'Which book did noone read?'

[6] See section 4 in M. Lee (2001c) for further discussion on Conditions on Minimal Information Marking.

[7] Even if there is no QR in Korean, only *everyone* takes a wide scope since *one student* does not c-command *every student.*

(I) [TopP everyone-Nom$_i$ [FocP one student-Acc$_j$ [$_{VP}$ recommended]]]]

[8] M. Lee (2001c) claims that scrambled XP over a nonspecific subject such as NPI subject is not necessarily interpreted as Contrastive Focus but just Information Focus.

[9] Again. even if there is no QR, the sentence is ambiguous since *one student* c-commands *everyone* and *everyone* c-commands the trace of *one student* left by the Contrastive Movement.

(I) [$_{CP}$ [Comp one student-Acc$_j$ [IP/TopP everyone-Nom [FocP t_i [$_{VP}$ V]]]]]

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L2 Pronunciation Accuracy of Beginning Adult Students of Spanish Following Formal Pronunciation Instruction

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1 Introduction

Contemporary foreign language teaching has not incorporated formal pronunciation instruction (FPI) into the classroom due to traditional views of second language phonological acquisition **(L2PA)** and principles of contemporary **(e.g.** communicative) language teaching. However, recent research shows that intermediate students of Spanish who receive FPI significantly improve their pronunciation accuracy over students that do not receive FPI (Elliot, 1997; **Gonzalez-Bueno,** 1997). It has since been argued **that** beginning adult **learners** might also benefit **from** FPI, as investigation reveals a lack of basic phonetic and articulatory instruction in first-year text books (Arteaga, 2000).

In this study, FPI was combined into the curriculum of a beginning adult Spanish classroom and accurate second language **(L2)** pronunciation was scored based on acoustic measures and criteria. A experimental group received FPI in the Spanish consonantal categories of voiceless word-initial stops /p,t,k/, voiced word-initial stops /b,d,g/ and their intervocalic allophones [β, ð, ɣ], word-medial tap /ɾ/, word-medial trill /r/, and word-final lateral /l/. A control group following the same curriculum did not receive FPI.

This paper focuses on the results of the acoustic analyses. A more in-depth discussion of student attitudes and the acoustic criteria used to measure accurate pronunciation are presented in **Munson** (2001). [2] Section 2 presents traditional views of **L2PA** and principles of contemporary teaching methods, which account for the lack of FPI in the classroom. Investigations into the effects of FPI are identified alongside arguments in favor of incorporating FPI into the classroom. Section 3 describes participant backgrounds, recording procedure, and the methods used in the data analyses. In Section 4, the results of the acoustical measures are presented using descriptive and inferential statistics.

The results are discussed in Section 5 by phonological category. It will be argued that beginning students of Spanish may benefit from FPI for some phonological categories.

2 Background

This section focuses on L2PA, the communicative method, and pronunciation studies. Differences between Spanish and English phonology are not presented here. For an overview of the phonological categories relevant to this study, see Barrutia and Schwegler (1994), Dalbor (1997), and Arteaga (2000). For in-depth investigations into phonological and acoustic difference~,see Lisker and Abramson (1964), Harris (1969), and Quilis (1981).

2.1 Traditional views of second language phonological acquisition

During the 1960s, contrastive analysis between a learner's native language (L1) and L2 was considered most accurate in predicting target language pronunciation errors (Tarone, 1978). Although contrastive analysis does predict some errors in L2 pronunciation, more recent research concludes that it cannot predict all errors which may result from a combination of processes including overgeneralization and approximation (Tarone, 1978; Terrell, 1989).

The age of the learner has also been greatly discussed as a factor affecting L2PA. Known as the Critical Period Hypothesis (CPH) and based on Lenneberg's (1967) findings, the extent of L2 language acquisition has been negatively correlated to brain lateralization in which cerebral centers important to language learning experience a loss of plasticity, or cerebral dominance (Snow and Hoefnagel-Höhle, 1982b; Flege, 1986; Herschensohn, 2000). According to the CPH, by the age of puberty, a learner should have more difficulty acquiring an L2 as the brain has already lateralized.

In regards to L2PA, the CPH has undergone much criticism. Research has demonstrated differing results concerning the effects of age on accurate pronunciation. Some studies contradict the CPH in that adult-learners demonstrate better pronunciation over child-learners (Olson and Samuels, 1982; Snow and Hoefnagel-Höhle, 1982a). Other studies yield evidence in support of the CPH in that L2 pronunciation is shown to be better in subjects beginning L2 study at younger ages (Asher and Garcia, 1969; Oyama, 1982).[3]

A learner's attitudes have also traditionally been correlated with pronunciation accuracy. Purcell and Suter (1980) find a subject's ***strength of concern for pronunciation accuracy*** to ***be*** one of four predictors of pronunciation accuracy. Elliot (1995) assesses learner attitudes and finds ***concern for pronunciation accuracy*** to most significantly predict accurate L2 pronunciation for

intermediate students of Spanish. A learner's self-assessment of accurate pronunciation is also correlated to actual pronunciation accuracy (Reeder, 2000).

2.2 Communicative language teaching and the lack of FPI

Concerning research, theory, and practice, "it is understood, if not explicitly stated, that contemporary language teaching means communicative language teaching" (VanPatten, 1998:925). All communicative models share three fundamental ideas: 1) In the classroom, meaning and context are emphasized for all communication, 2) communication and activities require comprehensible input (e.g. students must be able to understand the ideas and settings for each activity) and 3) methods try to keep a student's affective filter as low as possible in order to ease the learning process (Hammond and Flege, 1989). Additionally, a learner's anxiety level in the classroom can *filter* or prevent L2 acquisition despite comprehensible input, an effect referred to as the Affective Filter Hypothesis (Krashen, 1982a).

Three factors can account for the lack of FPI in communicative methodologies: 1) As a result of the influence of the CPH, instructors maintain a general feeling that FPI does little to improve pronunciation accuracy 2) although the rise of communicative methodology has led to the creation of new innovative teaching materials, pronunciation instructional materials remain focused on form over meaning thus falling outside the communicative method and 3) educators have assumed and been heavily influenced by Krashen and Terrell's (1983) Natural Approach to L2 acquisition which argues that acquisition rate is not effectively accelerated through conscious rule learning (Wong, 1986).

Terrell (1989) agrees that the communicative framework has had difficulty incorporating FPI. The absence of FPI from communicative methods is reflected by the lack of basic phonetic and articulatory instruction in beginning 'level communicative Spanish text books (Arteaga, 2000).[4]

2 3 Studies and arguments for FPI

Yule and MacDonald (1995) find varying effects of FPI on 23 graduate students from China. They found that individual factors influenced pronunciation accuracy over the course of several days, while differing forms of FPI yielded mixed and inconclusive results.

Longer-term FPI studies in actual classroom settings show that intermediate students of Spanish significantly improve in their accuracy of some Spanish categories over students that do not receive FPI (Elliot, 1995; Gonzalez-Bueno, 1997). Elliot (1995) analyzes the production of 19 Spanish phonological categories in Spanish from 60 students. Significant improvement is found for the experimental group over the control group in all categories in word repetition, sentence repetition, and word reading tasks.[5]

Unlike Elliot's (1995) study in which auditory judgments are used to assess pronunciation accuracy, Gonzalez-Bueno (1997) makes use of waveform analyses to identify minute changes in voice onset time (VOT).[6] An experimental intermediate level Spanish class received ten to fifteen minutes of FPI of word-initial stops (/p,t,k,b,d,g/) a day, while a control class did not. The experimental group showed a tendency to improve for all categories with significant differences over the control group for /p/ and /g/.

Despite principles of communicative methods, researchers have proposed incorporating FPI activities into the communicative curriculum (Terrell, 1989, Arteaga, 2000). Wipf (1985) identifies the lack of creative pronunciation activities in classrooms and advocates the incorporation of sound-symbol correspondence instruction. Advanced articulatory and phonetic information may actually aid students to more efficiently comprehend input (Terrell, 1989). Furthermore, the lack of FPI for beginning learners may reflect intermediate level learner needs. 568 intermediate students ranked pronunciation 5'' most important out of 14 language learning goals and 3rd most important out of 19 types of activities effective in realizing those goals (Harlow and Muyskens, 1994). In contrast, instructors rated pronunciation 9'' and 17th most important in regards classroom goals and effective activities to realize those goals, respectively. The lack of explicit phonetic and articulatory instruction in text books used for beginning adult-learners of Spanish, alongside the importance given to pronunciation by intermediate level students, support the integration of FPI in the first-year Spanish curriculum (Arteaga, 2000).

3 Methods

Participants in this study included native English speakers fiom two groups: GR1 consisted of fifteen students who received FPI and GR2 was comprised of four students that did not receive FPI. A foreign language background survey and a pronunciation attitude survey were administered to each student at the time of their first recording.

GR1 participated in the same four and a half week Spanish 101 class given by the researcherlinstructor in which students received ten to fifteen minutes of FPI per day.[7] All GR2 students took part in a different Spanish 101 course.[8] Students from both groups participated in the researcherlinstructor's Spanish 102 course from week 4 to week 8 in which FPI was not given. The average age of GR1 and GR2 participants was 24 and 21 years, respectively. As determined by the language background survey, all participants studied a variety of foreign languages in high school and/or at the university level and indicated having limited exposure to Spanish prior to the study.[9]

FPI began on day 5 of week 0 (T1) with an introduction to vowels. Phonological categories were then presented in the order of voiceless stops,

voiced stops, voiced intervocalic stops, taps, trills, and word-final lateral. After each category had been addressed individually, subsequent activities focused on a combination of phonological categories. At the end of 4 weeks (T2), each category received approximately 45 minutes of instruction. Neither group received FPI from week 4 (T2) to week 8 (T3).

FPI activities followed the same procedure: 1) The distinct phonetic and articulatory differences between the corresponding Spanish and English phonological categories were presented through the use of handouts written in English designed by the researcher. 2) Students participated in a perception activity involving productions of a native Spanish speaker." The perception activity included forced choice, a discrimination task, or a dictation of sounds. 3) Following the perception activity, students performed a production activity in groups of two or intermingling with the class as a whole. At this time, students would receive feedback from the instructor on their pronunciation.[11]

At each recording, participants were recorded reading from three lists in Spanish and one list in English.[12] Three dummy words appeared at the beginning and end of each randomized list in order to minimize list effects. Each Spanish list contained 20 words within the carrier phrase "Dices _____ también" while the English list utilized 20 words within the carrier phrase "He said _____ to me". The Spanish list was designed to reflect bi-syllabic words that can be found in the first several chapters of a Spanish 101 text. The majority of tokens included two phonological categories to be analyzed (i.e. perro contains two consonantal environments, /p/ and /r/, to be analyzed).

For each target category, waveform and spectrograms were produced using PRAAT (v. 3.9) signal processing software. Spectrograms utilized a 300 mHz filter and were analyzed with a 45 dB intensity level. A total of 6800 tokens were included in the analyses. Each phonological category was analyzed according to specific acoustic measures and criteria which are briefly described here:

Voiceless word-initial stops were measured using the continuous acoustic parameter of VOT. The measurement included the distance from the release burst to the trough of the first complex wave.

The remaining categories were scored with a value of 1 (accurate) or 0 (inaccurate). Voiced word-initial stops were scored accurate if voicing preceded the release burst within 20 ms.[13] A continuous measurement was not taken for this category as the preceding /s/ in *dices* was often voiced which made identifying the onset of voicing difficult to distinguish from the offset of the [s].

Voiced intervocalic stops were scored as 1 (accurate) as long as attenuation in the waveform at the target sound appeared for more than 30ms and showed no indication of a release burst. An erratic spike in the waveform or a release burst would have suggested a closure in the place of articulation, resulting in a rating of the token as 0 (inaccurate).

Word-medial taps were characterized by 20-25 ms of attenuation across all frequencies of the spectrogram. An approximant in place of a tap, with a lowering of the third formant below 2000 Hz (Ladefoged, 2001), yielded the token's score as 0 (inaccurate).

A token with the trill target was scored as 1 (accurate) if the spectrogram contained multiple striations, indicating a series of two or more taps. In accordance with Ladefoged and Maddieson (1996), the expected pattern was one in which the duration of the second tap would have been slightly less than the first.

A lateral token was scored as 1 (accurate) if the second formant attained (and sustained) a frequency similar to that of the following [t] in *también*, which was taken to confirm an alveolar or dental place of articulation. Unlike a velar lateral which would not reflect this rise in the second formant, an alveolar or dental lateral shows a sudden drop of intensity at the place of articulation. In addition to these spectral criteria, tokens were subjected to auditory analysis to check whether tokens were reasonable exemplars of the relevant phonological categories.

4 Results

This section presents the production results in three sections: 1) Voiceless word-initial stops, 2) voiced stops, and 3) the tap, trill, and lateral. For each phonetic category baseline values for English measures are provided which represent the average for each group across T1, T2, and T3 combined. All averages were calculated across 135 tokens (15 participants x 3 words x 3 repetitions). Baseline scores from a native Spanish speaker are also provided for each category.[14] Wilcoxon sum rank tests were performed for GR1's averages; however, no statistical tests were conducted for GR2 due to the small size of the sample.

4.1 Voiceless word-initial stops /p,t,k/

Table 4.1 presents the averages for voiceless word-initial stop measurements. For GR1 at T1, the average VOT value for /p/ was 53 ms with a standard deviation of 17 ms. After four weeks of instruction (T2), average VOT values for /p/ significantly decreased to 34 ms (Z=-.067; p<.01). Significant changes from T1 to T2 were also found for /t/ (Z=-3.124; p<.01) and /k/ (Z=-3.124; p<.01). At T3, the mean VOT for /p/ is still significantly lower than the mean /p/ value for these same participants at T1 ($Z = -2.191; p < .05$).[15] The change in average VOT for /t/ also constitutes a significant difference (Z=-2.803; p<.01). The value for /k/ does not reflect a significant change from T1 to T3

although it shows a tendency towards a decrease. None of the changes fiom T2 to T3 in average VOT is statistically significant.

By comparison, GR2 (who experienced no FPI) showed a similar change in time from T2 to T3 as GR1 fiom T1 to T2. In all categories, values showed a decrease in average VOT from 6–13 ms. This similarity between GR1 and GR2 is different from intergroup behavior in all other categories.

Table 4.1 Voiceless word-initial stop VOT by group over time

Native Spanish baseline:			GROUP 1			GROUP2	
/ p / = 14 ms			T1	T2	T3	T2	T3
/ t / = 27ms			(week 0)	(week 4)	(week 8)	(week 4)	(week 8)
/ k / = 40 ms			n = 15	n = 15	n = 10	n = 4	n – 4
Word		Category					
pan	/ p /	VOT (milliseconds)	53 ms	34 ms	37 ms	48 ms	35 ms
perro		*standard deviation*	*17 ms*	*10 ms*	*25 ms*	*24 ms*	*10 ms*
pido		English VOT *(stdev)*	58 ms *(10 ms)*			77 ms *(11 ms)*	
tal	/ t /	**VOT (milliseconds)**	58 ms	37 ms	35 ms	51 ms	45 ms
testigo		*standard deviation*	*17 ms*	*19 ms*	*21 ms*	*21 ms*	*21 ms*
toro		English VOT *(stdev)*	74 ms *(14 ms)*			75 ms *(4 ms)*	
, carro	/ k /	VOT (milliseconds)	74 ms	56 ms	59 ms	67 ms	57 ms
codo		*standard deviation*	*16 ms*	*17 ms*	*25 ms*	*20 ms*	*20 ms*
quiero		English VOT *(stdev)*	78 ms *(14 ms)*			77 ms *(4 ms)*	

4.2 Voiced word-initial and intervocalic stops /b, d, g/ – [β, ð, ɣ]

Table 4.2 presents the proportion of accurate productions for each voiced stop category. From T1 to T2, GR1's average prevoicing accuracy for /b/ increased fiom 19% (.19) to 45% (.45). All other categories showed a similar increase in accuracy values; however, significant changes were only found for /b/ (Z=-2.275; p<.05) and [ð] (Z=-3.188; p<.01). From T1 to T3, only the change in average accuracy for [ð] is significantly different from the corresponding T1 value (Z=-2.077; p<.05). None of the changes fiom T2 to T3 is statistically significant.

GR2 demonstrated only slight differences in their Spanish category values fiom T2 to T3. Although their prevoicing accuracy increased slightly for /d/ and /g/, the value for /b/ decreased slightly fiom 3% (.03) to 0% (0.0) accuracy. At T3, GR2 values reflect little to no prevoicing in their production. Spirant accuracy scores showed a slight tendency to increase fiom T2 to T3. Furthermore, GR2's English scores showed only slight variation from the corresponding Spanish category scores.

Table 4.2 Voiced word-initial and intervocalic stop average accuracy

Native Spanish baseline: / b / = .89 [β] = 1.0 / d / = 1.0 [ð] = 1.0 / g / = 1.0 [ɣ] = 1.0			GROUP 1			GROUP 2	
			T1 (week 0) n = 15	T2 (week 4) n = 15	T3 (week 8) n = 10	T2 (week4) n = 4	T3 (week 8) n = 4
Word		Catego					
banco	/ b /	prevoicing accuracy	0.19	0.45	0.42	0.03	0.00
bebo		*standard deviation*	*0.25*	*0.32*	*0.30*	*0.06*	*0.00*
billete		English prevoicing *(stdev)*		0.34 *(0.34)***		0.08 *(0.17)***	
dado	/ d /	prevoicing accuracy	0.22	037	0.42	0.06	0.08
debe		*standard deviation*	*0.22*	*0.34*	*0.38*	*0.11*	*0.17*
digo		English prevoicing *(stdev)*		0.24 *(0.23)***		0.08 *(0.10)***	
gato	/ g /	prevoicing accuracy	0.14	0.26	0.27	0.03	0.06
gol		*standard deviation*	*0.20*	*0.28*	*0.27*	*0.06*	*0.11*
guitarra		English prevoicing *(stdev)*		0.26 *(0.25)***		0.04 *(0.08)***	
bebo	β]	spirant accuracy	0.60	0.67	0.58	0.25	0.38
debe		*standard deviation*	*0.30*	*0.34*	*0.40*	*0.29*	*0.25*
		English spirantization *(stdev)*		0.41 *(0.32)***		0.42 *(0.10)*	
codo	[ð]	spirant accuracy	0.15	0.58	0.49	0.14	0.17
dado		*standard deviation*	*0.28*	*0.26*	*0.34*	*0.28*	*0.33*
pido		English spirantization *(stdev)*		0.08 *(0.13)***		0.0 *(0.0)*	
digo	[ɣ]	spirant accuracy	0.50	056	052	0.47	0.50
lago		*standard deviation*	*0.35*	*0.31*	*0.36*	*0.14*	*0.14*
testigo		English spirantization *(stdev)*		0.54 *(0.28)***		0.67 *(0.36)*	

** see endnote.[16]

4.3 Tap, trill, and word-final lateral /ɾ,r,l/

Table 4.3 presents the average accuracy values for taps, trills and word-final laterals. Following FPI (T2), GR1 produced a 72% (.72) tap accuracy average. Trills, "tap in place of trill,"'' and lateral categories showed an increase in accuracy. All values, except in the case of "tap for trill," showed significant differences from T1 to T2 [/ɾ/: Z=-2.102, p<.05; /r/: Z=-2.207, p<.05; /l/: Z=-2.474, p<.05]. At T3, ten participants accurately produced taps in 73% (.73) of Spanish tap environments. From T1 to T3, the values for trill and lateral accuracy also showed a tendency toward increased accuracy. Only lateral accuracy showed a significant change from T1 to T3 (Z=-2.812; p<.01). From T2 to T3, the average tap, trill, and lateral scores reflect slight improvements. However, none of these changes is statistically significant.

GR2 values showed only slight changes fiom T2 to T3. Tap and lateral values demonstrated slight increases, while the trill value showed a decrease fiom 11%

(.11) to 6% (.06) accuracy. In comparison to GR1, GR2 values are much smaller; GR2's highest values without any FPI are most similar to GR1's values at T1 before FPI.

Table 4.3 Tap, trill, and word-final lateral average accuracy

Native Spanish baseline: /ɾ/ = 1.0 /r/ = 1.0 /l/ = 1.0			GROUP 1			GROUP 2	
			T1 (week 0) n = 15	T2 (week 4) n = 15	T3 (week 8) n = 10	T2 (week 4) n = 4	T3 (week 8) n = 4
Words		Category					
para	/ɾ/	tap accuracy	0.48	0.72	0.73	0.28	0.39
quiero		*standard deviation*	*0.37*	*0.31*	*0.29*	*0.48*	*0.43*
taro		Eng. tap production *(stdev)*		0.0 *(0.0)*		0.0 *(0.0)*	
carro	/r/	trill accuracy	0.07	0.22	0.23	0.11	0.06
guitarra		*standard deviation*	*0.21*	*0.32*	*0.39*	*0.16*	*0.11*
perro				**			
	/ɾ/	tap in place of trill	0.44	0.64	0.57	0.31	0.42
		standard deviation	*0.39*	*0.36*	*0.45*	*0.36*	*0.43*
gol	/l/	lateral accuracy	0.13	038	052	0.08	0.11
mal		*standard deviation*	*0.25*	*0.35*	*0.29*	*0.11*	*0.16*
tal		English alveolar lateral production *(stdev)*		0.01 *(0.04)*		0.0 *(0.0)*	

** trill accuracy does not include an American English counterpart.

5 Discussion

5.1 Voiceless word-initial stops /p,t,k/

Following FPI (T2), students' voiceless stop VOT showed the most significant change of all the phonological category values. At T3, both groups showed similar VOT averages, although GR1 values at T2 are slightly lower than GR2 averages for /p/ and /t/. English VOT values are similar for both groups.

These results indicate that FPI may have had a robust short-term effect in reducing GR1's aspiration in voiceless stops. However, with comparable averages for both groups at T3, FPI may have had little effect at the end of 8 weeks. It is possible that some students from GR1 would have reduced their aspiration, regardless of FPI as GR2's results suggest. Still, with only four participants in GR2, it is difficult to arrive at a concrete conclusion. A more likely scenario may be that only some students from GR1 would have reduced their aspiration without FPI as the GR2 data may have been skewed. For example, participant G2-F2 demonstrated almost the same aspirated VOT averages for her English VOT and all three stop categories at T2 and T3.

The results for /t/ suggest that learners benefited from knowledge of a change in place of articulation. Aurally it was observed that some students did indeed change from an alveolar stop to a dental stop after FPI. GR1 and GR2 tend to differ only in their /t/ VOT values at T3. Furthermore, GR1's VOT values for /t/ were most significantly different from T1 to T3 than the other categories (Z=-2.803; p<.01).

52 Voiced word-initial stops /b,d,g/

Difficulty in prevoicing might have been a result of the carrier phrase, "Dices también". During FPI, voicing assimilation had been mentioned; however, it was not emphasized during the activities. Some students may have had difficulty prevoicing the stop or assimilating the voicing to the preceding /s/.

Informal observations suggest that students only applied the rules to environments in which they were familiar and/or focused. At T2, one female participant prevoiced the majority of phrase initial /d/'s in "Dices"; however, few tokens of target words were produced with prevoicing. In contrast, another female prevoiced many word-initial stops, but failed to prevoice the /d/ at the beginning of the carrier phrase.

Some students appeared to be overly focused on the prevoiced element as well. Participant G1-F4 at T2 produced several long prevoicing measurements; her longest prevoiced token revealed a VOT of –250 ms. An overly conscious effort on her part may account for what aurally sounds like humming.

A few students demonstrated what appears to be a conscious attempt at prevoicing without accuracy at T2. These tokens were not distinguished from inaccurate tokens in the foregoing discussion. However, they were labeled in this study as distant prevoicing.[18] In these instances, the participant appeared unable to overcome L1 short-lag VOT pronunciation, so that auditorily the token sounded like a homorganic nasal + stop sequence (e.g. [m:bilet] for "billete").

53 Spirantized voiced intervocalic stops [β,ð,ɣ]

The results show a significant improvement fiom T1 to T2 for [ð]. Unlike [β] and [ɣ], the failure to spirantize /d/ can sometimes lead to confusion with the tap in Spanish. Due to the emphasis of this confusion during FPI, students may have more intensely focused on [ð] rather than [β] and [ɣ], whose averages did not show any significant change fiom T1 to T2.

Similar to the decrease in mean VOT for /t/, a knowledge of a change in the place of articulation might account for the significant accuracy increase for [a] fiom T1 to T3 (changes for [β] and [ɣ] were not significant from T1 to T3). It

was aurally observed during data analyses that some participants produced intervocalic [ð] with a dental instead of an alveolar place of articulation.

5.4 Intervocalic tap /ɾ/

Students from GR1 incorrectly pronounced 48% of all tap environments as approximants at T1. However, no participants from either group showed any difficulty in pronouncing the word-medial tap in their English tokens. This raises the question as to why they would not be able to accurately produce word-medial or syllable final taps in Spanish. It appears as if orthography may have a greater effect on the learning of taps than of other categories. Students can produce taps in English, although they normally associate them as allophones of intervocalic /d/ and /t/. In Spanish, students must know to associate the tap with orthographic intervocalic <r> and not <d> or <t>.

FPI may help students not only to learn how to produce new features of phonological categories, but also how to correctly transfer categories and features that they already know. Following FPI, students in GR1 improved their tap accuracy to 72% while students in GR2, who had completed the same curriculum without the FPI, only averaged 28% accuracy.

5.5 Intervocalic trill /r/

More than any other phonological category, students demonstrated difficulty in accurately producing the Spanish trill. In contrast to Elliot (1997) who finds accurate trill production to undergo the most significant improvement, GR1 did not show the most significant change in trill accuracy. However, the findings in the present study support the observation that trills are difficult for native English adult learners to acquire in Spanish L2 (Terrell, 1989). Individual results also reflect the difficulty in producing trills. Although a comparable amount of FPI was spent on trills, only six students from GR1 showed any improvement in their trill after accuracy from T1 to T2.

Some participants were consciously aware of when to produce a trill, but simply could not do so. One male participant after T3 mentioned that he simply could not produce a trill no matter how hard he tried. This same participant had produced taps in place of trills 84% of the time before FPI at T1. However, despite his 0% trill accuracy again at T2 and T3, he decreased his substitution of individual taps for trills from 78% to 44% and finally to 11%, increasingly producing approximants for most trill environments. His increased tap accuracy (22% to 67% to 67%) suggests an awareness on his part that the tap is indeed distinct from the trill.

5.6 Word-final lateral /l/

The lateral may be a more difficult category to produce without FPI. GR1 significantly improved its accuracy average from 13% (T1) to 38% (T2). However, GR2 only scored 8% (T2) and 11% (T3). It may be that the place of articulation for this particular Spanish category is difficult to recognize for the untrained English native speaker. Those students with FPI continued their lateral accuracy to 52% at T3.

The lateral may also be the most difficult to measure acoustically. Although spectrograms examined in the pilot phase of this study revealed clear patterns in word-final laterals in the speech of native Spanish speakers, students produced a wide variety of spectral patterns. Auditorily, certain laterals sounded very close to being alveolar, yet were hard to discern acoustically. This seeming contradiction may owe itself to the placing of only the tongue tip on the alveolar ridge or dental place of articulation. In contrast, forming the lateral with a wider portion of the tongue tip would result with a more clear rise of the second formant of the lateral to the level of the second formant in the following /t/.[19]

6 Conclusions

FPI may have strong short-term effects for beginning learners of Spanish. Following FPI (T2), values changed significantly for all voiceless stops, word-initial /b/, intervocalic [ð], taps, trills, and laterals. However, at T3 values only showed slight non-significant changes for all categories. After eight weeks (T3), /p/, /t/, and [ð] scores remained significantly different from values at T1. These results suggest that FPI has lasting effects for categories which have an L2 change in place of articulation.

FPI may benefit students in their pronunciation accuracy over students that do not receive FPI, although to a lesser extent for voiceless stops. In comparing GR1 and GR2 at T3, values across all categories reflect robust differences except for voiceless stop VOT measurements. Similar VOT measurements suggest that students begin to reduce aspiration in their Spanish L2 voiceless stops, regardless of FPI.

Certain phonological categories appear more difficult to acquire. In particular, students showed the most difficulty in producing the trill, despite their own observations of knowing when they should be producing it. Prevoicing and spirantizing voiced stops also appeared difficult for students. The fact that GR2 hardly showed any signs of prevoicing suggests that FPI may be especially important in advancing its acquisition. For students exposed to FPI, taps appear easiest to produce in Spanish.

The results of this study suggest that students at the beginning level of Spanish can learn to accurately produce some Spanish phonological categories. Comments from students suggest that they are indeed aware of their pronunciation following FPI and that they might have benefited even more through continued FPI. However, only after long-term studies in relation to actual acquisition, instead of learning, can essential effects of FPI be determined.

7 Notes

[1] I am particularly grateful to Alicia Beckford-Wassink who has given me guidance, insight, and feedback throughout this study. Any errors, of course, are my own.

[2] Participants completed a language background and pronunciation attitude survey.

[3] See Oyama (1982), Flege (1986) and Patkowski (1990) for extensive discussion of L2 pronunciation and the CPH.

[4] The students in this study used the text *¿Sabías que...?* (VanPatten *et al.*, 1996) which was ranked in Arteaga's (2000) investigation as having the least amount of explicit pronunciation instruction.

[5] In a fourth free-elicitation task, the experimental group shows a tendency towards improvement although not in a statistically significant manner.

[6] Voice onset time can be defined as the temporal distance between the release of a stop (such as the separation of the lips for /p/) and the beginning of the vocal fold vibration (Ladefoged, 2001).

[7] During the summer term, all Spanish classes met for two hours per day, five days a week.

[8] GR2 followed the same curriculum without any FPI. Their Spanish 101 course was given by a native Spanish speaker from Mexico.

[9] Only one female and two males from GR1 had any formal exposure to Spanish instruction. At T2 (week 4), all GR2 participants had only been exposed to four weeks of formal Spanish.

[10] The recordings and many activities were adopted from Dalbor's (1997) tapes that accompany the instructor's edition of his text.

[11] Students would only receive isolated attention to their pronunciation during FPI. Otherwise. individual pronunciation was only addressed if there was a confusion in intelligibility.

[12] A randomly chosen copy of one of the three Spanish lists was always given as the first list. Treated as a warm-up list, the data was not analyzed.

[13] Auditory judgment supports the 20ms cutoff point; it is aurally difficult to perceive the cessation of prevoicing if it ends within 20 ms of the release burst.

[14] In order to provide a native Spanish baseline for the student scores, a native Mexican female speaker read from the same lists as the participants. A graduate student at the university, the native speaker spent all but the past year of her life in Guadalajara, Mexico.

[15] When T3 is compared to T1 or T2, only the average values from the ten participants involved at T3 are included in the analyses.

[16] It is important to recall that the English tokens were produced following a voiced sound in the carrier phrase, as opposed to the Spanish carrier phrase which precedes the token with a voiceless sound. (i.e. "He said ____ to me" vs. "Dices ___ también".). The *English prevoicing* and *English spirantization* scores reflect the occurrence of prevoicing and spirantization that one would expect to find in participants' English productions for the same phonological environments.

[17] In order to reflect the substitution of taps in environments where trills ought to occur. "tap in place of trill" is included as a subcategory of "trills" in the analysis (a tap production being rated as 1 – accurate). This analysis reflects the hypothesis that the tap is an intermediate phonological stage to producing accurate trills.

[18] Following the method described in §3, a token showing distant prevoicing would have been scored inaccurate if voicing ended before the release burst at a distance greater than 20 ms.
[19] Where the second formant appeared to be reaching an appropriate level but was not clear spectrographically, aural judgment was the deciding factor.

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The Collapse of the Foot in Oceanic*

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1 Introduction

The prosodic phenomena described here occur in the Oceanic languages Rotuman and Kwara'ae. Two registers exist in both languages. In what is here referred to as the citation register, all words have a strict (C)V syllable structure, in which onsets are optional and contain no clusters, codas do not occur, and vowel nuclei are drawn from a set of five simple vowels /a, e, o, i, u/. Feet are trochaic and bisyllabic, and the maximum number of segments which may make up a foot are four: CVCV. The citation register is used in songs and poetry, and, in Kwara'ae, calling-out routines as well.

In contrast with the citation register, the discourse register occurs in everyday speech. Feet in the citation register are also trochaic, but are monosyllabic and heavy, with stress spread evenly across the syllable. Codas are also allowed, and vowels may be diphthongal, and are drawn from a larger set which may include fronted low or round vowels.

Examples of the four subtypes of foot simplification are given for Rotuman in (1), and for Kwara'ae in (2)[1]; citation register forms are on the left and discourse register forms on the right:

(1) a. Vowel Tautosyllabification

(kĕ.u)	(kĕu)	'to push'
pu.(pů.i)	pu.(půi)	'floor'
jo.se.(ú.à)	jo.se.(úà)	'Joshua'

b. Metathesis

(hó.sa)	(hóas)	'flower'
se.(sé.va)	se.(séav)	'erroneous'
ta.ma.(mú.ʔa)	ta.ma.(múaʔ)	'impertinent'

c. Coalescence

(fú.ti)	(fýt)	'to pull'
fa.(mó.ri)	fa.(mór)	'people'
ʔu.ru.(ɔ́.ki)	ʔu.ru.(ǽk)	no gloss

d. Deletion

(sú.lu)	(súl)	'coconut-spathe'
(rá.ko)	(rák)	'to imitate'
to.(kí.ri)	to.(kír)	'to roll'

(2) a. Vowel Tautosyllabification

(gé.o)	(géo)	**'megapod'**
a.(bú.i)	a.(búi)	'to climb'
(tà.la).(ŋá.i)	(tà:l).(ŋéi)	'hundred'
(à.bɛ).a.(ní.a)	(ʔæ:b).a.(nia)	'help it'

b. Metathesis

(sé.lɔ)	(séol)	'sail'
da.(lú.ma)	da.(lúam)	'bailer, to bail'
(à.do).(lá.mu)	(àond).(láum)	'your pubic area'
(bà.ba).li.(li.ku)	(bà:b).li.(liuk)	'my cheek'
(má.ʔe).(tà.ʔe).(é.lo)	(mæʔ).(tæʔ).(éol)	'doorway'

c. Coalescence

(mó.li)	(mǿl)	'lemon'
a.(lá.ge)	a.(lǽ:ŋg)	**'seaweed'**
(à.bɛ).(á.ni)	(ʔæ:b).(ɛ́:n)	'to help'
(nò.ri).ma.(di.ko)	(nò:r).ma.(diok)	'grub'
(má.ʔe).(tà.ʔe).(é.lo)	(mæʔ).(tæʔ).(éol)	'doorway'

d. Same-Vowel Merger

(sá.ta)	(sá:t)	'name'
sa.(tá.da)	sa.(tá:nd)	'their name'
(bà.ba).(lí.li)	(bà:b).(lí:l)	'cheek'
(à.ba).a.(bá.ku)	(à:mb).am.(bǿuk)	'my shoulder'
(bà.li).(ò.lo).(ó.lo)	(bè:l).(ò:l).(ó:l)	'right hand'

The main point to be noted about the data in (1) and (2) is that bisyllabic feet with monomoraic syllables in the Rotuman and Kwara'ae citation register correspond to monosyllabic feet with bimoraic syllables in the discourse register.

The rest of the paper will be laid out as follows. Section 2 presents the analysis of the Rotuman registers given in McCarthy (2000), and shows why this account must be modified to account for the Kwara'ae facts. Section 3 introduces this new analysis in an the framework of Optimality Theory (McCarthy and Prince 1993, Prince and Smolensky 1993) and attempts to account for the facts of Rotuman and Kwara'ae in a unified way. Section 4 concludes with a summary, as well as a short discussion of remaining problems and future prospects.

2 McCarthy (2000): The ALIGN-HEAD-σ Analysis

The main point of McCarthy's (2000) analysis of Rotuman is that there is a crucial tension between the following two constraints:

(3) SYLL = μ: Syllables are monomoraic.

ALIGN-HEAD-a: Align(H'(PrWd), R, PrWd, R)
The main-stressed syllable is final in every PrWd.

The ranking SYLL = μ >> ALIGN-HEAD-a results in the citation register; the opposite ranking results in the discourse register (from McCarthy 2000: 160):

(4) ALIGN-HEAD-σ, FT-BIN, FT-FORM (TROCHAIC) >> SYLL = μ

/keu/	ALIGN	FT-BIN	FT-FORM	SYLL = μ	ONSET
a. ☞ (kéu)				*	
b. (ké.u)	*!				*
c. ke.(ú)		*!			*
d. (ke.ú)			*!		*

This analysis is hereafter referred to as the ALIGN-HEAD-o analysis. There are two potential problems with this analysis in its present form. The first is that it does not account for nearly identical phenomena in Kwara'ae, where prosodic simplification occurs not only at the right edge of the prosodic word, but in other positions as well. The tableau in (5) demonstrates this problem using the word 'grub':

(5) ALIGN-HEAD-o >> SYLL = μ (Kwara'ae)

/ŋo.ri.ma.di.ko/	ALIGN-HEAD-o	SYLL = μ
a. ☹ (ŋò.ri).ma.(dĭok)		*
b. (☞) (ŋò:r).ma.(dĭok)		*!*

The ALIGN-HEAD-o analysis is able to achieve the correct result at the right edge of the prosodic word, but not at the left edge where simplification is also expected.

The second problem with this analysis is that it is appropriate for a stage of Rotuman which is not actually described by Churchward (1940). This stage is comparable to modem Fijian (Rotuman's closest relative), in which footable morphemes (stems and affixes) head their own prosodic words (data from Dixon 1988):

(6) ***Morphologically Complex Words in Fijian***

Compound:	(gó.ne)=(vú.li) *child=learn*	'school-child'
Affixed:	(ré.ʔi)=ta.(i.na) *rejoice at=TRANS*	'rejoice at (something)'
Reduplicated:	(bú.ta)=bu(tá.ʔo) *RED=steal*	'to steal constantly'

Although this must have been true also for Rotuman at one point, it is no longer the case if we are to take Churchward (1940: 75, 86) literally that every prosodic word bears only one main stress:

(7) Morphologically Complex Words in Rotuman

	Citation	Discourse	
Compound:	(ki.a)=(lí.ʔi) *neck=to* sting	(kia)=(líʔ)	'to hanker after food'
Prefixed:	(a.ʔa)=(só.ko) *CAUS=reach*	(aʔ)=(sók)	'cause to reach'
Suffixed:	(sú.nu)=(ʔi.a) *hot=INGRES*	(sún)=(ʔia)	'become hot'
Reduplicated:	(ma.ta)=(má.ta) *RED=wet*	(mat)=(mát)	'wet in patches'

The present analysis treats Rotuman, as McCarthy (2000) does, at the 'Fijian' stage; a full treatment of the present stage of Rotuman is forthcoming (Norquest, Ms.).

3 The Present Analysis

The assumption is made in this paper that in the discourse register both Rotuman and Kwara'ae, the Stress-to-Weight Principle becomes highly ranked. The difference between the two languages is that in Rotuman, footing (and therefore stress) occurs only at the right edge of the Prosodic Word, whereas in Kwara'ae secondary fare parsed additionally at the left edge. A full account of both languages must therefore first deal with the footing patterns which distinguish them, exemplified below in (8), and then treat the Stress-to-Weght phenomena which distinguish the two registers.

(8) Rotuman: Primary Stress Kwara'ae: Primary/Secondary Stress

ta.ma.(mú.ʔa) 'impertinent' (fà.ʔi).(tá.ni) 'to turn over'

The following cover constraint is considered to be undominated in both Rotuman and Kwara'ae, the constituents of which are outlined in (9a-d). The derivation of prosodic heads (in both syllables and feet) is shown in tableau (10):

(9) PROSODIC HEAD (PRHD)[2]: Feet are left-headed; PrWds are right-headed

a. STRESS'': Feet must have stress.

b. ALIGN(Stress, L, Foot, L): Stress is aligned to the left edge of a foot.

c. $STRESS^{PRWD}$: Prosodic words must have primary stress.

d. RIGHTMOST: The head foot is rightmost in PrWd.

(Prince and Smolensky 1993)

(10) Derivation of Prosodic Heads (Syllables and Feet)

/CVCVCVCV/	ALIGN	$STRESS^{FT}$	RTMOST	$STRESS^{PRWD}$
a. ☞(CV́CV)(CV́CV)				
b. (CvCV́)(CvCV́)	*!*			
c. (CvCv)(CV́CV)		*!		
d. (CvCv)(CvCv)		*!*		
e. (CV́Cv)(CV́Cv)			*!	
f. (CV́Cv)(CV́Cv)			*!	
g. (CV́Cv)(CV́Cv)				*!

3.1 Footing in Rotuman

The constraints necessary for footing in Rotuman are given in (11), all taken from Prince and Smolensky (1993):

(11) a. FT-BIN: Feet are binary under moraic or syllabic analysis.

b. ALL-FT-RT: Align (Ft, Right. PrWd, Right).
Every foot stands at the right edge of the PrWd.

c. PARSE-SYL: Syllables are parsed by feet.

There are two crucial rankings between these three candidates. The first is that FT-BIN must dominate PARSE-SYL, to prevent the parsing of either degenerate or trisyllabic1trimoraic feet in words with odd numbers of peaks. This is shown below in (12), with the Rotuman *famori* 'people' in citation register:

(12) (PRHD). FT-BIN >> PARSE-SYL

/famori/	PRHD	FT-BIN	PSE-SYL
a. ☞ fa.(mó.ri)			*
b. (fá.mo.ri)		*!	
c. (fá).(mó.ri)		*!	
d. (fá.mo).ri	*!		*

The second crucial ranking is ALL-FT-RIGHT >> PARSE-SYL, which prevents secondary feet from being parsed at the left edge of the prosodic word (13b, c); it also prevents primary feet from being parsed at any place in the word besides the right edge (13b) -- this is also done via undominated PRHD, however, making this second effect redundant (see candidate 12d above). Tableau (13) illustrates with the word *parofita* prophet :

(13) (FT-BIN), ALL-FT-RIGHT>> PARSE-SYL

/parofita/	FT-BIN	ALL-FT-RT	PSE-SYL
a. ☞ pa.ro.(fi.ta)			**
b. (pá.ro).fi.ta		*!*	**
c. (pà.ro).(fi.ta)		*!*	
d. pa.(ró.fi.ta)	*!		*
e. pa.ro.fi.ta			**!**

In summary, all candidates with degenerate (monosyllabic) or ternary feet are eliminated by FT-BIN. Candidates with binary feet which are not aligned with the right edge of the word are done away with by ALL-FT-RIGHT. Winning candidates of three or more syllables necessarily violate PARSE-SYL, since only the rightmost two syllables of the prosodic word may be parsed into a foot; however, they still emerge as more optimal than candidates which fail to have any feet parsed at all.

3.2 Footing in Kwara ae

The following constraints are necessary for Kwara ae footing:

(14) a. FT-BIN: (discussed above)

b. ALL-FT-LEFT: Align (Ft, Left, PrWd, Left)
Every foot stands at the left edge of the PrWd.

c. PARSE-SYL: (discussed above)

There are two crucial rankings necessary to derive the right footing facts in Kwara'ae. The first is that FT-BIN >> PARSE-SYL, as in Rotuman, to avoid both degenerate as well as three-syllable and three-mom feet (see Tableau (14) for examples which transfer directly to Kwara'ae). The other crucial ranking is PARSE-SYL >> ALL-FT-LEFT, which ensures the parsing of two secondary feet in the case of words with six or more syllables. This is shown in tableau (15) with *maʔetaʔeelo*, 'doorway':

(15) PARSE-SYL >> ALL-FT-LEFT

/maʔetaʔeelo/	PSE-SYL	ALL-FT-LEFT
a. ☞ (mà.ʔe).(tà.ʔe).(é.lo)		**, ****
b. (mà.ʔe).ta.ʔe.(é.lo)	*!*	****

As in Rotuman, PARSE-SYL also prevents null prosodic parses, and PRHD eliminates candidate which do not have a primary foot aligned at the right edge. Tableau (16) provides an example with *ŋorimadiko* 'grub', which shows the full amount of constraint interaction within Kwara'ae thus far:

(16) FT-BIN, PRHD >> PARSE-SYL >> ALL-FT-LEFT

/ŋo.ri.ma.di.ko/	FT-BIN	PRHD	PSE-SYL	ALL-FT-LEFT
a. ☞ (ŋò.ri).ma.(dí.ko)			*	***
b. ŋo.(rí.ma).(dí.ko)			*	*, ***!
c. ŋo.ri.ma.(dí.ko)			*!**	***
d. (ŋò.ri).(má.di).ko		*!	*	**
e. (ŋò.ri).(mà).(dí.ko)	*!			**, ***

FT-BIN and PARSE-SYL do the same work in Kwara'ae as in Rotuman in 3.1 above; the former prevents degenerate (16e) or trisyllabic feet, and the latter prevents larger null prosodic parses than absolutely necessary (16c). PRHD categorically eliminates any candidate which fails to parse a foot at the right edge of the prosodic word (16d). ALL-FT-LEFT ensures that there is always a foot beginning at the left edge of the prosodic word in words of four or more syllables (16b), making the crucial decision about the placement of the unparsed syllable in a five-syllable form (compare with winning candidate). The domination of ALL-FT-LEFT by PRHD results in the fact that a three-syllable form will surface with one unparsed syllable at the left edge; its domination by PARSE-SYL ensures that there is never more than one unparsed syllable in any prosodic word, and that only in words consisting of an odd number of syllable .

3.3 The register distinction

The additional constraints necessary for the distinction between the citation and discourse registers are given in (17). The present analysis divides FT-BIN into FT-BIN (o) and FT-BIN (p) (see also Bemhardt and Stemberger (1998) as well as Ussishkin (2000) for ideas relevant to this bifurcation).

(17) a. STRESS-TO-WEIGHT: Stressed syllables are heavy.

b. FT-BIN (σ): Feet are binary under syllabic analysis.

c. FT-BIN (p): Feet are binary under moraic analysis.

In the present analysis, it is assumed that FT-BIN (p) is undominated in both the citation and discourse registers, but that there is a crucial tension between FT-BIN (σ) and SWP, and the dominance relation between the two makes the critical difference between the two registers in both Kwara ae and Rotuman. More specifically, the ranking FT-BIN (σ) >> SWP results in the light, bisyllabic feet of the citation register, while the reverse ranking SWP >> FT-BIN (σ) results in the heavy, monosyllabic feet of the discourse register. This is shown in tableaux (18-19) using the Rotuman word pure to rule ; candidates which would be thrown out by constraints responsible for footing will not be shown here.

...

(18) FT-BIN (μ), FT-BIN (o) >> SWP: Citation Register

/pure/	FT-BIN (μ)	FT-BIN (σ)	SWP
a. ☞ (pú.re)			*
b. (púer)		*!	
c. (pú:.re)	*!		

(19) FT-BIN (μ), SWP >> FT-BIN (σ): Discourse Register

/pure/	FT-BIN (μ)	SWP	FT-BIN (σ)
a. (pú.re)		*!	
b. ☞ (púer)			*
c. (pú:.re)	*!		

The difference between the two registers is thus dependent upon undominated FT-BIN (p) on the one hand, and the relative ranking of FT-BIN (o) and SWP on the other. The attempt to satisfy both FT-BIN (o) and SWP results in a fatal violation of FT-BIN (μ), as (18c) and (19c) demonstrate.

3.4 Complete ranking

A complete ranking, which integrates the constraints responsible for both footing as well as register distinction, are given below for Rotuman and then for Kwara ae.

3.4.1 Rotuman

The Rotuman registers have the **critical rankings** in (20). Example tableaux are given in (21) for the citation register and (22) for the discourse register:

(20) a. Citation: FT-BIN **(μ),** ALL-FT-RIGHT, FT-BIN (σ) >> PARSE-SYL >> SWP

b. Discourse: FT-BM (μ), ALL-FT-RIGHT, SWP >> PARSE-SYL >> FT-BIN (σ)

(21) Rotuman Citation Register

/parofita/	PRHD	F-B (μ)	A-F-RT	F-B (σ)	PSE-σ	SWP
a. ☞ pa.ro.(fi.ta)					**	*
b. (pá.ro).fi.ta	*!		**		**	*
c. (pà.ro).(fi.ta)			*!*			**
d. pa.(ró.fi.ta)		*!		*	*	*
e. pa.ro.fi.(tá:)				*	*!**	
f. pa.ro.(fiat)				*!	**	
g. pa.ro.(fi:.ta)		*!			**	
h. pa.ro.fi.ta					**!**	

(22) Rotuman Discourse Register

/parofita/	PRHD	F-B (μ)	A-F-RT	SWP	PSE-σ	F-B (σ)
a. pa.ro.(fi.ta)				*!	**	
b. (pá.ro).fi.ta	*!		**	*	**	
c. (pà.ro).(fi.ta)			*!*	**		
d. pa.(ró.fi.ta)		*!		*	*	*
e. pa.ro.fi.(tá:)					*!**	*
f. ☞ pa.ro.(fiat)					**	*
g. pa.ro.(fi:.ta)		*!			**	
h. pa.ro.fi.ta					**!**	

3.3.2 Kwara'ae

The Kwara'ae registers have the critical rankings in (23). Example tableaux' are given in (24) for the citation register and (25) for the discourse register. The merger of the two sets of constraints demonstrates that one more constraint is necessary for Kwara'ae: DEP-μ. This must crucially dominate PARSE-SYL in the discourse register to avoid a null prosodic parse (25g):

(23) a. Citation: PRHD, FT-BIN (μ), DEP-μ, FT-BIN (σ) >> PARSE-SYL >> ALL-FT-LEFT, SWP

b. Discourse: PRHD, FT-BIN (μ), DEP-p, SWP >> PARSE-SYL >> ALL-FT-LEFT, FT-BIN (a)

(24) Kwara'ae Citation Register

/ŋorimadiko/	P-HD	F-B(μ)	DEP-μ	F-B(σ)	PSE-σ	SWP	AFL
a. ☞(ŋò.ri).ma.(di.ko)					*	**	***
b. ŋo.(rī.ma).(dī.ko)					*	**	**!**
c. ŋo.ri.ma.(dī.ko)					*!**	*	***
d. (ŋò.ri).(má.di).ko	*!				*	**	**
e. (ŋò:r).ma.(diok)				*!*	*		***
f. (ŋò:.ri).ma.(dī:.ko)		*!*	**		*		***
g. ŋo.ri.ma.di.ko					**!***		
h. (ŋò:r).(mà:).(diok)			*!	***			*, **

(25) Kwara'ae Discourse Register

/ŋorimadiko/	P-HD	F-B(μ)	DEP-μ	SWP	PSE-σ	AFL	F-B(σ)
a. (ŋò.ri).ma.(dí.ko)				*!*	*	***	
b. ŋo.(rí.ma).(dí.ko)				*!*	*	*,***	
c. ŋo.ri.ma.(dí.ko)				*!	*!**	***	
d. (ŋò.ri).(má.di).ko	*!			**	*	**	
e. ☞ (ŋè:r).ma.(diok)					*	***	*!*
f. (ŋò:.ri).ma.(dí:.ko)		*!*	**		*	***	
g. ŋo.ri.ma.di.ko					**!***		
h. (ŋè:r).(mà:).(diok)			*!			*, **	***

4 Conclusion

The analysis presented in this paper asserts that the two registers of Rotuman and Kwara'ae may be analyzed in the same way. The discourse register differs from the citation register through a re-ranking of SWP over FT-BIN (a). The surface difference between the two languages in both registers is thereby reduced to a difference in footing patterns. The full rankings for the two languages are provided in (26) and (27) for comparison:

(26) Rotuman constraint rankings

a. Citation: PRHD, FTBIN (μ), ALL-FT-RIGHT, FTBIN (σ) >> PARSE-SYL >> SWP

b. Discourse: PRHD, FTBIN (μ), ALL-FT-RIGHT, SWP >> PARSE-SYL >> FTBIN (σ)

(27) Kwara ae constraint rankings

a. Citation: PRHD, FT-BIN (p), DEP-p, FT-BIN (σ) >> PARSE-SYL >> ALL-FT-LEFT, SWP

b. Discourse: PRHD, FT-BIN (p), DEP-μ, SWP >> PARSE-SYL >> ALL-FT-LEFT, IT-BIN (σ)

4.1 Remaining problems

As mentioned above, the synchronic description of Rotuman in Churchward (1940) is different in some respects from the account for Rotuman presented here. A significant change which has occurred in suffixed forms is that the stress of the prosodic word is maintained on the stem in the same location in which it would occur on a stem without a suffix (30). Accompanying this change is the divorce of stress from the domain of prosodic simplification:

(30)

Underlying	Bare Stem	Citation	Discourse
/hili=a/	(hí.li)	hí.(li.a)	hí.(lia)
choose=transitive	'to choose (tr.)'		
/hanisi=me/	ha.(ní.si)	ha.ní.(si.me)	ha.ní.(sim)
feel pity=hither	no gloss given		
/sunu=ʔia/	(sú.nu)	(sú.nu)=(ʔi.a)	(sún)=(ʔia)
hot=INGRES	'become hot'		

The evolution of Rotuman to this stage is treated in Norquest (Ms.).

4.2 Extensions to other languages

In closing, I offer an example of what is apparently the same prosodic simplification in the Kartvelian language Lower Balsk Svan (compare with Georgian) that has occurred in the Oceanic languages Rotuman and Kwara ae, and which is amenable to the same kind of analysis (from Catford 1994):

(31)

Svan Phonemic	Svan Phonetic	Georgian	
/didæb/	[didæb]	/dideba/	'fame'
/pwir/	[pʊir]	/puri/	'cow'
/twep/	[tʊɛpʰ]	/topi/	'gun'

Notes

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1 Rotuman examples are from Churchward (1940); Kwara'ae examples are from Sohn (1980).
2 For more on constraints of this nature, see Hayes (1995).

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Mapping out the CP: Evidence from Piedmontese

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1 Introduction

Recent work in generative grammar has convincingly argued for the need to break the major functional projections down into a series of specialised heads, distinguished one from the other both semantically and syntactically – Cf Cinque (1999), where the traditionally labelled 'IP' is fragmented into a myriad of projections.

As a functional projection the CP hasn't been able to escape its destiny and its decomposition started with Hoekstra (1993), Alber (1994) among others who laid the ground for Rizzi (1997). His work has shown that what was traditionally thought of as a single head, C, must be split into several distinct functional heads, Force, Topic, Focus and Finiteness. A further refinement of the structure comes form Benincà (2001) and Benincà and Poletto (2001). Observing the relative position of TopP, FocP, Hanging Topic and complementiser, they individuate three positions where the finite complementiser *che* can appear. They also show that what Rizzi assumed to be a set of recursive projections (TopP), is not so: the projections lower than the higher Topic have the syntactic characteristics of focussed elements.

Drawing from a conservative variety of Piedmontese (Pd) spoken in the city of Turin, in North-western Italy, this paper investigates constructions where two finite complementisers (compl and *comp2*) are allowed to co-occur. The evidence brought forward supports Beninch's idea of multiple positions for the finite complementiser *che*. Highlighting the differences between compl and *comp2*, this paper also expresses the need for further positions in the left periphery of the clause.

Pd allows a second complementiser to appear in some embedded contexts, as shown in (1) a and b. This is morphologically and phonologically identical to compl. the 'canonical' complementiser:

(1) a. Gioann a spera **che** Majo ch' as ne vada
John SCL hope.pr.3s that Mario THAT SCL+rfl part go.subj.3s
'John hopes that Mario goes away'

b. Majo a cherde **che** Ghitin ch' a sia desmentiass-ne
Mario SCL believe.pr.3s that Margaret THAT SCL be.subj.3s forget.pple.rfl-part
'Mario believes that Margaret has forgotten about it'

The questions that this paper addresses are the following:
i. Position filled by *comp2* – Section 2;
ii. Elements that can be sandwiched between *comp1* and *comp2* – Section 3;
iii. *Comp2*: restrictions on its appearance – as opposed to the use of *comp1* –, its semantic content – Section 4.

2 Position Filled by *comp2* – Subject Clitics (SCLs)

Pd, like the majority of Northern Italian dialects, displays a set of particle pronouns that co-occur with pre- and post- verbal subjects, be they nominal, pronominal or quantified elements. These particles are obligatory in all finite contexts and have been analysed as SCLs, i.e. clitics in nature, although different from, for example. French SCLs – Cf Rizzi (1986) and Poletto (1993).

Comp2 and the SCL of the embedded clause introduced by it are clustered together in the strict order *comp2*-SCL. I will exploit this proximity in trying to establish the position of *comp2*, taking Poletto's (2000) framework as a model.

Poletto identifies four morphological classes of SCLs, each of them occupying a precise position within the structure. She individuates two main positions for SCLs, before and after pre-verbal negation. Preceding the pre-verbal negation we find Invariable and Deictic SCLs, situated in the left periphery. Following the pre-verbal negation are Person and Number SCLs, situated lower down. Given that the different positions filled by the different types of SCLs display different properties, the observation of their behaviour with respect to a defined set of phenomena leads to the identification of features characteristic of each class. From these, conversely, we can identify to which group a particular SCL belongs. Poletto's (2000) criteria are position with respect to negation, coordination, clustering with the complementiser and compatibility with left-dislocated (LD) items. These will all be tested in turn. The set of Piedmontese SCLS is given in (2):

(2)

person	singular	plural
1st	I	I
2nd	[illegible]	[illegible]
3rd	[illegible]	[illegible]

Negation - Unfortunately, given that Pd has post-verbal negation (either ***nen*** or ***pa),*** a test on the position of its SCLs with respect to pre-verbal negative markers cannot be carried out.

Coordination – Poletto considers a particular type of coordination, involving two verbs that share most semantic features and differ only in tense or aspect from each other. **Benincà** and Cinque (1993) consider them to be a complex verb rather than two separate entities and under this type of coordination, Person SCLs necessarily need to be repeated in the second conjunct. Pd SCLs do not need to be repeated, as shown in (3):

(3)a. A les e O arles l' istess **liber**
SCL read.pr.3s and Ø re-read.pr.3s the same book
'S/He reads and re-reads the same book'

b. It fase e O **arfase** sempe l' istess travaj
SCL do.pr.2s and 0 redo.pr.2s always the same job
'You do and do again always the same job'

This test provides us with a strong argument that Pd SCLs do not belong to the Person type.

Clustering with the **complementiser** - From the above examples, we can see that the SCL of the embedded clause and *comp2* are clustered together. The examples in (4) show that lack of cliticisation yields ungrammaticality:

(4) a. ***Giòrs** a spera **che** Majo **che** as ne vada
George SCL hope.pr.3s that Mario THAT SCL+rfl part go.subj.3s
'George hopes that Mario goes away soon'

b. ***Luch** a pensa **che** ij tb **che** a sio ancorzuss-ne
Luke SCL think.pr.3s that the your THAT SCL be.subj.3p realize.pple.rfl-part
'Luke thinks that your parents have realized it'

According to Poletto, only Invariable and Deictic SCLs necessarily cluster with the complementiser, while this operation is only optional for Number and Person SCLs - this is due to the higher position filled by the former types.

So far, the tests that we have used have suggested that Pd SCLs belong neither to the Number nor to the Person groups.

Compatibility with LD items - Only Deictic SCLs are compatible with LD items; Invariable SCLs are not:

(5) a. Ti, it la cate?
You, SCL it.acc buy.pr.2s
'And you, are you buying it?

b. Cola **fietina, a** bala motobin
That little girl SCL dance.pr.3s very well
'That little girl, she dances very well'

We can now conclude that the evidence gathered strongly suggests that Pd SCLs belong to the Deictic type, and are therefore placed in the left periphery of the clause. I will not concern here with whether this is a CP or an IP.

Once the position filled by Pd SCLs has been ascertained, we can turn to our main point of concern, the position of ***comp2***. ***Comp2*** forms a cluster with the SCL, and the order inside the cluster is strictly ***comp2*+SCL.** Following Kayne's (1994) in not allowing right adjunction, we are forced to conclude that ***comp2*** has moved to its position from one lower down. At present I am not able to identify the exact position of the projection where ***comp2*** originates, and considering the observations that I will put forward in Section 5, I will identify it with Rizzi's (1997) **FinP.**

3 Items Sandwiched between *compl* and *comp2*

3.1 Left-dislocated (LD) phrases

Let us now turn to the elements that appear between compl and ***comp2.*** We will begin by looking at LD phrases and then will investigate subjects. I will assume that compl corresponds to its Standard Italian counterpart ***che*,** and that it is situated in Force – but Cf **Benincà** (2001) for alternatives.

LD elements – underlined in the examples – occur to the left of the ***comp2*+SCL** cluster and are not allowed to its right:

(6) a. Majo a spera **che** Luch e soa fomna, a ca soa, **ch'**
Mario SCL hope.pr.3s that Luke and his wife to their house THAT
as ne **tornèisso** tbst
SCL+rfl part return.subj.3p soon

b. ***Majo** a spera **che** Luch e soa fomna **ch'** as,
Mario SCL hope.pr.3s that Luke and his wife THAT SCL+rfl
a ca soa, ne **tornèisso** tbst
to their house pan return.subj.3p soon
'John hopes that George and his wife go back to their own house soon'

We can therefore conclude that their relative order is compl, **TopP** and ***comp2.*** The structure that we have been able to map so far is shown in (7):

(7) **…** [ForceP ***comp1*** **che** … [TopP **a ca soa** [… [XP ***comp2*** **ch$_i$'as** [YP t_i […

3.2 Subjects

Let us now turn to subjects. By looking at examples in (6), it can be seen that the subject of the embedded clause is found to the left of LD elements. Given that full DPs can undergo left-dislocation, it could be argued that the subjects in these examples are themselves LD. Negative (nothing, nobody) and pronominal (everything, a lot, something) quantifiers cannot be LD (Cf Beninch (1988:143, 157)). Therefore, substituting to the full DP Subject a quantified one will clarify the status of these high Subjects. In (8) a quantified element (in bold) is allowed to precede a LD phrase – different categories have been checked, an adverbial (a), a direct object (b), an indirect object (c) and a partitive (d) – suggesting that the position is not targeted **ONLY** by LD subjects. This is really a rather exciting consequence, given that subject positions are not usually thought of as being this high:

(8) a. Ghitin a cherd **che gnun,** a st'ora, ch' a son-a
Margaret SCL believe.pr.3s that nobody at this time THAT SCL play.pr.3s
'l ciochin
the bell
'Margaret thinks that at this time nobody would ring the bell'

b. Gioanin a spera **che gnun, ël lìber,** ch' a **l'**
John SCL hope.pr.3s that nobody the book THAT SCL L
abia gih lesulo
have.subj.3s already read.pple-it.acc
'John hopes that nobody has read the book'

c. Majo a pensa **che cheidun,** a Teresa, ch' a-j
Mario SCL think.pr.3s that somebody to Teresa THAT SCL-dat
l' abia gih daje 'l **lìber**
L **have.subj.3s already give.pple.dat the book**
'Mario thinks that somebody has already given the book to Teresa'

d. **Luch** a pensa **che tuti, 'd** sbn, ch' a
Luke SCL think.pr.3s that everybody, of this THAT SCL
sio desmentiass-ne
be.subj.3p forget.pple.rfl-part
'Luke thinks that everybody has forgotten about this'

From the evidence brought forward we can conclude that there are strong cues as to the existence of a canonical subject position in the left periphery of the clause. Continuing our investigation on subject positions, we can see that there is another position available, below LD phrases. This can be filled by full DP subjects but not by quantified elements, as shown in (9) a and b respectively:

(9) a. Ghitin a spera **che,** 'd sbn, **Luch** ch' as ne
Margaret SCL hope.pr.3s that of this Luke THAT SCL+rfl part
desmentia nen
forget.subj.3s neg
'Margaret hopes that Luke doesn't forget about this'

b ***Giòrs** a spera **che,** a **l'** ambient, **cheidun** ch'
George SCL hope.pr.3s that to the environment somebody THAT
a-j pensa
SCL+dat think.subj.3s
'George hopes that somebody is thinking about the environment'

Finally, there doesn't seem to be a pre-verbal subject position available below *comp2*: quantified, full DP and pronominal subjects all yield ungrammatical constructions:

(10) a. ***Ghitin** a cherd **che,** a st'ora, **che gnun** a
Margaret SCL believe.pr.3s that at this time THAT nobody SCL
son-a 'l ciochin
play.pr.3s the bell
'Margaret thinks that at this time nobody would ring the bell'

b. ***Teresin** a spera **che,** dle fior, **che** Giòrs as
Teresa SCL hope.pr.3s that of the flowers THAT George SCL+rfl
n' **arcòrda**
part remember.subj.3s
'Teresa hopes that George remembers about the flowers'

c. ***Luch** a pensa **che,** 'd vin, **che chiel** as ne
Luke SCL think.pr.3s that. of wine, THAT he SCL+refl part
desmentia nen
forget.subj.3s neg
'Luke thinks that he doesn't forget about the wine'

The contrast shown in (9) between a full DP and a quantified subject resembles the restriction on LD items, and we could conclude that we are dealing with a position that lies still within the LD domain. Poletto and **Benincà** (2001) argue that LD items can only precede focalised items, and the field where LD elements can appear is limited downwards by the field where focalised elements can land. Choosing a sequence of an LD item followed by a focalised element could be the deciding test for the conclusion suggested here. Unfortunately Pd does not allow preverbal contrastive nor informational focus, making it thus impossible to establish where the limit of the LD field is, and consequently, to establish the nature of the subject position below LD phrases.

Summing up, we have seen that there are subject positions in the left periphery of the clause, one preceding and one following LD items. While the former is

available to both full DP and quantified subjects, the latter can only be targeted by full DP subjects. There are no subject positions available below *comp2*. (11) shows all these positions – note that not more than one can be filled at any one time:

(11) [$_{ForceP}$ *compl* che [$_{XP}$ gnun/Luch [$_{TopP}$ a ca soa [$_{YP}$ *gnun/Luch [$_{XP}$ *comp2* ch$_i$'as [$_{ZP}$ t$_i$ [$_{WP}$ *gnun/Luch …

3.3 Other elements

To complete the picture, let us have a brief look at the other elements that can be found between *compl* and *comp2*. So far we have seen examples of a full DP subject (Cf (1)), a quantified subject (Cf (8)) and LD phrases (Cf (6)). The examples below show that we can also find adverbials (12) a, two LD items (12) b and an adverbial and a subject (12) c:

(12) a. Maria a pensa che doman ch' a-j parla
Mary SCL think.pr.3s that tomorrow pro THAT SCL+dat speak.subj.3s
al dotor
to the doctor
'Mary thinks that s/he will speak to the doctor tomorrow'

b. I spero che, 'l vot brut, a Giulia, ch' a-j lo
SCL hope.pr.1s that the mark ugly to Giulia THAT SCL+dat it.acc
diso doman, nen ancheuj
say.subj.3p tomorrow neg today
'I hope that they will tell Giulia about the bad mark tomorrow, not today'

c. A cherdo che Majo, për boneur, ch' a l' abia
SCL believe.pr.3p that Mario for fortune THAT SCL L have.subj.3s
pairà a vëdde Maria
manage.pple to see.inf Mary
'They think that Mario managed to see Mary'

Comp2 is not allowed to follow *compl* when there is no syntactic material phonetically realised between the two. This could suggest that *comp2* is a clitic element and that it needs some phonological content to which attach.

4 *Comp2*

4.1 Restrictions on *comp2*

The use of the second complementiser is a matter of optionality rather than necessity, which makes it difficult to obtain strong grammaticality judgements from the informants. Nevertheless, ***comp2*** is totally excluded from some contexts, and it is on this negative evidence that I have based my observations.

From a morphological and phonological point of view, ***comp2*** is identical to ***compl.*** In spite of this identity, the two complementisers are subject to different conditions. The Double Complementiser Construction (DCC) is restricted to those embedded contexts where the matrix verb has selected the subjunctive mood. This happens, for example. with the 'verbs-of-belief type such as ***chërdé*** – to believe, ***pensé*** – to think, ***speré*** – to hope. If a mood other than the subjunctive is used in the embedded clause, the DCC is ungrammatical, as shown in (13) a and b, where conditional and future indicative respectively are selected. ***Comp1***, on the other hand, is not affected by any of these restrictions, as shown by the examples in (14) with conditional, future and present indicative:

(13) a. Majo a pensa **che** Franchin (***ch'**) as n' **ancorzerìa**
Mario SCL think.pr.3s that Frank SCL+rfl part realise.cond.3s
'Mario thinks that Frank would realize it'

b. Gibrs a spera **che** Majo (***ch'**) as n' andarh tbst
George SCL hope.pr.3s that Mario SCL+rfl part go.fut.3s soon
'George hopes that Mario will go away soon'

(14) a. A diso **che** Luch e soa fomna a mangerio bin volonti
SCL say.pr.1s that Luke and his wife SCL eat.cond.3p well willingly
sta torta
this cake
'They say that Luke and his wife would happily eat this cake'

b. Gibrs a dis **che** Mariaa telefonerh **al** professor
George SCL say.pr.3s that Mary SCL phone.fut.3s to the professor
'George says that Mary will call the professor'

c. Am dis **che** Mariaa ven duman
SCL+me.dat say.pr.3s that Mary SCL come.pr.3s tomorrow
'S/He's saying to me that she arrives tomorrow'

This can only be interpreted as an indication of the fact that ***compl*** and ***comp2*** are in actual facts different and have a different function. Beninch (2001) individuates three positions where the finite complementiser ***che*** can appear in Standard Italian. The evidence brought forward here, indirectly supports her analysis, in that it shows two positions contemporaneously filled lexically. The data brought forward here prompt a further consideration. The restrictions on ***comp2*** – which, ***as*** we have seen, do not apply to ***compl*** – will limit the positions that it can fill; in other words, the positions where the two

complementisers can appear are not interchangeable. Consequently, the multiple positions where Beninch places the Standard Italian *che* – which is Pd *comp1* – cannot be landing sites for *comp2*. This would force us to postulate further positions in the left periphery of the clause, semantically and syntactically different. Thus, a structure such as Beninch's that at first sight appears undesirably complex, still needs further refinement when accounting for variation within and between varieties.

4.2 *Comp2*'s content

The subjunctive is clearly intertwined with *comp2*'s trigger mechanism. Cross-linguistically, the predicates that have the strongest tendency to take the subjunctive are desideratives, verbs of belief and those expressing some varieties of modality, as in 'it is possible that' and so on. It has been argued (already by Bolinger (1968), Terrell and Hooper (1974)) that the use of the 'indicative' versus the 'subjunctive' in embedded clauses can be accounted for in terms of 'assertion' and 'non-assertion'. In particular, the subjunctive indicates that the situation predicated about is purely within the realm of thought, knowable only through imagination. The subjunctive is clearly, then, a marker of the [+*irrealis*][1] status of the proposition. Given the dependency relation between subjunctive mood and the appearance of *comp2*, we could assume that *comp2* encodes modal information that relates to the [+*irrealis*] interpretation of the embedded clause. This would also account for the class of verbs that trigger the DCC.

The data in (13), though, do not support this hypothesis. In Pd the future is used, as well as to indicate an action that has not yet taken place, to express a certain degree of uncertainty. This can be seen in the examples in (15):

(15) a. Le fije a lavo ij piat
the.fp girl.fp SCL wash.pr.3p the.mp dish.mp
'The girls are going to wash the dishes'

b Le fije a lavran ij piat
the.fp girl.fp SCL wash.fut.3p the.mp dish.mp
'It is possible that the girls will wash the dishes'

The conditional, too, is often related to the uncertainty of the event stated, more specifically, to a possibility that could become true. Neither of them, in spite of their clear [+*irrealis*] content, triggers the DCC. Furthermore, factive-emotives (Cf Farkas 1992:70 for the definition) that select the subjunctive such as '*regreté*' to regret, '*ghignoné*' to hate, '*despiase*' to be sorry exemplified in (16), do trigger the presence of *comp2*. It is thus implausible to claim that *comp2* is linked to the [+*irrealis*] status of the embedded clause.

(16) a. Maria a regreta che Giòrs ch' a sia desmentiass-ne
Mary SCL regret.pr.3s that George THAT SCL be.subj.3s forget.pple.rfl-part
'Mary regrets the fact that George has forgotten about it'

b. Teresa a ghignon-ache Giobnn ch' as ne vada
Teresa SCL hate.pr.3s that John THAT SCL+rfl part go.subj.3s
sempe prima
always early
'Teresa hates it that John always leaves early'

c. A Majo a-j despias che Ghitin ch' as n'
To Mario to him feel sorry.pr.3s that Margaret THAT SCL+rfl part
ambrigna dij sb consèj
not care.subj.pr.3s of his advice
'Mario is sorry that Margaret doesn't care about his advice'

The suggestion that I would like to put forward here is that *comp2* expresses a sort of 'emotional import': the 'point of view' of the subject of predication. By taking this angle the paradox of factive verbs that select the subjunctive – thus creating a clash between a [*realis*] situation and the mood chosen to express it – could be explained. These types of verbs presuppose the reality of complement they select, i.e. Mario is sorry about something that has happened, but they also express a subjective reaction to that something, Mario's feeling sorry. Thus we could claim that although the truth-value of the complement selected is asserted, a personal view is expressed about it, justifying, therefore, the use of the subjunctive and the presence of *comp2*. We could think of these particular factive verbs as semantically decomposable in a core factive unit (Cf also Farkas 1992:100 for a similar view) – from which the factive interpretation is derived – embedded under an emotional/evaluative predicate – which justifies the selection of the subjunctive mood. Needless to say, this analysis requires a thorough investigation and further research. At this stage I am not able to develop the argument further.

5 Conclusions

Concluding, this paper has presented some interesting data where two finite complementisers are allowed to co-occur. An analysis of the elements that are closer to *comp2*, SCLs, has allowed us to establish that *comp2* is located in the left periphery of the clause. Looking at the different elements that can appear between the two complementisers, two subject positions have been identified, each targeted by different types of subjects. No subject positions seem to be available to the right of *comp2*. Benincà's (2001) claim of multiple positions for the finite complementiser is supported by my data, and the different restrictions active on the two complementisers, point to the need for further refinement.

Finally, some considerations have been made on the content of *comp2*, and it has been suggested that *comp2* could encode some sort of 'emotional import' expressed by the subject of the main clause. Further research is needed to identify with more precision the content of *comp2* and the position where it generates.

Notes

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1 The reader is referred to Elliott (2000) for an interesting discussion on the use of the terms ***realis*** and ***irrealis.***

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Appositive ACD: Evidence for PF Deletion*

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1 Introduction

The goal of this paper is to examine appositive Antecedent Contained Deletion (ACD) and argue that PF deletion analysis (Chomsky 1993, 1995; Chomky and Lasnik 1993) provides a better account than LF Copying analysis (May 1985, Hornstein 1995).

Let us first consider the following set of data:

(1) a. John suspected everyone Bill did [$_{VP}$ e] [restrictive ACD]
b. John suspected everyone Bill suspected

The restrictive ACD in (la), where the elided VP is contained within the restrictive relative clause, is interpreted as (l b). If we copy the antecedent VP into the elided VP to get an appropriate interpretation, an infinite regress arises, since the antecedent VP contains the elided VP. May (1985) argues that the infinite regress problem can be resolved by Quantifier Raising (QR), followed by LF Copying as illustrated in (2)':

(2) a. [everyone Op Bill did [$_{VP}$ e]]$_i$ [John [$_{VP}$ suspected t_i]]
b. [everyone Op Bill [$_{VP}$ suspected t_i]]$_i$ [John [$_{VP}$ suspected t_i]]

In (2a), the quantificational NP and the restrictive relative clause have undergone QR. At this point, if we copy the antecedent VP into the elided VP as shown in (2b), we obtain the desired interpretation. May further argues that appositive ACD construction (3a), where the elided VP is contained within the appositive relative clause, is ungrammatical. since it involves a definite NP. Being a definite NP, ***Mary*** cannot undergo QR and hence another elided VP is copied when we copy the antecedent VP into the elided VP, as shown in (3b):

(3) a. *John suspected Mary, who Bill did [$_{VP}$ e] [appositive ACD]
b. John suspected Mary, who Bill [$_{VP}$ suspected Mary, who Bill did [$_{VP}$ e]]

If we keep copying the antecedent VP, an infinite regress arises.

However, as Wyngaerd and Zwart (1991) note, a minor adjustment to this example markedly improves its status as shown in (4):

(4) a. John suspected Mary, who Bill did [$_{VP}$ e] as well
b. John suspected Mary, who Bill did [$_{VP}$ e] not

This seems to indicate that QR is not necessarily needed to account for appositive ACD[3]. Note, however, that the original observation still persists: the antecedent VP contains the elided VP. Therefore, if we copy the antecedent VP into the elided VP, an infinite regress arises.

In the following two sections, we will examine alternative analyses of appositive **ACD.**

2 Definite NPs Can Undergo QR

Reinhart (1991) and Heim and Kratzer (1998) argue that as an instance of more general syntactic rule, move a, not only quantificational NPs but also definite NPs can undergo QR-type movement at LF[3]. Under this analysis, the definite NP Mary and the appositive relative clause in (5a) will be able to undergo QR as shown in (5b). At this point, the antecedent VP can be copied into the elided VP, yielding a desired interpretation as in (5c).

(5) a. John suspected Mary, who Bill did [$_{VP}$ e] as well
b. [Mary who Bill did [$_{VP}$ e]]$_i$ [John [$_{VP}$ suspected t_i]] as well
c. [Mary who Bill [$_{VP}$ suspected t_i]]$_i$ [John [$_{VP}$ suspected t_i]]

Once we adopt the possibility that definite NPs, as well as quantificational NPs, can undergo QR, it is predicted that there will be no contrasts between restrictive ACD and appositive one. But this prediction seems not to be born out, as shown in (6)-(7) (examples adapted from Lasnik 1993, 1995):

(6) a. John stood near everyone Bill did
b. *John stood near Mary, who Bill did as well

(7) a. John showed Mary everyone Bill did
b. *John showed Mary the new teacher, who Bill did as well

If definite NPs undergoes QR and the elided VPs are recovered by LF Copying operation, we would incorrectly predict that the (b) examples in (6)-(7) should be grammatical, as (a) examples are. This suggests that the analysis cannot be maintained as such.

In the following section, we will discuss another approach to appositive ACD.

3 LF Raising to Spec of Agro

Hornstein (1995) offers a rather different approach to appositive ACD. What Hornstein offers is that raising to Spec of Agro is the process moving the object NP out of the **VP** to check its Case feature, hence moving the elided **VP** contained inside that NP out of its antecedent. Hornstein takes it for granted that this type of ellipsis involves LF Copying, based on the assumption that raising to Spec of Agro takes place at LF. Under this analysis, an infinite regress does not arise as shown in (8). In **(8b)** ***everyone*** that ***Bill did*** has raised to Spec of Agro. followed by LF Copying of the antecedent **VP** into the elided **VP.** Appositive ACD undergoes the same process as illustrated in (9):

(8) a. John suspected everyone that Bill did [$_{VP}$ e]
b. John [$_{Agro}$[everyone Op Bill [$_{VP}$ **suspected** t_i]]]$_i$ [$_{Agro}$[$_{VP}$ suspected t_i]]

(9) a. John suspected Mary, who Bill did [$_{VP}$ e] as well
b. John [$_{Agro}$[Mary, who Bill [$_{VP}$ **suspected** t_i]]]$_i$ [$_{Agro}$[$_{VP}$ suspected t_i]]

Note here that this analysis does not differentiate the Quantificational **NP** from the definite **NP.** Thus, it is predicted that restrictive ACD has the same grammaticality as appositive ACD, contrary to facts. This analysis fails to account for the contrasts between restrictive ACD and appositive ACD in **(6)**-(7). More specifically, this analysis incorrectly predicts that (6a) should be ungrammatical. Given the standard analysis of Case checking, the Case of ***everyone*** in (6a) is checked by the preposition ***near.*** Thus, ***everyone*** doesn't raise to Spec of Agro to check its Case feature. Since it remains inside the antecedent **VP,** LF copying of the **VP** will give rise to an infinite regress, resulting in an ungrammatical sentence. As for **(7a),** which involves double object construction, it is not so clear how the Case checking of the objects takes place. But no matter how it takes place, the crucial point here is that LF raising (to Spec of Agro) analysis fails to capture the contrast in (7a) and **(7b).**

There are other cases that show similar contrasts between restrictive ACD and appositive ACD. Let us first consider appositive ACD constructions in (10):

(10) a. ***He$_i$** suspected everyone **Bill$_i$'s** wife did
b. Every scientist$_i$ suspected everyone **his$_i$** wife did

(10a) is ungrammatical due to Condition C violation. **(10b)** shows that bound pronoun reading is possible. The grammaticality in (10) indicates that the matrix subject c-commands the one in the restrictive clause at LF. And the contrast in

(10) is expected under the LF raising analysis. Since the object NP and the restrictive clause raise only up to Spec of Agro, the matrix subject c-commands the one in the restrictive relative clause at LF.

When appositive ACD is involved, however, the grammaticality is reversed as shown in (11).

(11) a. He_i suspected Mary, who $Bill_i$'s wife did as well
b.??Every $scientist_i$ suspected Mary, who his_i wife did as well

In (I la), Condition C is obviated and in (I lb), bound pronoun reading is hard to get. If this is true, LF raising analysis cannot be maintained as such.

Before we move on, note that the contrast in (11) suggests that appositive relative clauses are not inside of their matrix clauses at LF. If they were, the grammaticality in (11) would be reversed. Given this property, I will assume that appositive relative clauses are outside of matrix clauses at LF[4].

In the following section, we will suggest an alternative analysis of appositive ACD.

4 Toward PF

4.1 Overt raising to Spec of Agro

Lasnik (1995, 1999a) observes that there is a striking parallelism between Pseudogapping and Appositive ACD. The relevant examples are shown in (12-14), where (a) examples are Pseudogapping constructions (examples adapted from Lasnik 1995):

(12) a. John suspected Mary and Bill did Sue
b. John suspected Mary, who Bill did as well

(13) a. *John stood near Mary and Bill did Sue
b. *John stood near Mary, who Bill did as well

(14) a. *John showed Mary the new teacher and Bill did the new student
b. *John showed Mary the new teacher, who Bill did as well

Adopting Koizumi's (1993, 1995) split VP-hypothesis, Lasnik argues that in the overt syntax, the object Sue in (12a) raises to Spec of Agro to check EPP feature. The relevant structure at this point of derivation is shown in (15):

(15) … and $Bill_j$ did $[_{VP1}\ t_j\ [\ _{AgroP}\ Sue_i\ [_{VP2}$ ~~suspect~~ $t_i\ ]]]$

If the structure is sent to PF at this point, the verb within VP2 can be deleted[5]. The resulting construction is Pseudogapping. Lasnik further notes that when Pseudogapping is allowed, the corresponding appositive ACD is also allowed as shown in (12b).

(13a) is ungrammatical, since the object of preposition ***Sue*** does not undergo overt A-movement to Spec of Ago, prohibiting Pseudogapping. The claim that ***Sue*** does not undergo A-movement is supported by the impossibility of Pseudopassive in (16):

(16) *Mary was stood near by John

Given that Pseudogapping is not allowed, the corresponding appositive ACD is not allowed, either, as shown in (13b).

Overt raising (to Spec of Agro) analysis predicts that if in some cases, an object of preposition can undergo A-movement in Pseudopassive, Pseudogapping is also allowed. It makes a further prediction that if Pseudogapping is allowed, the corresponding appositive ACD construction is also allowed. As observed in Lasnik (1995), these predictions are born out as in (17):

(17) a. Mary was spoken to by John
b. John spoke to Mary and Bill did Sue
c. ?John spoke to Mary, who Bill did as well

The Pseudopassive construction in (17a) is allowed, since the preposition can be reanalyzed with the verb and thus can be stranded. Given that the object of reanalyzing preposition can undergo A-movement, it can undergo overt A-movement to Spec of Agro to check EPP feature, licensing Pseudogapping constructions such as (17b). And the possibility of Pseudogapping in (17c) correlates with the possibility of the appositive ACD in (17c).

In the double object construction in (14a), Relativized Minimality guarantees that the first object remains higher than the second object. Then the first object cannot be deleted without the second one being deleted. This explains why (14a) is ungrammatical. Under this analysis, it is correctly predicted that the first object can be a Pseudogapping remnant as shown in (18):

(18) ?John gave Bill a lot of Money and Mary will ~~give~~ Susan ~~a lot of money~~

Again, the ungrammatical Pseudogapping construction correlates with the ungrammatical appositive ACD construction in (14b).

Given the parallelism, Lasnik suggests that Appositive ACD can be reduced to Pseudogapping. Under this analysis, the relevant structure of (12b) will be (19b):

(19) a. John suspected Mary, who Bill did as well
b. John [$_{VP1}$ [$_{AgrP}$ [$_{NP}$ Mary who Bill [$_{VP1}$ [$_{AgrP}$ t_i [$_{VP2}$ ~~suspected t_i~~]]]]$_j$ [$_{VP2}$ suspected t_j]]]

In (19b), the appositive relative clause and its head form a constituent and they raise to Spec of Agro in the overt syntax. When the structure (19b) is sent to PF at this point, VP2 in the appositive relative clause can be deleted under identity[6]. This analysis explains why (13b) is ungrammatical. Since the object of the preposition cannot raise to Spec of Agro, the VP in the appositive ACD is inside the matrix VP, as shown in (20b):

(20) a. *John stood near Mary, who Bill did as well (=13b)
b. [John [$_{VP}$ stood [$_{PP}$ near [$_{NP}$ Mary [who Bill [$_{VP}$ stood [$_{PP}$ near t_i]]]]]]]

Given that the matrix VP is different from the VP inside the appositive relative clause, deleting the latter is not allowed. This analysis accounts for the grammaticality of the appositive ACD constructions in (14b) and (17c).

Note that under this analysis, it is assumed that appositive relative clause and its head form a constituent in the overt syntax. However, this assumption seems to contradict the property of the appositive clause discussed in (11) in section 3. Recall that the binding facts in (11) suggest appositive relative clause is not inside of the matrix clause. Therefore, appositive relative clause and its head do not form a constituent. This paper attempts to resolve this contradiction. Before we move on to our proposal, we will first discuss related properties of appositive relative clause in the following section.

4.2 Appositive relative clause

McCawley (1982) observes that appositive relative clause can be inside of matrix clause as shown in (21) (examples adapted from McCawley (1982)):

(21) John sold Mary, who had offered him $600 an ounce, a pound of gold

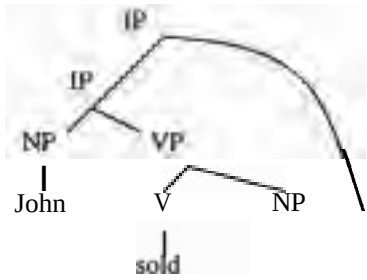
McCawley also observes that appositive relative clause and its head do not form a constituent. The relevant example is (22):

(22) John sold Mary, who had offered him $600 an ounce, a pound of gold, but Arthur refused to. (= refused to sell Mary a pound of gold; # refused to sell Mary, who had offered him $600 an ounce, a pound of gold; .

refused to sell Mary)

MaCawley points out that the elided site cannot be understood as ***sell Mary, who offered him $600 an ounce, a pound of gold,*** since the head and the appositive relative clause do not form a constituent. This property, however, contradicts the one in (21); The example in (22) suggests that the appositive relative clause cannot be inside of the matrix clause, while (21) suggests it can. In order to resolve this contradiction, McCawley proposes discontinuous constituent as shown in (23):

(23) Discontinuous Constituent: **McCawley** (1982, 1995, 1998)



..

We have seen that the parallelism between Pseudogapping and appositive ACD can be easily captured if we assume that appositive relative clause and its head form a constituent and thus they can raise to Spec of Agro, allowing Appositive ACD. Under **McCawley's** analysis of appositive relative clauses, however, it is very difficult to capture the parallelism between Pseudogapping and Appositive ACD, since appositive clause and its head do not form a constituent as shown in (23). This suggests that we need an alternative analysis of the appositive relative clause.

Given this sate of affairs, I would like to suggest an alternative analysis of appositive relative clause. First, I will assume, with Ross **(1973),** that appositive relative clause is adjoined to IP before Spell-Out. Let's further assume that this structure holds at LF. At PF, on the other hand, the relative clause undergoes lowering and attaches to its head, yielding a kind of head-complement configuration. It seems that this process is needed anyway since PF is the level where linearization takes place (cf. Kayne **1994)**[7]. Otherwise, we wouldn't generate the right word order.

Now let us consider how this analysis accounts for the properties of appositive relative clause. First, given that appositive relative clause is adjoined to IP at LF, we can account for the biding facts in (1**1),** which is repeated here as (24):

(24) a. He_i suspected Mary, who $Bill_i$'s wife did as well
b. ??Every $scientist_i$ suspected Mary, who his_i wife did as well

The subject in (24) does not c-command into the relative clause[R]. This analysis accounts for why Condition C is not violated in (24a) and why the bound pronoun reading in (24b) is hard to get.

Second, given that appositive relative clause undergoes lowering to its head at PF, we can account for the facts that appositive relative clauses can be inside of matrix clauses as shown in (25):

(25) John sold Mary, who had offered him $600 an ounce, a pound of gold

Furthermore, this analysis can easily capture why grammaticality of appositive ACD parallels that of Pseudogapping. Let us first consider (26):

(26) a. John suspected Mary, who Bill did as well (= 12b)
b. [John [$_{VP1}$ [$_{AgroP}$ $Mary_j$ [$_{VP2}$ suspected t_j]]]] [who$_i$ Bill [$_{VP1}$ [$_{Agro}$ t_i [$_{VP2}$ suspected t_i]]]]
--- Before Spell-Out
c. [John [$_{VP1}$ [$_{AgroP}$ [$_{NP}$ $Mary_j$ [who$_i$ Bill [$_{VP1}$ [$_{Agro}$ t_i [$_{VP2}$ suspected t_i]]]]] [$_{VP2}$ suspected t_j]]]]
--- At PF (after Spell-Out)

In (26b), the appositive relative clause is adjoined to the matrix clause and the object NP has raised to Spec of Agro before Spell-Out takes place. At PF, the relative clause undergoes lowering to the raised NP as shown in (26c)[9]. At this point, the VP2 within the relative clause is deleted under identity with its antecedent VP2 within the matrix clause.

This analysis also accounts for why the appositive ACD in (27a) is ungrammatical:

(27) a. *John stood near Mary, who Bill did as well (=13b)
b. [John [$_{VP}$ stood [$_{PP}$ near Mary]]] [who Bill [$_{VP}$ [$_{VP}$ stood [$_{PP}$ near t_i]]]]
--- Before Spell-Out
c. [John [$_{VP}$ stood [$_{PP}$ near [$_{NP}$ Mary [who Bill [$_{VP}$ stood [$_{PP}$ near t_i]]]]]]]
--- At PF (after Spell-Out)

In (27b), the appositive relative clause is adjoined to the matrix clause. Note here that the object of the preposition should remain within the PP, as discussed in section 4.1. At PF, the relative clause undergoes lowering to its head, as shown in (27c). However, the VP in the appositive relative clause cannot be deleted, since it remains contained within its antecedent VP and hence no identity holds between the VPs.

To summarize, we have seen that appositive ACD can be better accounted for by PF deletion, which crucially relies on overt raising to Agro and PF lowering of appositive relative clause. However, given that the proposed analysis argues that appositive ACD remains to be adjoined to matrix clauses at LF, it seems necessary to reconsider Hornstein's (1995) LF raising (to Spec of Agro) analysis and see how it can be reanalyzed in this regard.

5 LF Raising Revisited

According to the overt raising and PF lowering analysis proposed above, the appositive ACD in (28a) is represented at LF as in (28b), where the appositive ACD is adjoined to the matrix clause:

(28) a. John suspected Mary, who Bill did [$_{VP}$ e] as well
b. [[John suspected Mary] [who Bill did [$_{VP}$ e] as well]]

Recall that under the LF raising analysis of Hornstein (1995), the object NP in the matrix clause is required to raise to Spec of Agro to check its Case feature at LF. The representation is illustrated in (29):

(29) [[John [$_{AgroP}$ Mary$_i$ [$_{VP}$ suspected t_i]]] [who Bill did [$_{VP}$ e]]]

At this point, we can copy the antecedent VP into the elided VP and obtain the desired interpretation as shown in (30):

(30) [[John [$_{AgroP}$ Mary$_i$ [$_{VP}$ suspected t_i]]] [who Bill [$_{VP}$ suspected t_i]]]

Under this analysis, it seems that LF Copying analysis is a viable option.

However, according to Lasnik (1999b, in press), raising to Spec of Agro takes place in overt syntax. More specifically, Lasnik argues that raising to Spec of Agro is optional and that it takes place in the overt syntax when it does.

First, let us consider the following examples in (31) (examples from Lasnik 1999b):

(31) a. The DA proved [two men to have been at the seen of the crime] during each other's trials
b. *The DA proved [there to have been two men at the scene of the crime] during each other's trials

In (31a), the ECM subject *two men* can bind the anaphora within the matrix clause adverbial. This is possible since ECM subject can raise to Spec of Agro of the matrix clause. Given the standard assumption that a movement relation

connects the expletive and the associate, the ungrammatical sentence in (31b) suggests that the ECM subject does not undergo movement at LF. Otherwise, we would expect (31b) to be as good as (31a). If there is no LF raising to Spec of Agro, the object ***Mary*** in (28a) stays in situ. Then the antecedent VP cannot be copied, since when it is copied, it will results in an uninterpretable LF representation as in (32):

(32) [[John [$_{AgroP}$ [$_{VP}$ suspected Mary]]] [who Bill [$_{VP}$ **suspected** Mary]]]

(32) is not interpretable since there is no variable the operator ***who*** can bind.

With similar reasoning, if there is no LF raising to Spec of Agro, ECM construction that involves Appositive ACD as in (33a) would be predicted to be ungrammatical. It would violate two things; first, it would violate Condition A since the ECM subject never raises to higher Spec of Agro at LF. Second, no proper antecedent VP would be copied into the elided VP for the same reason. As shown in (33a), however, the construction is not as bad as one would expect. Note that the marginal status of (33a) is not because Condition A is violated. Even without anaphora, the status is still marginal as shown in (33b):

(33) a. ??John proved two men, who Bill did as well, to have been at the scene of the crime during each other's trials
b. ??John proved two men, who Bill did as well, to have been at the scene of the crime during the criminal trials

Given that the status of (33) is not as degraded as the ungrammatical appositive ACD constructions (cf. (13b)), it seems that the marginal status of (33) is not because ellipsis is not allowed here. This suggests that there are some other factors responsible for the marginal status.

Even if we assume that somehow the object in (28a) raises to Spec of Agro at LF, we cannot account for the fact that raising to Spec of Agro is optional. Chomsky (1995) suggests that there is no A-movement reconstruction. Let us consider (34):

(34) a. Everyone seems [*t* not to be there yet] (everyone > not)
b. Everyone isn't there yet (everyone >< not)

(34b) shows that when ***everyone*** is in the subject position, the sentence has ambiguous readings. Unlike this, however, (34a) is unambiguous. It has only one reading where ***everyone*** has wider scope than the negation. The unambiguous sentence in (34a) suggests that there is no A-movement reconstruction. If the reconstruction of ***everyone*** to the embedded subject position were allowed, (34a) would be ambiguous.

The scope ambiguity in (35) suggests that raising to Spec of Agro is optional. If it were obligatory, we would expect (35) has only one reading where everyone has wide scope.

(35) I believe everyone not to have arrived yet (everyone >< not)

The optional raising to Spec of Agro cannot be accommodated by LF raising analysis, since under this analysis, raising to Spec of Agro is obligatory for Case checking reason.

In this section, we have seen that there is no LF raising to Spec of Agro. If there is no LF raising to Spec of Agro, then it follows that LF Copying is no longer a viable option for appositive ACD.

6 Conclusion

We have seen that PF deletion approach provides a better account of appositive ACD than LF Copying approach. Two LF Copying based analyses have been investigated and turn out to be implausible in accounting for appositive ACD. Instead, we argue that ellipsis takes place at PF, followed by PF lowering operation of the appositive ACD. This analysis in turn constitutes an argument for the overt NP raising to Spec of Agro analysis (Lasnik 1995, 1999a, in press), given that it crucially relying on the overt raising analysis. This analysis also provides an account of the claim of Fiengo and May (1992) and Lasnik (1995) that Pseudogapping is responsible for appositive ACD: The two seemingly different constructions are related phenomena in that they are both based on overt raising of NP to Spec of Agro. Given that there are contrasts between appositive ACD and restrictive ACD, it seems that restrictive ACD cannot be accounted for just by adopting the analysis proposed in this paper. However, this does not exclude the possibility that it can be accounted for by PF deletion. Rather, if the analysis of appositive ACD is on the right track and thus ellipsis involves PF deletion rather than LF Copying, it seems to be the case that restrictive ACD also involves PF deletion.

Notes

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[1] In this paper, expressions with bold letters indicate they are copied ones at LF.

[2] Throughout this paper. only the appositive ACD with negation or as *well* ate discussed, sincc without these, appositive ACD is always degraded. See Lasnik (1993) for some discussion.

[3] May (1991) also argues that definite NPs can undergo QR. However, he further notes that QR of definite NPs is not freely allowed. It is allowed only when the resulting LF is one of quantification. Given that there is no way of getting quantification in the case of appositive ACD, his analysis cannot be adopted here.

[4] It seems that appositive relatives are always outside of matrix clauses, no matter how many clauses are embedded the matrix clauses, as illustrated in (i):

(i) a. He, thinks that Max talked about ***Syntactic Structures.*** which John, liked
b. ??Every syntatician, thinks that Max talked about ***Syntactic Structures***, which he_i liked

[5] In this paper, expressions with strikethrough indicate that they are deleted ones at PF.

[6] The matrix verb further raises to VP1 at PF so that we can get the right word order (cf. Boeckx and Stjepanovič 2001). An alternative analysis is that the matrix verb raises to VP1 in the overt syntax, leaving its copy within VP2. This copy is identical with the verb in the appositive ACD. licensing ellipsis. See Lasnik (1999a) for related discussion.

[7] Needless to say, further research is required to investigate the PF-lowering operation in more detail.

[8] Note that in this paper, I am not assuming the segment theory of adjunction (cf. Reinhart 1976, 1981). Otherwise, the subject in (24) would c-command into the adjoined relative clause.

[9] As for the verb raising in the matrix clause to get the right word order, see fn. 6.

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A Constraint-Based Analysis of Reciprocals in German Sign Language

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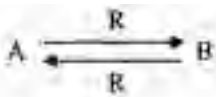
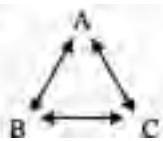
1 Introduction[1]

The term reciprocal denotes a semantic feature of linguistic expressions, which implies a mutual relation between several subjects and objects. The diagrams in (1) illustrate some typical reciprocal situations. The structurally most simple one is the situation with only two participants sketched in (1a), where R indicates the relation between the two participants. Therefore, in this particular situation, A has a certain relation with B and B has the same relation with A. In other words: each of the two participants A and B receives more than one thematic role from the verb (e.g. agent and patient).[2]

(1) a.



b.



Reciprocal constructions are of course not limited to situations with only two participants, which stand in a mirror-image relation to each other. Rather, it is also possible to encode situations with more. than two participants, in which every participant need not necessarily have a reciprocal relation with all other participants (Langendoen 1978, Lichtenberk 1985). Two of the conceivable relational patterns between three participants are illustrated in (1b). Obviously, things get much more complex when we consider situations with four or more participants. For the sake of simplicity, however, we restrict the following discussion to situations with only two participants.[3]

In section 2, we take a brief look at some of the properties of reciprocal constructions in spoken languages. Section 3 introduces how reciprocal situations are encoded in German Sign Language (DGS). We are going to show

that – depending on the verb type – there are four different strategies for encoding such situations in DGS. In section 4, we present a constrained-based analysis for the data and in the section 5 we summarize our main findings.

2 Reciprocal Constructions in Spoken Languages

In spoken languages, the reciprocal marker (RM) may have different characteristics in that it may either be of a nominal or verbal nature. Reciprocal markers of the nominal type show characteristics of nouns or pronouns, while verbal markers are part of the morphology associated with the verb.

Let us first have a look at reciprocal markers of the nominal type. German and English RMs, for instance, belong to this group; these markers function as noun phrases and take either the position of the direct (2ac) or indirect object (2b). The nominal character of this element is particularly obvious in a number of African languages, in which nouns like 'body' or 'relative' may function as a RM. In Lele, an Eastern Tchadic language, for example, the noun *kús* 'body' plus possessive suffix is used to mark the reciprocal relation (cf. (2d) from Frajzyngier (1999:188)).

(2) a. [Die Frau und der Mann]$_i$ kratzen **einander$_i$/sich$_i$**.
The woman and the man scratch **each.other**

b. [Die **Brieffreunde**]$_i$ schicken **einander$_i$/sich$_i$** Briefe zu
the **penpals** send **each.other** letters PART

c. [The cat and the dog]$_i$ chase each **other$_i$/one another$_i$**

d. **Ngù$_i$** **gól-é** **kūsū-ngū$_i$** wàydn gh
2.PL see-NOM body-2.PL.POSS tomorrow Q
'Will you see each other tomorrow?'

The indices in the examples in (2) indicate that nominal RMs are necessarily coindexed, i.e. coreferent, with another noun phrase in the same sentence, since RMs – just like reflexive markers – are anaphoric elements. According to principle A of Chomsky's binding theory, they must be bound by a c-commanding antecedent within their governing category (Chomsky 1981:188).[4]

Reciprocal markers of the verbal type are also very common in the world's languages. The examples in (3) illustrate this point. In Turkish, for example, the harmonizing suffix *-(I)š*, which attaches to the verb stem gives rise to a reciprocal interpretation, as example (3b) illustrates.

(3) a. Çocuk-lar öğretmen-i selâmla-dı-lar
child-PL teacher-ACC greet-PAST-3.PL
'The children greeted the teacher.'

b. Çocuk-lar selâmla-š-tı-lar
children-PL greet-REC-PAST-3.PL
'The children greeted each other.'

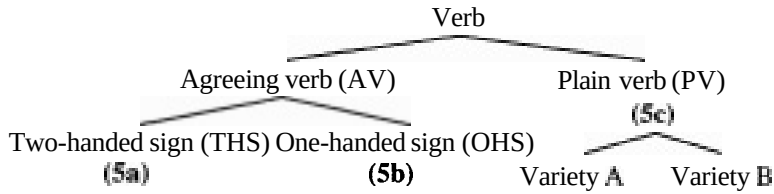
Interestingly, even in a language that has a RM, reciprocal situations need not always be encoded by that marker. Typically, this is the case, when the relation in this particular situation is necessarily or saliently a reciprocal one (cf. Lichtenberk 1985). On the basis of pragmatic world knowledge, a sentence like ***Andre Agassi and Steffi Graf married*** will most probably be interpreted as a reciprocal one even without an overt RM. In contrast to that, a reciprocal reading does not suggest itself for ***Prince Charles and Andre Agassi married.*** Obviously, the verb ***marry*** optionally allows for a reciprocal interpretation even without an overt RM. Likewise, the English verb ***meet*** may be used without an overt RM, as in ***Peter and Susan met.*** In this case, however, zero-marking obligatorily triggers a reciprocal interpretation (for details cf. Dowty 1991:583ff).

3 Reciprocal Constructions in DGS

Let us now consider how the reciprocal function is encoded in DGS. Crucially, in DGS there isn't just one marker – be it a NP or a verbal affix – which is used throughout when it comes to encode a reciprocal situation. Rather, there are different strategies, which depend on the verb type.

It is a well-known fact that verbs in sign languages do not behave uniformly with respect to certain grammatical processes. Most importantly, a distinction has to be made between verbs that agree with their subject and/or object by means of spatial modification of the sign (so-called agreeing verbs) and verbs that do not inflect for agreement features at all (so-called plain verbs). This distinction will turn out to be crucial for reciprocal marking in DGS. Moreover, the realization of reciprocal marking with agreeing verbs also depends on the phonological form of the verb, i.e. on the phonological feature [± two-handed sign]. Last but not least, note that reciprocal marking of plain verbs comes in two (possibly dialectal) varieties. The structure in (4) gives an overview over the different verb types that shall play a role in the following discussion.

(4)



The verb HELFEN 'to help' in (5a) is a two-handed agreeing verb. Both hands move from the position of the subject (as introduced by the pointing sign P_x) towards the position of the direct object (as introduced by P_y). With the one-handed agreeing verb GEBEN 'to give' in (5b), it is only the dominant hand that moves from x to y. In contrast to this, VERTRAUEN 'to trust' in (5c) is a two-handed plain verb. Both hands move but the beginning and end point of the movement are not determined by agreement features but are lexically fixed.'

(5) a. ARZT P_x MANN P_y $_x$HELF$_y$
doctor index man index AGR.S-help-AGR.O
'The doctor is helping the man.'

b. MANN P, FRAU P_y BLUME $_x$GEB$_y$
man index woman index flower AGR.S-give-AGR.O
'The man is giving a flower to the woman.'

c. MANN (P,) ARZT (P_y) $_1$VERTRAU$_2$
man (index) doctor (index) trust
'The man trusts the doctor.'

The four verb-specific options of reciprocal marking in DGS we are going to present are (a) conversion, (b) conversion and feature copy onto the non-dominant hand, (c) zero-marking, and (d) insertion of an overt agreement marker.

3.1 Two-handed agreeing verbs: Movement conversion

Let us first look at two-handed agreement verbs (AVs). In their reciprocal use, the crucial change imposed on two-handed AVs is conversion of path movement and/or orientation. The example in (6) illustrates this point (REC stands for reciprocal).

(6) $_x$WIR_BEIDE$_y$ [$_x$HELF$_y$HELF$_x$]
we.two help-REC
'We are helping each other.'

For the verb HELFEN 'to help', we observe a conversion realized in a movement sequence: in (6) both hands move from point x (proximal to the signer's body) to point y (distal to the signer's body) and then back to point x. Obviously, exactly those features are conversed that are responsible for the realization of agreement.

In two-handed signs, the second (non-dominant) hand is either a coarticulator (as with HELFEN) or a place of articulation (e.g. FAXEN 'to fax'). In the first case, both hands are affected by the conversion in exactly the same way; in the latter case, it is only the moving (dominant) hand that is affected.

3.2 One-handed agreeing verbs: Conversion and H2-copy

If one-handed agreeing verbs like, for instance, GEBEN 'to give' derived their reciprocal form by means of conversion just like the two-handed agreement verbs, then the surface form in (7) with converse movement of the dominant hand in a sequence should be fully grammatical. This, however, is not the case.

(7) * $_x$WIR_BEIDE$_y$ BLUME++ [$_x$GEB$_y$GEB$_x$]
we.two flower-PL give-REC
'We are giving flowers to each other.'

Obviously, with one-handed AVs, the movement is not converted in a sequence. Rather, the converse movement is realized simultaneously by the non-dominant hand (H2) onto which the handshape features of the dominant hand have been copied. That is, the dominant hand moves from x to y, while H2 simultaneously performs a converse movement from y to x. This strategy is exemplified by the example in (8).

(8) WIR_BEIDE BLUME++ [$_x^y$GEB$_y^x$]
we.two flower-PL give-REC
'We are giving flowers to each other.'

With two-handed agreeing verbs like HELFEN in (6), however, simultaneous execution of the converse movement with H2 leads to ungrammaticality. For these verbs, the second hand is already lexically specified and is therefore not available for movement conversion. This is illustrated in (9).

(9) * $_x$WIR_BEIDE$_y$ [$_x^y$HELF$_y^x$]
we.two help-REC
'We are helping each other.'

In sum, we have seen that in reciprocal marking, conversion is the crucial phonological change imposed on all AVs in DGS. Execution of the conversion with H2, however, is possible (and obligatory) only with one-handed AVs.

3.3 Plain verbs I: Zero-marking

For plain verbs, we get diverging grammaticality judgments from our informants. On the one hand, this looks like an unpleasant situation, on the other hand, however, it is quite interesting to see that there is uniformity within this diversity. In other words: For exactly those verbs for which one informant chooses one strategy, the other informants consistently choose the other strategy. It is not the case, that one and the same informant chooses the one strategy with some plain verbs and the other strategy with other plain verbs. We therefore assume that we are dealing with two different varieties here.

Plain verbs like e.g. VERTRAUEN 'to trust' are characterized by the fact that movement and orientation features are lexically specified. From this it follows that for such verbs, conversion of these features is not an option.

Let us first have a look at the (morphologically) more simple option, which, in the following, shall be called 'variety A'. In this variety, the reciprocal marking is established by dropping the object DP, so that – in spite of the use of a transitive (two-place) verb – a seemingly intransitive sentence surfaces. This way of encoding a reciprocal situation is observed for two-handed signs as well as for one-handed signs. The verb used in (10) is a two-handed plain verb.

(10) $_{x}$WIR_BEIDE$_{y}$ $_{1}$VERTRAU$_{2}$
we.two trust
'We trust each other.'

As shown above, reciprocal marking by means of object drop is also possible for a small number of English verbs (e.g. we met, we kissed, etc.). The DGS variety A, however, is different from English in that the zero-marking option in this variety is not semantically but rather sublexically triggered.

3.4 Plain verbs II: Overt agreement marker

A reciprocal interpretation of intransitive sentences with transitive predicates (as in (10)) is not available for speakers of variety B. Rather, they rely on a strategy which involves an overt marker, namely PAM (Person Agreement Marker, cf. Rathmann 2001). In very much the same way as agreeing verbs, PAM is capable of encoding the reciprocal function by means of conversion; it therefore surfaces as $_{x}$PAM$_{y}$PAM$_{x}$, as is illustrated by the example in (11).[6]

(11) $_{x}$WIR_BEIDE$_{y}$ $_{1}$VERTRAU$_{1}^{2}$ $_{x}$PAM$_{y}$PAM$_{x}$
we.two trust PAM-REC
'We trust each other'

So far, we have shown that the realization of reciprocal marking in DGS crucially depends on phonological and morphosyntactic properties of the underlying verb. With all agreement verbs, we observe conversion. This conversion is realized sequentially with two-handed verbs and simultaneously with one-handed verbs. Conversion is also observed with plain verbs in variety B. For these, however, the conversion is realized by the newly introduced marker PAM. In contrast to that, conversion plays no role for plain verbs in variety A. In this variety, the reciprocal function is encoded by zero-marking. The basic facts are summarized in the following table.'

Agreement verb		**Plain verb**	
Two-handed sign	One-handed sign	Variety B	Variety A
Conversion			**No Conversion**

4 A Constraint-Based Analysis for Reciprocals in DGS

We assume that the conversion observed with all agreeing verbs and with plain verbs in variety B is triggered by the morphological feature [+ rec], which is added to the base verb by a lexical rule of reciprocal marking. On the one hand, this feature changes the semantics; on the other hand, it may also change the morphophonological form of the verb it is added to.

In this section, we are going to propose an optimality-theoretic account of reciprocal marking in DGS.[8] We are going to argue that the morphophonological form of the corresponding output is determined by a number of constraints, which are all independently motivated. We will show how the restrictions on reciprocal marking in DGS discussed in the previous section can be accounted for by the interaction of four very basic constraints.[9]

The central constraint of reciprocal marking in DGS is PARSE, which forces conversion in the output.

(12) PARSE: Every feature present in the input must be realized in the output.

In DGS, a lexical rule of reciprocal marking adds a lexical feature [+ rec], which triggers conversion. [+ rec] is thus part of the input and PARSE requires it to be realized in the corresponding output. PARSE is crucial for the derivation of all agreeing verbs and of plain verbs in variety B, all of which involve conversion.

By contrast, it does not apply to plain verbs in variety A, which do not involve conversion (cf. the table above).

Another well-known constraint is FAITH, which requires that all features that are lexically specified in the input may not be changed in the derivation. That is, a lexical rule may add new features to a lexical item or specify lexically underspecified features of this item, but it may not change features, which are intrinsically specified.

(13) FAITH: Features specified in the input, may not be changed.

FAITH accounts for two properties of reciprocal marking in DGS. First, it excludes conversion with plain verbs. As opposed to agreeing verbs, the beginning and end point of plain verbs are not determined by subject/object agreement, but are lexically specified. Consider again the two-handed plain verb VERTRAUEN 'to trust' in (10). In this example, both hands perform a short symmetrical forward movement from the sides of the forehead towards the center of the signing space. Both the beginning (index 1) and the end point (index 2) of the movement are intrinsic lexical properties of this plain verb. To allow for conversion of the verb sign, these points would have to be replaced by variables. According to FAITH, however, these points may not be changed by lexical or syntactic rules and therefore, conversion (as in (14)) is correctly excluded.

(14) *$_{x}$WIR_BEIDE$_{y}$ [$_{x}$'VERTRAU$_{y}$/'VERTRAU$_{x}$']
we.two trust-REC

By contrast, the beginning and the end point of agreeing verbs are not specified in the lexicon. Rather, they are occupied by two variables, which have to be coindexed with the subject and object, respectively. Consider again the two-handed agreeing verb HELFEN 'to help' in (6). Both hands execute a parallel movement from the position of the subject (x) to the position of the object (y), both of which are determined by the spell-out of phi-features. Thus, the lexical entry of agreeing verbs, unlike that of plain verbs, always contains two variables, and it is exactly this property, which permits conversion of the movement path.

Secondly, FAITH also explains why with two-handed agreeing verbs, the conversion of path movement cannot be simultaneously executed by H2. In contrast to their one-handed counterparts, two-handed agreeing verbs lexically specify both hands for movement and orientation features. Therefore, the simultaneous execution of the conversion triggered by the [+ rec]-feature with H2 would once again violate FAITH. In sum, FAITH accounts for the realization of reciprocal marking with two-handed agreeing verbs and with plain verbs in variety A.

The third constraint we wish to introduce is called *MOVE. It excludes additional movements, which are not part of the lexical entry of the verb.

(15) *MOVE: Sequential movements must not be added to the input.

Intuitively, *MOVE restricts the linear complexity of signs. It is only violated when sequential movements are added to the whole sign. Additional sequential movements make signs exceptionally long. In contrast, simultaneous movements do not extend the average length of a sign. Recall from section 3.2 that one-handed agreeing verbs like GEBEN 'to give' in (8) permit the simultaneous execution of the conversion by H2. The reciprocal form of GEBEN, however, is as long (i.e. has as many syllables) as simple non-reciprocal GEBEN. According to our definition of *MOVE in (15), the additional movement introduced by [+ rec] does not violate *MOVE because it is executed simultaneously. By contrast, the reciprocal marking with two-handed agreeing verbs always violates *MOVE, since the conversion of the movement is executed sequentially. We must therefore assume that *MOVE is always outranked by PARSE, which forces the realization of the input feature [+ rec].[10] This ranking triggers sequential conversion with two-handed agreeing verbs like HELFEN 'to help' in (6). FAITH, on the other hand, must be ranked higher than PARSE in order to prevent plain verbs from undergoing conversion. Consequently, the ranking of these three constraints is as given in (16).

(16) FAITH >> PARSE >> *MOVE

The (preliminary) ranking in (16) accounts for the reciprocal form of all kinds of agreeing verbs (one- and two-handed) as well as for the reciprocal form of plain verbs in variety A. The derivation of two-handed agreeing verbs is illustrated in tableau 1 below. The successful output candidate in line 1, i.e. the candidate which involves an additional sequential path movement of both hands, does neither violate FAITH nor PARSE, because both the beginning and end point of the movement path are not lexically specified and conversion is part of the output, as required. The additional (converse) movement path of this candidate only violates *MOVE, which, however, is ranked very low. All the other candidates violate one constraint, which is ranked higher than *MOVE. As a consequence, the violation of *MOVE does not influence the grammaticality of the first candidate.

$_{x}$HELF$_{y}$ + [+ rec]	FAITH	PARSE	*MOVE
☞ $_{x}$HELF$_{y}$ $_{y}$HELF$_{x}$			*
$_{x}$HELF$_{y}$	*!		
$_{x}$HELF$_{y}$		*!	

$_x$[1]HELF$_x$ $_y$[2]HELF$_y$	*!		*

Tableau 1: Two-hand agreement verbs (variety A and B)

As opposed to two-handed agreeing verbs, their one-handed counterparts permit simultaneous execution of the conversion, because for them, only one hand is lexically specified in the input. Therefore, the lexically unspecified **non-**dominant hand can take over the conversion of the movement without violating FAITH. Neither does this simultaneous second movement path violate *MOVE, because this constraint is defined relative to sequential movements. Consequently, the output in the second line of tableau 2 is the optimal candidate.

$_x$GEB$_x$ + [+ rec]	FAITH	PARSE	*MOVE
$_x$GEB$_y$GEB$_x$			*!
☞ $_x$[2]GEB$_y$ $_y$[1]			
$_x$GEB$_y$		*!	
$_x$[2]GEB$_y$ $_y$[1]GEB$_x$[2]			*!

Tableau 2: One-hand agreement verbs (variety A and B)

In variety A, plain verbs do not permit conversion. Recall that conversion is impossible without replacing the lexically specified beginning and end point of the movement path by variables. This replacement, however, would lead to a violation of FAITH. Therefore, for this group of verbs, conversion always violates FAITH, which outranks both PARSE and *MOVE. The only option for reciprocal marking of plain verbs in variety A is therefore zero-marking, which only involves a violation of PARSE.

$_x$[1]VERTRAU$_y$[2] + [+ rec]	FAITH	PARSE	*MOVE
$_x$[2]VERTRAU$_y$[1]VERTRAU$_x$[2]	*!		*
$_x$[2]VERTRAU$_y$[1]	*!*		
☞ $_x$[1]VERTRAU$_y$[2]		*	
$_x$[2]VERTRAU$_y$[1]VERTRAU$_x$[2]	*!*		*

Tableau 3: Plain verbs (variety A)

So far, our analysis accounts for reciprocal marking of agreeing verbs as well as for reciprocal marking of plain verbs in variety A. However, it cannot explain the observed difference between variety A and B without modification. We have seen that with plain verbs, variety B uses a completely different strategy for encoding the reciprocal function. Instead of zero-marking, it makes use of an additional reciprocal marker, the functional morpheme PAM. Just like agreeing verbs, this functional element contains variables that are spelled out according to agreement features. Thus, it has the relevant sublexical properties that allow for

conversion. This, however, leads to a problem. It turns out that reciprocal marking with PAM is actually more optimal than reciprocal marking without PAM, because the insertion of PAM prevents a violation of PARSE, which is ranked higher than *MOVE. Therefore, zero-marking is expected to be ungrammatical in principle and no variation should arise.

In order to derive the observed variation we need to introduce another constraint, which regulates the insertion of additional lexical material. We call this constraint *INS-LEX.

(17) ***INS-LEX:** Avoid the insertion of additional lexical material

*INS-LEX, like *MOVE, prevents the insertion of additional lexical information which is not part of the input. The observed variation can be accounted for in a straightforward way when we assume a different ranking of this constraint in both varieties. In variety B, *INS-LEX is ranked between PARSE and *MOVE. Hence, the grammatical output in line 4 of tableau 4 can be correctly derived.

$_1$[VERTRAU$_2$]^2 + [+ rec]	FAITH	PARSE	*INS-LEX	*MOVE
$_2$[VERTRAU$_3$ VERTRAU$_3$]$_2$	*!			*
$_2$[VERTRAU$_3$]$_2$	*!*			
$_1$[VERTRAU$_2$]^2		*!		
☞ $_1$[VERTRAU$_2$]^2 $_2$[PAM $_3$PAM$_3$]$_2$			*	**
$_2$[VERTRAU$_3$ VERTRAU$_3$]$_2$	*!*			*

Tableau 4: Plain verbs (variety B)

In contrast to that, in variety A, *INS-LEX is ranked higher than PARSE. Therefore, PAM insertion, which violates *INS-LEX, is correctly excluded for this variety and the competing output form involving zero-marking is the successful candidate. Hence, the observed differences between variety A and B can be attributed to a reranking of the constraints PARSE and *INS-LEX.

$_1$[VERTRAU$_2$]^2 + [+ rec]	FAITH	*INS-LEX	PARSE	*MOVE
$_2$[VERTRAU$_3$ VERTRAU$_3$]$_2$	*!			*
$_2$[VERTRAU$_3$]$_2$	*!*			
☞ $_1$[VERTRAU$_2$]^2			*	
$_1$[VERTRAU$_2$]^2 $_2$[PAM $_3$PAM$_3$]$_2$		*!		**
$_2$[VERTRAU$_3$ VERTRAU$_3$]$_2$	*!*			*

Tableau 5: Plain verbs (variety A)

Please note that *INS-LEX does not influence the derivation of one-handed and two-handed agreeing verbs (as sketched in tableaus 1 and 2). because *INS-LEX

is ranked higher than *MOVE in both varieties. Therefore, PAM insertion always yields a less optimal candidate for agreeing verbs.

5 Conclusion

Depending on the verb type and the variety, there are four ways of encoding the reciprocal function in DGS. With agreeing verbs, we observe conversion of movement and/or orientation features. This conversion is realized sequentially with two-handed agreeing verbs, but simultaneously with the non-dominant hand with one-handed agreement verbs. For plain verbs conversion is not an option, since movement and orientation features of plain verbs are specified in their lexical representation. For plain verbs, we either observe zero-marking (variety A) or insertion of the functional morpheme ‚PAM‚ (variety B). In the latter case, conversion applies to this newly introduced element.

We have argued that for all agreeing verbs, the reciprocal marker is an element associated with the verbal morphology. For plain verbs in variety B, the reciprocal marker is associated with the verbal affix ‚PAM‚.

Furthermore, we have shown that the observed variation can be accounted for in a straightforward way within Optimality Theory. In particular, all forms of reciprocal marking in DGS can be derived by the interaction of only four, independently motivated constraints. These constraints account for the difference between agreeing and plain verbs on the one hand and one-handed and two-handed agreeing verbs on the other hand. In addition, the reranking of PARSE and *INS-LEX correctly derives the difference observed for plain verbs in the two varieties. The rankings of the relevant constraints in variety A and B are given in (18).

(18) a. variety A: FAITH >> *INS-LEX >> PARSE >> *MOVE
b. variety B: FAITH >> PARSE >> *INS-LEX >> *MOVE

Notes

[1] We are very much indebted to our DGS informants Daniela Happ, Andrea Kaiser. Elke Steinbach. and Jutta Warmers; without their help this research would not have been possible. Moreover. we would like to thank Anne Baker. Hans den Besten, Gereon Müller, Ralf Vogel, and Inge Zwitserlood for their comments on an earlier version of this paper.

[2] For the semantics of reciprocal expressions see Fiengo & Lasnik (1973), Dougherty (1974), Langendoen (1978). and Dalrymple et al. (1998).

[3] DGS draws a morphological distinction between reciprocal situations with two participants and situations with more than two participants. Note, that a similar distinction between dual and plural reciprocals is made in some spoken languages, such as French and Estonian (Schellinger 2001).

[4] The German example (2a) illustrates that occasionally. reflexive pronouns may also serve a reciprocal function. Therefore, the sentence ***Die Frau und der Mann krarzen sich*** in (2a) is ambiguous between a reciprocal and a reflexive reading. This kind of polysemy is observed in many spoken languages (cf. e.g. Heine 1999 and McGregor 1999).

In Chomsky's binding theory, reflexive and reciprocal pronouns are treated alike; this however, gives rise to a number of problems (cf. Lebeaux 1983 and Everaert 1999).

[5] Please note the following notational convention: Subscripts and superscripts indicate points in the signing space. Small letters represent variables, i.e. points in the signing space, which are spelled out according to agreement features, while small numbers represent beginning and end points of movements which are invariable, i.e. lexically fixed. Whenever a verb sign is given with subscripts and superscripts, we are dealing with a two-handed sign in which both hands move; in this case. both lines have to be read separately. Therefore, in (5a), both hands move from position x (the location introduced for ARZT) to position y (the location introduced for MANN). In (5c), both hands perform a symmetrical movement from the (lexically specified) position 1 (the sides of the forehead) to position 2 (a central position in the signing space in front of the signer).

[6] Please note that in DGS. PAM is not only used as a reciprocal marker. It also finds use in certain nominalizations, as an agreement marker in copula constructions with adjectival predicates, and for narrow focus on the object of some agreeing verbs.

[7] To complete the picture, we would like to point out that there are five verbs for which all of our informants came to the assessment that they encode a reciprocal situation by means of zero marking. All of these verbs are two-handed signs which express an inherent reciprocal action, namely TREFFEN 'to meet', GRATULIEREN 'to congratulate', UMARMEN 'to embrace'. STREITEN 'to argue'. und DISKUTIEREN 'to discuss'. Interestingly, there is considerable overlap between these verbs and the before mentioned English verbs which are also capable of encoding reciprocal situations by zero-marking.

[8] A rule-based account (as proposed in Pfau & Steinbach 2001) would force us to postulate at least three rules, the application of which depends on specific properties of the input: one rule triggering movement conversion, one copying features onto H2, and one inserting PAM.

[9] Up to now, only few OT-analyses of aspects of sign language grammar have been proposed: weak hand drop (Brentari 1998), articulatory restrictions on the realization of agreement (Mathur & Rathmann 2001), restrictions on two-handed signs (Sasaki 2000).

[10] Note that in DGS, repetition of movements is also observed with nominal plurals (as, for example, BLUME++ in (7) and (8) above) and with verbal aspectual marking. All of these additional movements violate *MOVE.

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On the Grammaticalization of Italian Clitic Pronouns

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1 Introduction

This paper reviews the process of grammaticalization of Italian clitic pronouns. First, in section 2, 1 introduce the clitic pronouns found in Modern Standard Italian (MSI) and their distribution. Next, in section 3, I compare the synchronic clitic system, both in terms of shape of the clitics and their placement, to that of Old Italian (mainly 13th century), pointing at the major differences between the two systems. In section 4 I provide a brief sketch of the grammaticalization stages the clitic pronouns underwent within the evolution of the Italian language follows. Finally, in section 5, I review some interesting tendencies in the process of grammaticalization found in contemporary Italian.

1.1 Grammaticalization

Before introducing MSI clitic system, I will provide a concise definition of the term grammaticalization. Briefly, the grammaticalization (or *de-syntacticization*) indicates a general diachronic process of morphosyntactic reanalysis, by which linguistic forms undergo a more or less substantial loss of syntactic independence accompanied by a concomitant increase of grammatical function. Ideally, grammaticalization starts off with a full lexical item that, through a combination of changes taking take place at different language levels, ends up becoming an affix.

2 MSI clitic pronouns

As shown in Table 1, which illustrates MSI clitic pronouns and their Latin sources, 1st and 2nd sg. clitics originate from personal pronouns; 3rd sg. and pl. come from different forms of the demonstrative ILLE; 1st plural derives from the adverbial HIC 'here' plus the presentative **ECCE,** and 2nd person **pl.** from the

adverbial IBI **'there'.** Notice that ci and vi are more recent forms, which replaced the earlier no (< NOS) and vo (< VOS).

TABLE I
Object clitic pronouns in MSI

Person	Direct object	Indirect object	Latin source
sg. 1	mi	mi (me)	ME
2	ti	***ti*** ***(te)***	TE
3	lo m., la f.	gli [ʎi] m., ***le*** f.	ILLU(M)
pl. 1	ci [tʃi]	ci (ce)	ECCE HIC
2	vi	***vi*** (ve)	IBI
3	***li*** m., ***le*** f.	***(gli)***	ILLU(M)

Other Italian clitics are 3rd sg. and pl. reflexive si (se), the partitive ne, and the locative ci, ***vi***, homonymous to 1'' and 2'' pl. direct/indirect person pronouns. Notice that the forms in parenthesis are allomorphs occurring in the environment of 'clitic doubling' (***pronomi doppi***), i.e. in case of co-occurrence of direct 3rd person and indirect pronouns. The 3rd pl. indirect object clitic gli also appears in parenthesis because its status is still to some extent controversial: although widely used in the spoken language (in both informal and formal registers), traditional grammars still ban its use and prescribe the tonic (non-clitic) form ***loro*** (< Lat. genitive pl. ILLORUM). as shown in (1).

(1) a. Carlo presta **loro il** libro

b. Carlo **gli** presta **il** libro
'Carlo lends them the book'

As for their placement, Italian clitic pronouns are obligatorily contiguous to a verb (host). As shown in (2), we have both proclisis, with clitics occurring immediately before their host in (2a); or enclisis, with the pronoun placed immediately after the verb in (2b).

(2) a. Lo compro
'I buy it'

b. Voglio **comprarlo**
'I want to buy it'

In case of enclisis, clitics become attached to their host also orthographically (prosodic attachment always holds). The following partial generalization can

then be made about the rules of clitic placement in MSI: a) proclisis occurs in the environment of finite verbs; b) enclisis is found with nonfinite verbal forms (i.e. infinitive, gerund, past participle and present participle in absolute constructions).

Such generalization, however, is only partial since complications arise in the imperative, for which we observe enclisis in case of the affirmative informal forms but proclisis with the formal (both affirmative and negative) forms. Also, both proclisis and enclisis are allowed with the negative informal imperative. Examples illustrating the distribution of clitic pronouns in MSI are given in Tables 2, 3, and 4, using the predicate ***comprare*** 'buy'.

TABLE 2
Proclisis in MSI: finite verbal forms

Present indicative (1st sg.)	***lo compro***	* ***comprolo***
Passato prossimo (1st sg.)	***l'ho comprato***	* ***ho compratolo***
Future (1st sg.)	***lo comprerò***	* ***comprerollo***
Imperfect indicative (1st sg.)	***lo compravo***	* ***compravolo***
Formal imperative (2nd sg.)	***lo compri!***	* ***comprilo!***

TABLE 3
Enclisis in MSI: non-finite verbal forms & informal imperative

Infinitive	***comprarlo***	* ***lo comprare***
Gerund	***comprandolo***	* ***lo comprando***
Past participle	***compratolo***	* ***lo comprato***
Informal imperative (2nd sg.)	***compralo!***	* ***lo compra!***
Informal imperative (1st pl.)	***compriamolo!***	* ***lo compriamo!***
Informal imperative (2nd pl.)	***compratelo!***	* ***lo comprate!***

TABLE 4
Proclisis & Enclisis in MSI: negative informal imperative

2nd singular	***non comprarlo!***	***non lo comprare!***
1st plural	***non compriamolo!***	***non lo compriamo!***
2nd plural	***non compratelo!***	***non lo comprate!***

Notice that the alternation shown in Table 4 is not found in the formal negative imperative nor does it apply to the infinitive, although Italian 2nd sg. imperative

is actually rendered by the infinitive form of the verb preceded by the negative particle non.

Hence, the main constraint to MSI clitic placement appears to be of morphosyntactic nature, i.e. clitic placement seems to be governed by the distinction finite vs. non-finite host, although such generalization fails to account for the more complex (seemingly arbitrary) behavior of the negative informal imperative. which allows for both enclisis and proclisis.

3 Differences between OI and MSI clitic systems

The major constraint to clitic placement found in OI relates to clausal configuration, i.e. it is of syntactic/structural nature. Such constraint, best known as the Tobler-Mussafia Law, indicates that clitic pronouns were banned after a surface clause boundary. In other words, clitics could not occur in clause initial position in OI and enclisis was obligatory at the beginning of a clause, regardless of the morphosyntactic nature of the host. Two other crucial differences between Old and Modern Italian with respect to clitic placements are a) greater number of enclitic constructions is found with finite verbal forms, b) occurrence of proclisis in the environment of affirmative imperatives. Common to both Old (at least 13th century) and Modern Italian, on the other hand, is the obligatoriness of enclisis with non-finite verbs. Examples illustrating OI clitic placements are given in (3) below.

(3) a. el greco la prese, e **miselasi** (= se la mise) in pugno (Novellino. 13th century)
'the Greek it f. took and put it f. refl. in (his) fist'

b. **Menàronlo** (= lo menarono) (ibid.)
'(They) lead him'

The examples in (4) indicate that the Tobler-Mussafia Law had already weakened as early as 13th century, at least in main clauses found in second position within the sentence, e.g. in matrixes following subordinates and after prostases of 'if-clauses' (cf. Maiden 1995; Wanner 1981).

(4) a. Papirio veggendo la voluntà della madre, **si** pensb una bella bugia
'Papirio, seeing the wish of (his) mother, thought refl. a good lie'

b. se tanto scendi, **gli** (= li) potrai vedere
'if much (you) descend, them you will be able to see'

Summarizing, the syntactic constraints governing clitic placement are somehow instable already in 14th century Italian and the most violated of such constraints seems to be the ban on proclisis with clause-initial verbs in the environment of matrixes following their subordinates.

During the 15th and 16th century, the distribution of clitics advances further in the process of loosening from the syntactic constraints comprised in the Tobler-Mussafia Law. More precisely, proclisis becomes the norm with negative infinitives (but with no other non-finite forms), whereas enclisis only had so far occurred in this environment (see Machiavelli's ***Principe).*** Enclisis, then, becomes more and more restricted to the same environments in which it is found in MI, i.e. non-finite verbs and imperative. Such restriction in the occurrence of enclisis can be due to the fact that both non-finite verbs (in absolute constructions) and imperatives most frequently tend to occur in clause initial position. By the 16th century, the Tobler-Mussafia Law had lost most of its power and, except in the extremely conservative Old Florentine dialect, the morphosyntactic shape of the host has become the prominent factor determining the placement of clitic object pronouns. Of course, enclisis with finite verbs did not disappear abruptly. On the contrary, it continued to survive in the language at least until the 19th century, although it gradually became less and less common and restricted to written, literary and specialized (mainly bureaucratic) registers. Remnants of enclisis with finite predicates can still be found in MSI in impersonal constructions such as ***vendesi*** **(= *si vende*)** 'for sale', ***affittasi*** **(= *si affitta*)** 'for rent', etc., which however might be better regarded as instances of lexicalization.

4 Grammaticalization of Italian clitics

Analysis of 13th century texts indicates that the process of grammaticalization of Italian clitics had already reached a quite advanced phase since by this time they had practically acquired their present phonetic shape. The initial stages of the process are mostly unattested since the very few pre-thirteen century Italian texts are characterized by the same clitic system found in later documents. Reconstruction of such earliest stages is quite difficult because Late Latin texts show only minimal deviation from the pronominal system of Classical Latin, most likely as a result of the high degree of purism practiced by medieval writers and copyists (see Wanner 1981 for a detailed account).

Based on the phonetic shape clitics had reached by the 17th century and the changes in their rules of placement, the following grammaticalization stages can be identified:

a) ***Phonetic erosion*** (or ***condensation*** in Lehmann's (1985) terminology), which has affected to the highest degree 3rd person pronouns as well as 1st pl. and locative ***ci*** (< Lat. ILLŬ(M) and ECCE HIC respectively.)

b) ***Paradigmatization***: the clitic pronouns have been arranged in a paradigm characterized by the replacement of the original 1'' and 2'' pl. ***no*** and ***vo*** with the locative adverbial pronouns ***ci*** and ***vi,*** possibly as consequence of analogical leveling triggered by the singular correspondent forms ***mi*** and ***ti***

c) ***Coalescence,*** i.e. loss of autonomy: the pronouns are no longer independent lexical items and have become dependent on a host (verb); in case of enclisis, the final stage of affixation has been reached since orthographical attachment of the clitic to its host is obligatory

d) ***Fixation:*** enclisis and proclisis are no longer in free variation with finite predicates; the order of occurrence of the pronoun has become fixed. Fixation has also taken place at the level of the ordering direct and indirect pronoun sequences since, as shown in (5), in OI direct + indirect and indirect + direct were both equally acceptable orders whereas in MI only the latter is allowed:

(5) a. OI dicerolti (= dicerb **lo** ti) & **te lo** dirb

b. MI **te lo** dirb vs. * **lo ti** dirb
'I will tell you'

e) ***Extensive neutralization*** (semantic ***bleaching)*** of the direct vs. indirect object distinction, which is maintained only in the 3rd person. Gender neutralization can also be noticed in the 3rd singular indirect object in case of ***pronomi doppi*** ('clitic doubling'), so that ***glielo dico*** stands for 'I say it to him/her'.

As we will see in the next section (§ 5), semantic bleaching represents a significant development in more recent stages of the grammaticalization of Italian clitics.

5 New developments in the grammaticalization of Italian clitics

5.1 Gender and number neutralization in 3rd person

An increase in semantic ***bleaching*** can be noticed in the 3rd sg. indirect object clitic, since in MSI (definitely at the spoken level but also more and more extensively in written (informal) registers), neutralization of the gender

distinction has taken place in favor of the masculine form *gli.* with the feminine *le* surviving only in (very) carefullformal speech when speakers want to maintain a higher (if not pedantic!) standard. Neutralization of the number distinction has also occurred to quite some extent since *gli* is increasingly used in place of non-clitic 3rd pl. indirect object *loro,* which actually surfaces even more sporadically than 3rd sg. f. ***le*** and is considered a sign of affectation by many (most I would say) speakers. Extension of *gli* to the oblique 3rd pl. implies elimination from the clitic paradigm of the only non-clitic forms therefore it represents a significant advancement in the process of grammaticalization. In case of 'clitic doubling', the gender distinction formally disappeared a long time ago at all registers (it is already present in Dante), and is accompanied by orthographical fusion of the two pronouns: ***glielo*** *do* stands for both '(I) give it to **him/to** her' and has no gender specification *per se* with respect to the **recipient/benefactor.** Number differentiation has also practically disappeared in the contexct of 'clitic doubling' so it would be more accurate to state that ***glielo*** *do* can indeed mean '(I) give it to **him/her/them'.**

An interesting development linked to the process of simplification operating at the level of indirect object clitics just illustrated is the replacement of *gli, le,* and *loro* by 1st pl. ci, as we see in (6).

(6) Compraci **il** libro!
'Buy **us/him/her/them** the book!'

This phenomenon has often been restricted to *italiano popolare* (substandard language) (Harris-Vincent 1990, among others). In my opinion of native speaker, it is more correct to view the use of *ci* as 3rd person indirect pronoun as a general tendency of spoken informal (familiar) Italian, which may appear stronger in central and southern regions but is definitely not restricted to lower **and/or** dialectal registers nor does show signs of decline, as indicated by the examples in (7), taken from actual conversations registered in a family whose members could not be considered speakers of *italiano popolare* (see Berretta *(1985)* for an interesting analysis of regional differences with respect to this issue).

(7) a. Non dai neanche un bacetto **al** nonno? E daccelo (= **daglielo**), **sù!**
'Won't you give a little kiss to grandpa? Give him one, come on!'

b. **Perchè** non provi a **parlarle tu?-** No, io non ci (= le) **parlo** proprio!
'Why don't you try to talk to her? No, I won't talk to her at all!'

Traditional (prescriptive) grammar allows the use of ***ci*** as 3rd person indirect clitic for oblique objects other than true datives as well as for inanimate datives. Trying to establish whether and to what extent this fact that may have a role in

the extension of ***ci*** to animate datives goes beyond the scope of this paper but it is certainly an issue worth investigating.

5.2 **Grammaticalization** of *ne*

A quite advanced stage of grammaticalization has been reached also by the (partitive) clitic ***ne***. Sala-Gallina (1996) offers a nice overview of the status of this clitic in MI, pointing out how ***ne*** is better interpreted as a *marca flessionale*, i.e. it is an affix rather than a clitic pronoun. As shown in (8) below, with a number of predicates such as *fregarsene/infischiarsene* 'not care about', ***aveme abbastanza, non poteme più*** 'be tired oflannoyed by', ***ne*** has become obligatory even when the object of the predicate is expressed overtly.

(8) a. Me ne infischio di te (vs. * Mi infischio di te)
'I do not care about you'

b. Non ne posso più di te (vs. * Non posso più di te)
'I am tired of you'

Clearly, both in (8a) and (8b) ***ne*** no longer has a partitive meaning; nor does it have anaphoric function as indicated by the obligatoriness of an overt (PP) complement (e.g. di ***te***). Rather, ***ne*** has become a suffix/marker that confers idiomatic value to specific verbs, as illustrated by the contrast between (9a) and (9b).

(9) a. Hai abbastanza soldi? Si, ne ho abbastanza/*di soldi
'Do you have enough money? Yes, of them I have enough'

b. Ne ho abbastanza di te! (vs. *Ho abbastanza di te!)
'I am tired of you/I cannot stand you any longer'

We see that in (9a) ***ne*** stands for the object of ***avere***, i.e. ***soldi*** (which must be omitted in order to obtain a pragmatically unmarked reading) and refers to (part of) an indefinitelunspecified quantity as the contrast in (10) clearly illustrates:

(10) a. Hai i soldi? Sì li ho
'Do you have the money? Yes, I have them'

b. Hai dei soldi? Si ne/* li ho
'Do you have some money? Yes. (I) have some'.

On the other hand, in (9b) ***ne*** obviously cannot be interpreted as a pleonastic clitic co-referent with the argument of the predicate, i.e. (di) ***te*** ' of you*;rather,

its function is to confer a new idiomatic connotation to the verb and therefore it is absolutely obligatory. In other words, lexicalization of ***ne*** (plus the adverb ***abbastanza)*** has taken place creating a separate predicate, ***averne abbastanza.***

However, in case of other verbs such as for instance ***saperne*** 'know about', ***intendersene, capirne*** 'be an expert/connoisseur of, complete grammaticalization has not been reached yet since although ***ne*** has somewhat lost in pragmatic function it has not become obligatory.

(11) a. Non so niente di quella storia

b. Non ne so niente di quella storia
'I don't know anything about that story'

The examples in (11) show that, contrarily to what indicated by (9b), omission of the clitic does not lead to ungrammaticality. On the other hand, it must be noticed that (11b) is usually no longer interpreted as a marked right-dislocated construction by native speakers. Also, (11a) is more often than not ascribed to overly formal (if not pedantic) written and/or spoken registers, with (11b) being considered as typical of the standard (spoken) language. Moreover, addition of the clitic adds to the predicate(s) a semantic ***nuance*** of personal involvement or special interest of the participants in the discourse, as shown by the examples in (12).

(12) a. Cosa sai di quella storia?

b. Cosa ne sai di quella storia?

c. Di quella storia, cosa ne sai?

d. ?/*Di quella storia, cosa sai?
'What do you know about that story?'

Of the constructions above, only (12c) is pragmatically marked, as supported by the questionable acceptability of (12d). As for (12b), the presence of the clitic might still be considered optional if we interpret *sapere* as meaning 'have information/knowledge about' but ***ne*** becomes obligatory if we want 'the predicate to acquire the more specific meaning of 'have information/knowledge about + involvement/implication in'. In case of *saperne* then we cannot speak of lexicalization of the clitic: even though considerable loss of both anaphoric and pragmatic features has occurred, ***ne*** cannot be analyzed as an affix because its omission does not result in ungrammaticality for some speakers in (highly) selected registers.

The scenario outlined by the examples with ***saper(ne)*** given in (12) is quite relevant since coexistence of different stages of a given structure and/or norm has indeed been identified as a typical feature of grammaticalization (cf. inter alia Heine et al. 1991; Hopper 1991).

5.3 Grammaticalization of locative *ci*

A process analogous to the one noticed for ***ne*** can be observed for the locative ***ci*** in verbs such ***entrarci*** 'be related to/involved in something', ***volercilmetterci*** 'take, intransitive', ***starci*** 'agree to do something', and others (cf. Berruto 1987, Sala-Gallina 1996). As indicated by the examples in (13), in these predicates ***ci*** functions quite similarly to the ***ne*** of ***infischiarsene, aveme abbastanza,*** etc: it has completely lost its locative reference (cf. ***Quando vai*** a ***Roma? Ci vado il mese prossimo*** 'When are you going to Rome? There I go next month') and has become obligatory even in pragmatically unmarked (non-dislocated) constructions. In other words, just like for ***ne,*** some instances of ***ci*** can be better analyzed as a verbal markerlaffix.

(13) a. *(Ci) vogliono venti minuti per andare a casa di Carlo
'It takes twenty minutes to go to Carlo's house'

b. Carlo non *(c')entra affatto in questa storia
'Carlo is not involved at all in this story'

In (13), omission of ***ci*** would result in ungrammaticality at any register level since a semantic relation no longer holds in MSI between the predicates ***volere, entrare, stare*** and their counterparts with ***ci,*** which, as the examples in (14) clearly show, have become completely separate lexical items:

(14) a. Carlo vuole andare a casa
'Carlo wants to go home'

b. Carlo non entrerebbe mai in quella casa!
'Carlo would never enter that house'

It has been claimed (Berruto 1985; Renzi 1989) that ***entrarci*** has in fact undergone a double process of complete grammaticalization since it has developed into the independent lexical entry ***centrarci,*** via speakers' association of an additional instance of the clitic ***ci*** to the predicate, so that a sentence like ***Carlo non ci centra*** 'Carlo is not involved' would be possible.
Similarly to what we noticed for ***ne,*** in some verbs ***ci*** does not appear to be fully grammaticalized. A good example of such predicates is ***averci*** ≤ ***avere*** 'have, own, possess'. Although still strongly condemned by purists, ***averci*** is extremely

widespread in spoken MSI and sentences like (15) can be said to represent the norm.

(15) a. Carlo c'ha due figli
'Carlo has two children'
b. Carlo c'aveva molti amici a Siena
'Carlo had many friends in Siena'

For the majority of Italian speakers, omission of ***ci*** in (15) does not rule out the sentence. However, omission of ***ci*** becomes (significantly) less acceptable in null-subject as well as in case of pronominalization of the object of ***avere,*** as shown in (16):

(16) a ?(C')hai le chiavi?
'Do you have the keys?'

b. No, non ?(ce) le ho
'No, I don't have them'

Grammaticalization of ***ci*** appears to have progressed noticeably among verbs of perception, such as ***sentirci*** '(be able to) hear', ***vederci*** '(be able to) see', etc. Also in this case, ***ci*** has completely lost its locative pronominal reference but I believe that rather than becoming a semantically empty marker with purely reinforcing value (Berruto 1987). it has acquired the function of modifying the meaning of the basic predicate, so that the following contrast is obtained:

(17) a. non ti sentolvedo
'I don't hear/see you'
b. non ci sento/ vedo
'I cannot see/hear', i.e. 'I am (temporarily) deaf/blind'

Omission of the direct object ***ti*** in (17a) would still make the sentence a close synonym of (17b) but at the same time it would definitely assign it to an overly formal (almost pedantic) register. Conversely, addition of a direct object in (17b) results in uncontroversial ungrammaticality, as expected for stative intransitive predicates. Thus, at least in ***sentirci*** e ***vederci,*** rather than a purely emphatic value ***ci*** carries out both a semantic (state) and a grammatical (intransitive) function.

I would like to conclude with a brief comment on the morphological status of ***ci.*** We have seen that in case of predicates such ***metterci, entrarci,*** etc. ***ci*** unquestionably lacks in pronominal function and behaves like an affix. Nonetheless, I believe that it is not quite accurate to treat ***ci*** as a true affix

because if the stage of affixation had been really reached, we would expect (18) to be grammatical.

(18) A: Quante uova ci vogliono per fare **gli** gnocchi?
'How many eggs do you need to make gnocchi?

B: ***Non ne ci** vogliono affatto (vs. Non **ce ne** vogliono affatto)
'I don't need any at all'

In other words, even ignoring the interrelated issues of orthographical representation (affixes are bound morphemes) and placement (volerci vs. ***ci*** vuole, **i.e.** suffix or prefix?), it should at least be impossible to ,interrupt the sequence ci + V. I believe then **Pulgram's** (1978) spelling ciavere is questionable because although it well highlights the advanced grammaticalized status of the clitic, ci does not behave as a true affix in conjugated verb forms.

6 Conclusion

To summarize, grammaticalization of Italian clitics had reached a fairly advanced stage as early as the 13th century. We saw that with respect to clitic linearization/placement, the main evolution observable in Modern Italian is represented by the disappearance of the syntactic constraint banning **clause**-initial proclisis **(i.e. loss** of Tobler-Mussafia Law), so that In MSI the enclisis - proclisis alternation depends (mainly) on the morphological shape of the predicate hosting the clitic pronoun. Other more recent and more advanced developments of the grammaticalization process are a strong tendency towards the merger of 3rd sg. indirect object clitics ***gli*** and ***le*** (neutralization of gender distinction), accompanied by a significant extension of ***gli*** to 3rd pl. in replacement of the non-clitic ***loro*** (neutralization of number distinction). Also, several instances of complete grammaticalization can be noticed regarding the clitics ne in verbs like ***infischiarsene***, aveme ***abbastanza***, etc., and the locative ci in metterci, entrarci, starci, even though neither ci nor ne have fully reached the stage of affixation.

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On Two OSV Constructions in Navajo: Beyond Subject-Object Inversion*

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In this paper 1 present some hypotheses about clause structure in Navajo, citing some relatively familiar and some relatively unfamiliar data assembled from the syntactic literature and from the lexicographic masterpiece of Navajo, Young and Morgan 1987. My approach is very much tree-based in the tradition of Speas 1990, Hale 2000, and related work, and in this is unlike the inspiring work of Thompson 1989, 1996, Willie 1991, 2000, Willie and Jelinek 2000, Aissen 2000, and Hale, Jelinek, and Willie 2001 which takes a more discourse-oriented approach. It is my hope that the two approaches complement each other.

Below I examine patterns of word order and pronominal morphology in Navajo, including the well-known Subject-Object Inversion (SOI). I propose that Navajo clause structure includes subject and object positions both inside and outside VP, as well as a distinguished projection for discourse-linked arguments and a CP projection which is the landing site for question movement and what I will call Focus Movement after Willie 1991 and Willie and Jelinek 2000. My analysis grows out of work done with Keren Rice (Rice and Saxon 1991, 1993, 1994, ms) on comparative Athapaskan, and is part of a larger crosslinguistic study of the cognates of Navajo yi- and bi-. It is closest in its empirical concerns to the work of Chad Thompson, in particular Thompson 1996, and in its theoretical stance to Speas and Yazzie 1996. It shares important analytic elements with Hale 2000.

1 The Classical *yi-/bi-* Alternation

I begin with the most familiar data, which has been discussed in many works including Hale 1973, Perkins 1978, Platero 1978, Thompson 1989, 1996, Speas 1990, and Willie 1991, 2000.' Navajo word order is basically SOV, as in the classic data below. Sentences like (1a) are

formed through merger of the V and its arguments in VP and the raising of the subject to a VP-external position. Hale 1973 observed that OSV word order is also possible, correlating with a change in object marking morphology from yi- in the (a) example to ***bi-*** in the (b) example. The word order contrast signals a contrast in information structure, so that the "inverted" order is often best translated with a passive, as in (1b): the more topical NP comes first. (Let me note, however, echoing Willie 2000 and other work, that this is not a passive structure. Hale considers the most accurate term for it to be 'inverse'.)

(1) a. [illegible] dzaanéézyiztał.
horse mule y-kicked
'The horse kicked the mule.' (Hale 1973:300)

b. Dzaanéézbiztał.
mule horse b-kicked
'The mule was kicked by the horse.' (Hale 1973:300)

Following Saxon 1986, Rice 2000a, I assume that yi- and ***bi-*** are affixes marking agreement with DPs in argument positions, an assumption which is controversial in studies of Navajo (cf. Willie and Jelinek 2000, Hale 2001, and see also Speas 2000 for an overview).

Another pair illustrating subject-object inversion is shown in (2).

(2) a. 'At'éédJáanyizts'ǫs.
girl John y-kissed
'The girl kissed John.'
but not 'John kissed the girl.' (Perkins 1978:102)

b. Jáan'at'éédbizts'ǫs.
John girl b-kissed
'The girl kissed John.'
but not 'John kissed the girl.' (Perkins 1978:102)

Inversion is limited so that if one of the nominals outranks the other on a scale of animacy or potency, that nominal must be the first of the two in sequence, regardless of grammatical relations, which are discerned from the verbal morphology. The examples (3) and (4) make a minimal pair. In the first, (3b) is ruled out because of the ranking of ***tó dilchxoshi*** 'soda pop' and ***'ashkii*** 'boy'.

(3) a. 'Ashkii todilchxoshi yoodlą́ą́.
boy soda pop y-drank
'The boy drank the soda pop.' (Hale 1973:301)

b.*Tó dilchxoshi 'ashkii **boodlą́ą́.**
soda pop boy b-drank
*'The boy drank the soda pop.' (Hale 1973:301)

Similarly, (4a) is strongly dispreferred in the basic SOV form; we hear (4b) instead, because of the unequal status of ii'ni' 'lightning' and [illegible]' 'horse'.[2]

(4) a.?*li'ni' [illegible]' **yiyiisxí.**
lightning horsey-killed
'The lightning killed the horse.'
(Willie 1991:90 [judged as "objectionable"])

b. [illegible]' ii'ni' **biisxí.**
horse lightning b-killed
'The lightning killed the horse.' (Willie 1991:90)

Authors such as Thompson (1989, 1996), Willie (1991, 2000), and Aissen (2000) have discussed the hierarchy of availability of the *yi-/ bi-* alternation in terms of obviation.' While I will argue that bi- should not be construed as marking a proximate, 1 believe that there is something right about recognizing yi- as an obviative form. I will say more about this idea later in the paper.

Some significant facts about the bi- construction help us in its analysis. Willie (1991) makes the important discovery that the inverted object in the bi- construction must be definite, as in (5a), and not indefinite, as in the ungrammatical (5b).

(5) a. 'Ashkii 'at'ééd lei' **bizts'ǫs.**
boy girl Indef b-kissed
'The boy was kissed by a girl.'

b.*'Ashkii léí' 'at'ééd **bizts'ǫs.**
boy Indef girl b-kissed
***'A** boy was kissed by the girl.' (Willie 1991:77)

As Willie shows, there is no such restriction on the yi- construction, as in (6), where either subject or object can be indefinite.

(6) a. 'Ashkii léí' **'at'ééd** **yizts'ǫs.**
boy Indef girl y-kissed
'A boy kissed the girl.'

b. 'Ashkii 'at'ééd léi' yizts'ǫs.
boy girl lndef y-kissed
'The boy kissed a girl.' (Willie 1991:76)

This striking fact led researchers to identify the inverted object as a "topic", a view explicitly argued for by Speas and Yazzie (1996). Following Speas 1990, they argue that bi- is an incorporated pronoun bound by a topic, as in Italian Clitic Left Dislocation (Cinque 1990). The definiteness effect supports this idea. Willie and Jelinek (2000). following Willie (1991), likewise suggest that bi- identifies topical non-subjects: as topics must be definite, the definiteness effect follows.

Willie (1991:204) is responsible for another important finding: the inverted object may be a question phrase, in which case it receives a discourse-linked interpretation like "which one?" rather than "who?", as in (7).

(7) Háí-sh Jáan bizts'ǫs ?
who-Q John b-kissed
'Which one (of you) was it that John kissed? (Willie 1991:204)

This 'finding is in conflict with the topic analysis of bi-, as question elements cannot be topics because of a conflict between semantic content and information structure: in information questions the question phrase, creating a demand for new information, necessarily corresponds to a discourse focus. Thus, there is something not quite right about the topic analysis of inversion.

A third critical discovery about the bi- construction is due to Perkins (1978), who observes the data in (8). From a basic structure in (8a) where the direct and oblique objects dzi'izi 'bike' and *at'ééd* 'girl' are both marked by *yi-*, it is only possible to invert one nominal; thus (8b) is possible but (8c), with two bi- forms, is strongly ruled out.

(8) a. Ashkii at'ééd dzi'izi yiɬ yoodzíįs.
boy girl bike y-with y-pull
'The boy is pulling the bike with the girl [on it].'

b. Ashkii at'ééd dzi'izí biɬ yoodzíįs.
boy girl bike b-with y-pull
'The girl is pulling the bike with the boy [on it].'

c.*Ashkii at'ééd dzi'izí biɬ boodzíįs.
boy girl bike b-with b-pull
*'The girl is pulling the bike with the boy [on it].'
(Perkins 1978:116)

These facts fit well with the widely acknowledged intuition that the *bi-* construction elevates one nominal in the clause to discourse prominence. They find a conceptual explanation in the claim common to Speas and Yazzie 1996 and Willie and Jelinek 2000 that bi- marks a non-subject topical DP. However, the data in (8) are not expected under a strict reading of Speas and Yazzie's account, as in general Clitic Left Dislocation is not restricted to a single occurrence per clause (Cinque 1990:58).

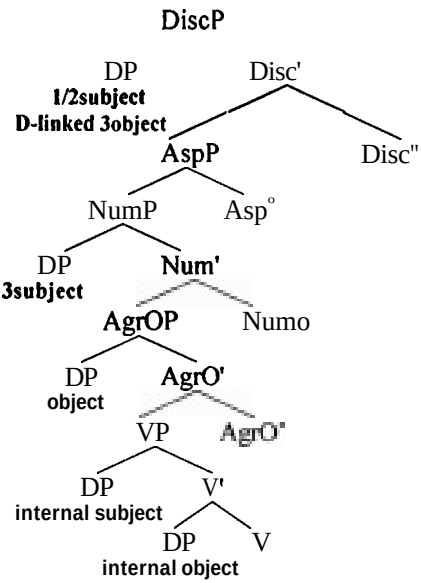
So how is this restriction to be explained theoretically? Aissen 2000, following Thompson 1989, 1996, suggests that it provides strong motivation for an analysis of Navajo in terms of obviation. Aissen argues that the nominal identified by bi- is proximate. The limit of one *bi-* per clause gives strong empirical support to this approach, as the domain of obviation permits at most one proximate nominal (see Aissen 1997 for an overview of the phenomenon).

For reasons to be discussed in section 3, 1 must disagree with Aissen's proposal.[4] As an alternative, I propose that the inverted object occupies the Specifier position of a functional category that I will call "DiscPhrase" after a suggestion by D}chaine 2000. Accounting for the prefixes marking first and second person agreement on the Algonquian verb which are unmarked for grammatical relation, D}chaine posits a projection for discourse-linked arguments, in particular speech-act participants.

I propose that discourse-linked DPs in Navajo raise to this [Spec, DiscP] in order to be licensed in the discourse (see (9) on the next page). All of the elements in this position have distinctive verbal inflectional forms whose features could attract the DP undergoing movement. The hierarchical position of these moved DPs at the top of the tree structure mirrors their prominent role in the discourse. My proposal is identical to Hale's conception of the inverted object as "the DP appearing in the highest Spec or adjunct position in the inflectional portion of the extended projection" (Hale 2000:71, fn12).

The Navajo moved objects show clear signs of being necessarily discourse-linked. The definiteness restriction is one facet of this restriction: as Fernald et al. (2000) show, the determiner *léi'* in Navajo necessarily introduces a new discourse referent, like indefinite articles in many languages. This fact explains the incompatibility of a *léi'* phrase with the requirements of [Spec, DiscP]. The question facts in (7) also strongly support my proposal, particularly the implication given by the gloss that a discourse-linked 'who' by preference limits the choice set to the addressees. An important discovery by Willie (1991:77f), that generics are excluded from the *bi-* construction, is also compatible with my proposal, as generics are not possibly discourse-linked.'

(9)



The architecture in (9) yields the word order facts of Subject-Object Inversion and should be compared with Willie and Jelinek's (2000) structures, which are in many ways very similar. (See also Speas 1990, 2000.) On independent grounds Rice and Saxon (1994) propose a structure just like (9) for some northern Athapaskan languages, with the difference that we called the highest functional category not DiscPhrase but AgrSP and limited it to speech-act participants. For justification of NumP in (9), see Rice and Saxon 1994 and Rice 2000a:180-194, which build on Ritter 1995. Our proposing distinct projections for discourse-linked arguments (AgrSP) in opposition to third person subjects (NumP) depends on structural evidence from the morphology of subject inflection and the syntactic treatment of the two classes of DPs.

In (9), the canonical positions for third person subject and object are the specifier positions of NumP and AgrOP respectively. It is known that yi- as third person object agreement is only licensed in Navajo when the subject is also third person. In Aissen 2000 this is part of the motivation for calling yi- the marker of an obviative object. By my account ***yi-*** is used when the object falls within the c-command domain of a subject in NumP. If the object is in [Spec, DiscP], it is not in the c-command domain of the third person subject. Therefore yi- is not licensed and the default third person object marker bi- must be used instead.[6] As [Spec, DiscP] is the sole position for a discourse-linked third person object, there will be at most one bi- marker when the

subject is also third person. Thus, we obtain the hallmarks of Subject-Object Inversion, including facts of word order, semantic interpretation, and morphology.

2 A Less Familiar Construction: Focus Movement

In addition to the canonical SOV structure and the structure of Subject-Object Inversion, I would like to investigate a third clause type in Navajo, the outcome of an operation called Focus Movement after Willie 1991. This construction has been mentioned in the literature, although never discussed at length. The first comment on it of which I am aware is in a footnote in Hale's (1973) paper introducing Subject-Object Inversion, in which he says:

> Where the subject and object are clearly distinct in rank [...] the surface ordering of the subject and object is not absolutely fixed. Thus, I assume that, quite apart from the inversion rule, there is the possibility of reordering the subject and object, provided ambiguity does not result; where reordering of this secondary type has taken place, the higher ranking noun phrase may appear in a position other than the initial one in the surface structure. (Hale 1973:309, fn 3)

Thompson (1996:83-84) discusses this clause type, and Willie (1991), Willie and Jelinek (2000), and Aissen (2000) also briefly discuss manifestations of it. In this construction, seen in examples (10)-(13) from the Young and Morgan (1987) dictionary, the object precedes the subject in linear order, but object inflection takes the morphological form yi-, not *bi-* as in SOI. Further distinguishing the construction from Inversion, the first two examples below have a fronted nominal which is marked by the indefinite determiner *léi'*, impossible in SOI (cf. (5b)).

(10) **Yistłé** **'ayóo** **naats'ǫǫd** lei' **shádí** **shá** nayiisnii'.
sock very 3s-stretch Indef 1s-ol sister 1s-for y-bought
'My older sister bought me some very stretchy stockings.'
(Young&Morgan 1987:601)

(11) Dana L. Shipley **wolyéé** lei' dine
named-Rel Indef Navajo

doo **yił** **nda'asdįįd** da.
Neg y-with 3p-abide Neg
'The Navajos couldn't stand a [person] named Dana L. Shipley.'
(Young&Morgan 1987:640)

Three of the four examples, including the two below, involve movement of an object which would be ineligible for SOI because of a conflict with the animacy hierarchy (cf. (3)).

(12) Shibee'ak'e'elchihi sitsili **t'óó 'átsé shá neiłtin.**
1s-pencil **1s-yr** brother merely y-have loan from-1s
'My younger brother has my pencil on loan from me.'
(Young&Morgan 1987:599)

(13) **Tsiighá** bee **yiilch'íłí 'áłchíní yóó' 'adeiztą́ą́** 18.
curling iron children **y-3p-carry** off Evid
'The children had carried off the curling iron.'
(Young&Morgan 1987:219)

These examples obviously represent a different construction from Subject-Object Inversion. First, strikingly, the morphology is not the same. Second, the facts relating to information structure are not the same. In SOI the inverted object must be definite. Examples (10) and (11) show that the fronted object here can be indefinite. Third, it is widely discussed how SOI is subject to an animacy constraint (see Willie 1991 for much discussion). In this construction, on the contrary, the fronted object is typically inanimate, preceding a human agentive subject which outranks it.

Although Hale 1973 observes the construction in the quotation above, he does not speculate on its discourse functions. It is very interesting, therefore, to find that the fronting that takes place in questions seems to share properties with the construction now at issue. Compare (14a) and (14b). The object of the verb ***yiyiiłtsą́*** 'see' is questioned here and two word orders are possible, with the question word ***ha'át'íísh*** 'what' in situ or in clause-initial position.

(14) a. Ashkii **ha'át'íísh** **yiyiiłtsą́**?
boy what-Q y-saw
'What did the boy see? (Schauber 1979:118)

b. Ha'át'íísh ashkii **yiyiiłtsą́**?
what-Q boy y-saw
'What did the boy see?' (Schauber 1979:117)

In both cases the object inflection is yi-. (15) and (16) show two further examples with a fronted question word.

(15) Ha'ht'iish Jkn neidiyoofnih?
what John y-will buy
'What will John buy? (Schauber 1979:132)

(16) **Háí-sh** **Jáan** **yizts'ǫs** ?
who-Q John y-kissed
'Who kissed John? or 'Who did John kiss?
(Willie&Jelinek 2000:272)

(16) is particularly interesting because it is ambiguous, and can mean either 'who kissed John? or 'who did John kiss?, with neutral question interpretations.

Going well beyond word order and morphology, the parallels between Hale's object reordering and question movement extend to the fact that neither one obeys the animacy or discourse-linking requirements that we saw with SOI. (16) shows that question movement, unlike SOI, is not constrained by 'avoid ambiguity'. The example in (I I) hints that object reordering may not be so constrained either, as here a human object is reordered with a human subject (though the sentence is not actually ambiguous because of a pluralizing prefix in the verb).

To account for all of these facts, I propose that object movement, as in **(10),** and question movement, as in **(16),** involve movement of a DP to [Spec, CP].[7] The use of yi- as object inflection represents a reconstruction effect, expected in A-bar movement. The term 'Focus Movement' from Willie 1991 and Willie and Jelinek 2000 is very apt when we consider that the operation affects question phrases, which are invariably a focussed element in the clause in which they appear. (See also Akers 2001 on the parallels between Focus Movement and question movement.)

It remains to be shown whether the discourse contexts for examples like (10)-(13) also support an analysis in terms of focus. It also remains to be seen whether the proposed Focus Movement has the expected characteristic of A-bar movement that it can be iterated. For some speakers of Navajo, long distance movement of question phrases is possible in certain grammatical contexts, as in (17) and **(18).**

(17) Ha'ht'iish **Jáan** [__ nahideeshnih] nizin ?
what-Q John Is-will buy wants
'What does John want to buy? (Schauber 1979:131)

(18) **Háágóólá** Jáan [doo __ **jidoogáałda**] **shó'ní** ?
where-to-Q John Neg one-goes-Neg **1sOO-say** of
'Where is it that John expects me not to go?'
(Schauber 1979:181)

It is a question for empirical study whether the movement of non-interrogative phrases in Focus Movement is likewise possibly unbounded.

By hypothesis, yi- in Focus Movement represents agreement with an empty object reflecting a moved element. We might then expect to find a parallel pattern with an empty pronominal object in place of the moved element. Platero (1978:163) indeed makes the claim that examples like (19) are structurally ambiguous, and in principle allow readings in which the overt nominal is either subject or object. (See also Hale, Jeanne, and Platero 1977.)

(19) Ashkii **yizts'ǫs**.
boy y-kissed

Platero credits a perceptual/processing strategy for the fact that out of context the sentence cannot receive any reading apart from 's/he kissed the boy'. In context, however, the pattern with a null pronominal object is quite amply exemplified in Young and Morgan 1987 and has been discussed in Willie 1991, 2000 and Willie and Jelinek 2000:

(20) 'Ashkii **yiyííbį́'**.
boy y-picked round objects
'The boy picked them [e.g. berries].' (Willie 1991:61)

(21) **'Asdą́ą́** yi **yiyíiɬbéézh**.
woman y-in y-cooked
'It was the woman who cooked it in it.'
(Willie&Jelinek 2000:274)

Willie and Jelinek (2000), explaining the lack of ambiguity in such examples, remark on how lexical semantics and pragmatics limit interpretations so that the human referent in such examples cannot be interpreted with any role apart from subject. Willie (2000:365f, fn 5) shows that context can favour forms like those above. The preferred answer to the question 'what happened to the horse?' is the following, which represents the null pronominal object with yi-:

(22) Bill **yi'diiɬid**.
y-branded
'Bill branded it.' (Willie 2000:366)

I reproduce below several more examples from Young and Morgan 1987, for each including the context given in the dictionary. We see that the referent of the pronominal object marked by yi- is included in

the preceding (or rarely, following) context, typically in a clause in construction with the clause at issue.

In **(23),** the referent of the empty pronominal is *jooł* 'balls', and appears in the preceding sentence.

(23) Jooł **'ałtso** hooghan **góne'yah 'ahéjaa'.**
ball all hogan into I**s-carried**

'Áko ndi sitsili **ch'ínáyiisne'.**
however 1**s-y.brother** y-toss out

'I carried all the balls one **after** another into the hogan. However, my little brother tossed them all back out.'

(Young&Morgan 1987:276)

In (24) and **(25),** the pronominal object is in the second conjunct in a coordinate structure.

(24) **'Éé'** bee naashnishi **hadiil'é'ígíí** **'ádaa diisht'ąą́**
my overalls 1s-take off

dóó she'esdzą́ą́ sh9 yizgis.
and Is-wife Is-for y-washed

'I took off my overalls and my wife washed them for me.'

(Young&Morgan 1987:347)

(25) Shim6 **nizhónígo** diyogi **'íílééh ńt'éé'**
Is-mother well rug make but

shádí yiyííłchxǫ'.
1s-o sister y-ruined

'My mother was making a nice rug but my older sister ruined it.' (Y**oung&Morgan 1987:780)**

In (26) the null pronominal has an antecedent mentioned in a subordinate clause.

(26) [**Gohwééh ni' niníką́ągo**] **háíshįį́**
coffee ground Is-set down-Comp someone

sits'ą́ą́' yiih **dooltáál.**
Is-from y-in stepped

'When I set my cup of coffee down on the ground somebody stepped in it on me [lit. from **me].'(Young&Morgan 1987:650)**

The null pronominal in (27) occurs in a subordinate clause, its antecedent yaateet'sheepskin' following it in the matrix.

(27) [Shicheii yikáá' dindodaał biniiyé]
Is-grandfather y-on 3s-sit in order

ni'góó yaateeł ninítkaad.
ground-on sheepskin Is-spread
'I spread a sheepskin down on the ground for my grandfather to sit on [it].' (Young&Morgan 1987:650)

Observing this syntactic pattern is important because of its place in the earlier literature, where a focus on Subject-Object Inversion and the role of the animacy hierarchy led to examples like (19)-(27) not being much discussed.

3 Internal Subjects with *bi-* Objects

I want to discuss one other pattern, which is also not treated at length in the literature. In this pattern, the use of yi- is prohibited, no matter which order of nominals occurs. Examples (28) and (29) are a pair from Willie's (1991) dissertation, differing only in word order. These examples with bi- make a triple with (4a), which contains yi- and is ungrammatical.

(28) łi'ni' ł[[' biisxį.
lightning horse b-killed
'The lightning killed the horse.' (Willie 1991:90)

(29) ł-[[' ii'ni' biisxį. [=(4b)]
horse lightning b-killed
'The lightning killed the horse.' (Willie 1991:90)

The pair in (30) and (31) from the Young and Morgan dictionary also show how word order is immaterial to the choice of object inflection in these cases. In the first the word order is SOV, and in the second OSV. Both verbs show inflection with bi-.

(30) 'Ak'ah sidogo shila' bik'ésdááz.
grease hot Is-hand b-splash on
'Hot grease splattered on my hand.'
(Young&Morgan 1987:200)

(31) **... shítáá'gi** tsidii bichaan **bik'ésdáázˀ**
Is-forehead bird droppings b-splash on
'Bird droppings splattered on my forehead.'
(Young&Morgan 1987:200)

See also Thompson **(1996:84)** for parallel examples from San Carlos Apache, a language closely related to Navajo.

Ellavina Perkins is responsible for the observation that when a subject is inanimate typically only the bi- construction is permitted:[3]

[...] the appearance of the lyil or lbil form is conditioned by the animacy or inanimacy of the subject NP, such that the /yi/ form is used with animate subjects and the lbil form is used with inanimate subjects. (Perkins 1978:136)

This construction is not amply illustrated in the literature so I provide a few additional examples below. In all of these examples the inanimate subject precedes the (postpositional) object, which is marked by bi-. As we saw in section 1, with animate subjects bi- occurs only if the object precedes the subject in Subject-Object Inversion.

(32) Joo**ł** tsin **báhátis** yilts'id **...**
ball log b-over 3s-rolled
'The ball rolled over the log.' **(Perkins 1978:55)**

(33) **Asaa'** tst bikaa' si' **ą́.**
pot rock b-top 3s-be located [chunky 0]
'The pot is on the rock.' **(Perkins** 1978: **1** 19)

(34) [Honishgish **'awéé'** **biná** **sitą́go**] **'ájiił'įįh.**
poker baby b-beside 3s-be located [stick] 4-let
'One should leave the poker [sitting] beside the baby.'
(Young&Morgan 1987:223)

(35) Shich'ah tsin bigaan **binahidé'ą́.**
Is-hat tree branch **b-hang** over
'My hat is hanging over the tree limb.'
(Young&Morgan 1987:225)

The example in (36) shows that the pattern with inanimate subjects extends to direct objects:

(36) **... joo****ł** **shéłt'ish** ńt'éé' sitsili **béstal.**
ball 1s-hit foul and **1s-y.brother** b-kicked

'I batted a foul ball and it hit [lit. kicked] my younger brother.'

(Young&Morgan 1987:802)

In this example the null subject of *béstal* 'hit' refers to the ball mentioned in the first conjunct. Object inflection agreeing with *sitsili* 'my younger brother' is bi-.

The unavailability of the object form yi- is something to be explained for this pattern, which represents a different syntactic configuration in my view. I propose that in these examples the subject nominal remains inside the VP, assuming this is an option in UG and motivated in Navajo. Since only a subject in [Spec, NumP] licenses the yi- form—in Hale's terms, it defines the domain of obviation, my proposal accounts for the facts of inflection: in the absence of a subject in [Spec, NumP], the third person object form must be the default bi- and cannot be the obviative form yi-.

What prevents an inanimate subject from moving out of the VP? Only animate (actually, human) nouns in Navajo can be specified for singular as opposed to plural number, as in the examples below (Young and Morgan 1987:grammar7-8; 492, 804).

(37) a.	'ashkii	'boy'	'ashiiké	'boys'
b.	hddi	'one's older sister'	hádíké	'one's older sisters'
c.	shinálí	'my son's child'	shinálíké	'my son's children'
d.	shik'éí	'my relative'	shik'éíyóó	'my relatives'

Assuming that features of Num^0 attract only a subset of nouns including those inflectable for number, we can derive the restriction against inanimate subjects in [Spec, NumP]. From there the facts of object inflection follow.[9]

Examples with inanimate subjects provoke questions concerning two prominent approaches to bi- in the Navajo literature which depend on the observation that there can be at most one bi- in a clause. (See the discussion surrounding (8) above.) Speas and Yazzie (1996) and Willie and Jelinek (2000) argue that bi- is associated with the (single) topic of a clause. Aissen (2000) views bi- as a proximate form, limited to one per obviation span. When we examine clauses where the subject is inanimate, we find examples in which one clause contains two instances of bi-, contrary to these predictions. The following examples come from Young and Morgan 1987.

(38) **Bił biná'eet.**
b-with b-float around
'It (a boat) floats around it (e.g. an island) with him.'

(Young&Morgan 1987:227)

(39) ... shicheii 'ahbínidą́ą́' tsinaabąąs bi4
1s-gr.father this.morning wagon b-with

binísbą́ą́z lá.
b-catch up to Emphatic
'... this morning the wagon rolled along catching up to them with my grandfather [driving].' (Young&Morgan 1987:151)

(40) Bilagáana ... chidí naat'ai' bił bidah
whiteman airplane b-with b-down

'eelts'id.
3s-moved out of sight
'The whiteman ... was involved in a plane crash.'
[lit. the whiteman, the plane moved out of sight down to it with him] (Young&Morgan 1987:475)

In each of these examples the main predicate is a verb of motion whose inanimate subject is a conveyance (boat, wagon, plane) for the rider who is represented in Navajo grammar as the object of the postposition -if 'with'. The clause in each case also includes another oblique object, which like the object of *-it* is marked by *bi-*. In (38) all of the elements of the situation are expressed by pronominals. In (39), the subject is *tsinaabąąs* 'wagon', and the rider is shicheii 'my grandfather'. The other oblique is a pronominal. The structure of (40) is parallel to (39), with the subject *chidí naat'aí'* 'airplane' and the rider *bilagáana* 'whiteman'.

By my account two bi-s arise in a clause when there are third person objects not in the c-command domain of a canonical third person subject in [Spec, NumP]. By hypothesis the inanimate subjects of these sentences are VP-internal and may not license yi- for a third person object.[10] The alternative is default bi- for object inflection.

4 The Roles of *bi-* and *yi-*

The inflections yi- and *bi-* both mark third person objects. Yi- is limited to those environments in which a third person subject occupies the canonical subject position c-commanding the VP. Bi- occurs in other environments: when the object c-commands the subject (section 1), when the subject is internal to VP (section 3),[11] and when the subject is not third person. The two sentences below exemplify this last type, and include multiple instances of bi- so that this possibility can be observed.

(41) Shidá'í bił{{' niltihigii ba nabiishtá.
1s-uncle 3s-race horse bfor b-walk [it] around
'I'm walking my uncle's racehorse for him.'
(Young&Morgan 1987:525)

(42) Chiditsoh naabąąs bínabineeltąą'.
truck drive b-b-1pshow how
'We showed him how to drive a truck.'
(Young&Morgan 1987:223)

Bi- has a much broader distribution that yi- and I regard it as the default form.[13] Yi-, alternatively, is dependent on the presence of a distinct third person in its clause. It thus shows one of the classic properties of an obviative form, in that it represents a second third person in a given domain. As an obviative it is remarkable in being restricted to non-subject status and in requiring a third person canonical subject as its licensor, but it nonetheless merits the designation 'obviative' by its primary limitation.'' In reaching this conclusion I follow many distinguished researchers, including Hale, Thompson, Willie, Jelinek, and Aissen.

In summary, what I have attempted to do here is provide more or less strictly structural accounts for the four patterns of subject-object word order and *yi-/bi-* morphological form found in Navajo, hoping that these results contribute to the literature on Navajo syntax, which encompasses many complementary approaches.[14]

Notes

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[13] In this paper I am ignoring important work on the *yi-/bi-* alternation in the context of relative clauses and possessive constructions, and hope to incorporate the insights of Platero 1974, 1978, Hale, Jeanne, and Platero 1977, Willie 1989,2000, Thompson 1996, Horseherder 1998, and others into subsequent work.

[2] In section 3 I present a different account of the ungrammaticality of (4a) which depends on the fact that ***ii'ni'*** **'lightning'** is inanimate.
[3] **Perkins (1978:92)** reports that Hale's first work on Subject-Object lnvcrsion (Hale 1968) relies on obviation.
[4] Rice **(2000b)** argues against a topic analysis of bi- in the language Slave, though on different grounds.
[5] Broadwell and Duncan (2001) examine a passive construction in Kaqchikel, a Mayan language of Guatemala, which shows remarkable parallels to Subject-Object Inversion in Navajo. Potentially **DiscP** could be of use in the analysis **of this** language as well.
[6] **Hale** observes that inverting the subject has the effect of "removing it from the domain in which obviation applies, forcing use of the general third person object prefix *b*-" (Hale **2000:70)**. Clearly my concept is identical.
[7] See Potter 1997 for an extended study of questions in the closely related Western Apache.
[8] **I also** found the following pair in Young and Morgan 1987: here what changes is ***yi***- or bi-. The subject is inanimate.

(i) **Nááts'íílid** dziɫ **yináhaazlá**.
rainbow mountain y-surround
'Rainbows surround the mountains.' **(Young&Morgan 1987:225)**

(ii) **Nááts'íílid** **dziɫ** **bináhaazlá**.
rainbow mountain y-surround
'Rainbows surround the mountains.' **(Young&Morgan 1987:225)**

Neither **Perkins** 1978 nor I predict **thc** grammaticality of (i). I don't have an explanation for it, though I note that Young and Morgan list it as a secondary option. Willie **(2000:365)** remarks that the special agency of entities like rainbows or lightning are responsible for the exceptional grammatical patterns they enter into. Note in this connection the following pair, also implying an important role for agency:

(iii) Niyol d66 to **tsé** **yiní'íígháázh**.
windand water rock **y-into-3S-pf-gnaw**
'The water and **thc** wind gnawed **[croded]** into the rock.'
(Young&Morgan1987:237)

(iv) **biní'íígháázh**
'It gnaws into it.' (Young&Morgan 1987:233)

[9] There is a prefix da- in Navajo which is characterized as pluralizing nouns (Young and Morgan **1987:grammar7)**. This **form** has a broad distribution, also being a verbal prefix, and arguably serves an adverbial rather than inflectional role (see **Yazzie** et **al** 2000 for discussion).
[10] If the adverbial 'abínídą́ą́' 'this morning' marks the left margin of the VP, then word order also supports the claim that the subject of (39) is VP-internal.
[11] Navajo and other Athapaskan languages permit a type of impersonal clause in which the subject is an expletive represented in the verb by a prefix which has a space or situation as its referent, termed "3s" by Young and Morgan **(1987:grammar76-77)**. (The expletive therefore resembles English there in some respects.) (i) is an example. The prefix takes the form ho-.

(i) **Biɫ** bte **hózin.**
b-with b-by be known

'He knows it, lit. [asituation] is known to him by means of it.' (Willie 1991:107)

I regard this subject as internal.

[12] Thcrc is also a zero form for third person objects: the usual inflection for third person objects when the subject is first or second person is zero, as in (i).

(i) **decshk'áát**
'I will grind it.' (Willie 1991:30)

(Exceptionally bi- can be used in this context for animate direct objects in the derived causativc construction (Hale and Platero 1996:4f); my (41)-(42) involve this type of verb.)

[13] In work in progress encompassing some of the results of Rice and Saxon 1993, 1994, Keren Rice and I show that cognates of ***yi-*** in other Athapaskan languages show somewhat different structural licensing conditions. In almost all languages ***yi-*** seems to be 'obviative' in that it is limited to contexts in which another third person is more prominent.

[14] See Johns 2001 for a parallel study using phrase-structural hierarchy to model other types of hierarchical rclations.

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Negation and Aspect in Hungarian*

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1 Introduction:

This paper studies the interaction of propositional negation and aspect in Hungarian.[1] The paper has two aims. It makes an attempt to show that propositional negation interacts with inner (VP) aspect and outer (sentence) aspect in two different positions in the syntactic representation. Its interaction with inner aspect can be read off by the semantic component if it occupies a VP internal NegP position. Its interaction with outer aspect can be read off by the semantic component when negation raises to SpecPolP in the I system.

I will be claimed that negation triggers ambiguity with accomplishment verbs that carry a perfective marker. It may negate the complex event or the result state of the event. I will claim that this ambiguity can be accounted for if negation can occur in two different positions in the layered VP, either in a NegP above the complex VP as an extension of the VP that encodes the complex event or in a NegP above the lower VP headed by the perfective marker that encodes the final state of the event as in (1).[2]

(1) a. $[_{NegP}$ Neg $[_{VP_1}$ DP V0 $[_{VP_2}$ DP Pref]]]
b. $[_{VP_1}$ DP V0 $[_{NegP}$ Neg $[_{VP_2}$ DP Pref]]]

In spite of its scope, negation always occurs preverbally in Hungarian. I will argue that the position it moves to is PolP in the I system. Negation has to move from the VP internal NegP to PolP because it modifies sentential aspect. Negative sentences pertain to states as in (2) (Verkuyl (1993)).

(2) $[_{PolP}$ Neg$_i$ $[_{IP}$ – $[_{NegP}$ e$_i$ $[_{VP}$ …]]]]

Negation interacts with inner (VP) and outer (sentence) aspect. It interacts with inner aspect in VP and with outer aspect in the split-IP. In VP negation either negates the complex event or the result state and in IP it modifies all event types. It turns all event types into states.

This paper is organised as follows: section 2 discusses the overt position of propositional negation and its interaction with the event structure. In section 3 I present Pustejovsky's theory of events and argue that the interaction of negation and inner aspect can be accounted for if we assume that subevents can be syntactically realised in Hungarian in a layered VP. Section 4 presents data about the interaction of propositional negation and perfective aspect. Section 5 discusses the position of the verb and the prefix with respect to negation in the initial structure in the sentence. In section 6 I will claim that propositional negation interacts with inner and outer aspect. Negation interacts with inner aspect in NegP within VP, while it interacts with outer aspect in PolP in Split-JP.

2 The Position of Propositional Negation in Hungarian

In Hungarian operators and quantifiers occur in their scope position in overt syntax (É. Kiss (2001). Szabolcsi (1997)). Propositional negation nem "not" always precedes the verb as in (3).[3]

(3) Jdnos nem evett almát.
Jdnos not ate apple-acc
Jdnos did not eat apples.

The overt position of negation shows that the scope of propositional negation is the VP. In sentence (3) negation simply denies that there was an *apple-eating* event performed by Jdnos. In the semantic tradition there is a single event per sentence (Higginbotham (1988), Parson (1985)). If we assume that the event is encoded in VP in the syntactic structure, then propositional negation necessarily has to precede VP in a language like Hungarian in which operators tend to occur in their scope position in overt syntax (E. Kiss (2001). Szabolcsi (1997)).

(4) Péter nem úszott le egy kilométert.
Péter not swam pref a kilometre
'Péter didn't swim a kilometre.'

Sentence (4). in which negation precedes VP, as well, the overt syntactic position of negation does not necessarily reflects its scope. Sentence (4) is ambiguous. The ambiguity is triggered by the interaction of negation and the event structure. The event is interpreted as perfective due to the presence of the perfective prefix. Negation either negates the whole event or the resulting state of the event.[4]

Notice, though, that apart from the position of negation, another problem arises. As it has been already pointed out in any traditional approach to event structure it is not at all clear, why these sentences are ambiguous, as events are primitive notions and each VP encodes only one event, which is actually in the scope of propositional negation.

3 The Event Structure (Pustejovsky (1990))

Pustejovsky (1990) argues that grammatical phenomena make reference to the internal structure of events. A subeventual analysis for predicates can capture these effect. Pustejovsky proposes a configurational theory to represent event structure on lexico-semantic ground in which event types (states, processes and transitions (accomplishments and achievements)) make reference to embedded event types. He claims that processes and states can be represented as non-branching trees consisting of only one subevent while events of transition can be represented as branching trees that consist of two subevents.

This theory can make predictions about the behaviour of adverbial modification in terms of scope assignment within an event structure making reference to subevents. Consider the following English sentences.

(5) a.. John does not like Mary.
b. Mary did not eat biscuits.
c. Jack did not build a house.

In sentence (5a) negation simply negates the state of ***John's liking Mary*** and in (5b) the event of ***Mary' s eating biscuits*** while in (5c) negation can have scope over the main event (Jack did not even start building a house) or only the resulting state (Jack started to build a house but did not finish it).

Propositional negation not triggers ambiguity when it modifies events of transition (accomplishments), as it can modify the main event and the result state as in (6c).[5] In case of processes and states there is only one event (and subevent) to modify, which explains the lack of ambiguity in these constructions represented in (6a) and (6b).

(6) a. (not) state
state

b. (not) process
process

c. (not) transition
process (not) state

One major advantage of Pustejovsky's theory is that it can account for the two interpretations, that accomplishment verbs can have with propositional negation.

In English, in case of complex events (Pustejovsky (1990)) negation always triggers ambiguity as in (7).

(7) John did not swim a mile.

Sentence (7) can be interpreted as ***John did not even started swimming,*** or ***John starred swimming*** but swam less than a mile.

4 The Interaction of Perfectivity and Negation in Hungarian

4.1 Two strategies for perfectivity in Hungarian

In Hungarian there exist two strategies to express perfective events that are necessarily interpreted as events of transition in Pustejovsky's theory (Dahl (1985)).[6] Events of transition can be interpreted as perfective without any morphological marking if they are in the scope of certain operators like past tense (Maleczki (p.c.)). In sentence (8b) the verb carries the perfective marker ***meg*** and always denotes perfective situation.

(8) a. JBnos **épített** egy **házat, aztán elvált.**
JBnos built a house then he divorced.
'JBnos built a house then he divorced.'

b. JBnos **felépített** egy **házat** aztan **elvált.**
JBnos pref-built a house then he divorced.
'JBnos built a house then he divorced.'

In sentences (8a) and (8b) the event of ***building a house*** is completed. The events have perfective interpretation. As perfective situations are events of transition in Pustejovsky's sense, we would expect both sentences to behave in the same way with respect to negation and adverbials, that is, both sentence types should be ambiguous.

4.2 Negation and perfectivity in Hungarian

In Hungarian sentences equivalent to the English sentence in (7) are not ambiguous as in (9).

(9) Jhnos nem liszott egy **mérföldet..**
JBnos not swam a mile
'János did not swim a mile.'

Nem "not" has scope over the whole event, though the event ***úszik egy mérföldet*** "swim a mile" is an event of transition (accomplishment). It seems that in Hungarian adverbs cannot "see" the internal structure of complex events.

The question is whether sentences that contain a prefixed verb and negation remain unambiguous.

(10) JBnos nem liszott **le** egy **mérföldet.**
János not swam pref a mile
'János did not swim a mile.

Sentence (10) are ambiguous the same way as the English sentence in (7) is. In sentences (10) negation can have scope over the main event (there was not an event of ***swimming*** a ***mile by John)*** or it can have scope over the resulting state of the **event** (John did not finish ***swimming*** a ***mile).*** It seems that in Hungarian adverbial modifiers can see the internal structure of the event only when the resulting slate is morphologically realised in the VP.

As it has been shown, in Hungarian the scope of negation over events is "read off' by semantics in the syntactic structure. On the basis of the data presented so far, I claim that the prefix encodes the result state and therefore, provides the scope. for negation, when it negates the result state of the complex event. If there is no prefix no domain for negation is available, hence the lack of ambiguity in sentence (9).

5 The Syntactic Representation of Pref-V Complex in the Initial Structure

5.1 The position of the prefix in the initial structure

In this part of the paper I will discuss the syntactic status of the **prefix** in Hungarian. I assume, following **Szabolcsi** (1986) that the prefix and the verb form one lexical unit because the prefix can change the argument structure of the base verb and in some complex verbal construction the meaning of the prefix and the verb is **noncompositional.**[7] In spite of that, in Hungarian prefixes are independent syntactic units. They can be separated from the verb in the syntactic representation.

As they are lexically dependent on the verb. there are two options to analyse their syntactic status in the initial structure. The prefix can be analysed as a head forming a complex head with the verb in the initial structure as in (11a) (Brody (1990) or it can be analysed as a head of the VP projection selected by the main verb in a layered VP construction as in (10b) (Tóth (2001).

(11) a. $[_{VP1}$ DP $[_{V'}$ $[_{V0}$ Pref-V0] DP]]
b. $[_{VP1}$ DP$[_{V'}$ $[_{V0}$ V] $[_{VP2}$ DP $[_{V'}$ $[_{V0}$ Pref]]]]

In (11a) the only available position for negation is in a functional projection over VP where it has scope over the VP that encodes the complex event but there is no position where negation can merge from where it can take scope only over the result state of the event. The structure in (11a) cannot account for the ambiguity.[8] In (11b) negation is allowed to merge in two different positions in the initial structure as in (12).

(12) a. $[_{NegP}$ Neg $[_{VP1}$ János$[_{V'}$ $[_{V0}$ épített] $[_{VP2}$ egy házat$[_{V'}$ $[_{V0}$ fel]]]]]
b. $[_{VP1}$ János$[_{V'}$ $[_{V0}$ épített] $[_{NegP}$ nem $[_{VP2}$ egy házat $[_{V'}$ $[_{V0}$ fel]]]]]

In (12a) negation has scope over the complex event, it is merged in NegP over the complex VP. In (12b) it has scope over the result state of the event, it can be merged in the NegP position between VP1 and VP2 where it has scope only over VP2 that encodes the result state of the complex event.

5.2 VP internal functional projections

In recent years there have been several proposals made about the presence of functional projections within the V system. Koizumi (1993) claims that AgrOP occurs between the vP and VP projections (Chomsky (1995)). Cinque (1999) claims that several VP internal adverbs are merged in functional projections in the V system. The adverb *teljesen* "completely" can cooccur only with complex perfective VPs (13b), it cannot modify simple perfective VP as in (13a).

(13) a. *János teljesen evett egy almlt.
János completely ate an apple
'János ate an apple completely.'

b. János teljesen megevett egy almlt.
János completely pref-ate an apple
'János completely ate an apple up.'

The data presented so far suggest that in sentences where perfectivity is expressed with an overt perfective marker, there are. at least, two VP projections with functional projections between them. As it has been shown, negation and adverbs like ***teljesen*** "completely" can be merged into functional projections above VP2. I will assume that negation can be merged into two different NegPs in the V system. When the perfective prefix is present as an overt realisation of perfectivity, it heads VP2. It can be optionally extended by functional projections that host VP internal adverbs like ***teljesen*** *"**completely**"* and propositional negation. For the adverb ***teljesen*** "completely" the only available position is a VP internal adverb projection as in Cinque (1999).

7 The Motivation for NegP Movement

7.1 The trigger for NegP movement

The movement of negation from the VP internal NegP position to VP external PolP position still has remained unexplained. One way to motivate it is to claim, in the spirit of the Minimalist Program (Chomsky (1995)) that there is a strong feature on the polarity head in PolP, that must be checked by negation in Spec-head configuration in the derivation, otherwise the structure crashes at LF due to the non-interpretable strong feature of the polarity head, which violates the Principle of Full Interpretation (Chomsky (1995)). In this analysis the movement of propositional negation to PolP satisfies the output condition at the LF interface, because it deletes non-interpretable feature, but movement of negation to the external SpecPolP does not have scope assignment as its side-effect (Stowell-Beghelli (1997) as negation does not have scope over the whole event, (its scope position in VP internal NegP where it moves from). Therefore, an operator movement takes place without having any semantic effect. In this section I will make an attempt to show that the movement of negation has a semantic effect.

I will argue that negation has two tasks in the sentence. One is to interact inner aspect encoded in the VP. The other one is to modify the event, the same way as the progressive operator or habitual adverbs do. The position of these elements is always outside VP, as they always modify the whole event (Cinque (1999)).

7.2 Verkuyl's theory of aspect

According to Verkuyl (1993) inner and outer aspects have to be distinguished depending on whether we refer to the internal temporal structure of the VP or

the internal temporal structure of the sentence. In Verkuyl's theory inner aspect is composed of verbal and nominal properties in the syntactic representation. Verkuyl claims that VP (inner) aspect can be reduced to verbal and nominal features. The temporal parameter for verbs is encoded by the verbal feature (+/-ADD) where (+ADD) means roughly "progress in time" and (-ADD) means the lack of it. This feature specification distinguishes stative verbs from dynamic verbs (process, accomplishment, achievement). In the nominal domain the relevant feature is **(+/-SQA),** which means "specified quantity of'. The **(+/-SQA)** feature is the feature of the determiner system. A nominal construction is **(+SQA)** if it has a determiner or it is quantized, if neither of them is present and the nominal construction is a bare NP of existential reading, it has (-SQA) feature. Only if the properties of the verb and the arguments meet what Verkuyl calls the Plus **Principle** (all verbal and nominal features are specified for (+) value) is the VP telic.[9]

(14) a. The boys **(+SQA)** hated (-ADD) some operas **(+SQA)** for **years/*in** a year.

b. The boys **(+SQA)** built (+ADD) houses (-SQA) for **years/*in** a year.

c. The boys **(+SQA)** built (+ADD) a house **(+SQA)** *for **years/in** a year.[5]

As we can see in **(14a)** the verb has (-ADD) feature and the event is atelic, in **(14b)** the internal direct argument has (-SQA) feature and the event is atelic, in **(14c)** and **(14d)** all the nominal and verbal features are specified for (+), the events are telic.

I will assume that in Hungarian the prefix forms part of inner aspect that is VP internal aspect, as it can only be associated with telic events as prefixed verbs cannot cooccur with bare **nominals** and it can be prefixed to deverbalized nouns.

(15) a **könyv elolvasása**
the book pref-reading-3p.s.
'the reading of the book'

Outer aspect is obtained by the interaction of A-quantifiers and sentence operators that can modify aspectual **information** in the VP as the progressive operator, habitual adverbs and negation. (Verkuyl (1993). Telic events are terminative at the VP level, but these operators can **turn** them intodurative at the sentence level. In contrast to **(16a),** in **(16b)** the VP event is modified by

the adverb gyakran "often", in (16c) by the progressive operator and in (16d) by propositional negation. All these operators turn the event into durative situation?

(16) a. ***János** egy Cven **át meglátogatta az anyját.**
JBnos one year for pref-visited his mother
'JBnos visited his mother for a year.'

b. JBnos egy Cven át gyakran **meglátogatta** az **anyját.**
JBnos one year for often pref-visited his mother
'JBnos often visited his mother for a year.'

c. JBnos egy **órán át rajzolt** egy **kört.** .
JBnos one hour for drew a circle
'JBnos was drawing a circle for an hour.'

d. JBnos egy **órán** át nem olvasta el **az újságot**
János one hour for not read pref the newspaper
'JBnos did not read the newspaper for an hour.'"

Verkuyl (1989). (1993) observes that **proposational** negation always turns any event type into a stative situation as in (17). This operation always seems to take place when there is a propositional negation in the sentence, it is insensitive to the actual scope of negation.

(17) a. JBnos ***egy héten keresztül/egy hét** alatt **felépitett** egy **házat.**
JBnos *for a **week/in** a week pref-built a house
'JBnos built a house *for a **week/in** a week.'

b. JBnos egy **héten keresztül/ ??egy hét** alatt nem Cpitett fel egy **házat.** (in neutral sentence)
JBnos for a **week/??in** a week not built pref a house
'JBnos did not build a house for s **week/??in** a week.'

Verkuyl claims that the **aspectual** behaviour of events of transition changes under negation. Negative sentences are always stative, therefore they are always durative.

7.3 Negation and aspect

Verkuyl's theory makes it **possible to** explain the double nature of negation. It seems that negation on the one hand interacts with inner VP aspect, on the

other hand it interacts with outer aspect. The domain of inner aspect is the domain of VP that encodes the event structure. Negation can negate the whole event or the resulting part of the complex event. In the first case it is merged in the specifier position of NegP as an extension of the complex VP. When it has scope over the end part of the event, then it is assumed that there is an extra VP2 projection projected that has a NegP in its extended projection between VP1 and VP2. In this construction negation only negates the content of the VP2 projection.

When negation interacts with outer aspect, it has to move to the domain where elements active in the formation of outer aspect are hosted. This is the domain outside VP in the sentence, either I system. As propositional negation always behaves as an adverb that modifies VP aspect, it has to move to a position outside VP, hence it always precedes VP. The obligatory movement of negation to PolP essentially has the semantic effect of modifying the event.

Checking the (neg) feature has the semantic effect of turning all event types into stative situations. Merging negation into its base position has the effect of event negation where negation negates the event or subpart of the event. Movement of negation to SpecPolP is due to the set of features negation is associated with. These features are interpretable in the position where they are checked. If we assume that the (neg) feature has the semantic effect of modify the event, but not to negate it, then negation in PolP cannot be interpreted as event negation, only as event modification. While the base position of negation is the scope of negating the event or the resultant state of the event. The obvious contradiction that negation is always in PolP, even in those constructions in which its scope is not the whole event can be resolved. .

8 Conclusion

The central concern of this paper has been the double nature of propositional negation in Hungarian. The starting points have been the observations that (1) the interaction of negation and the event structure encoded in VP in the syntactic representation can trigger ambiguity if the verb carries a perfective marker, that is, negation can scope over the whole event and only the resulting state of the event and (2) propositional negation always occurs in a preverbal functional projection, independently of its scope properties.

I pointed out that both problems can be solved if we assume that negation can interact with inner aspect and outer aspect (Verkuyl (1993)) in a sentence simultaneously. Negation interacts with inner aspect by being able to see the internal structure of the event encoded in VP (Pustejovsky (1990)) whenever the complex events are realised syntactically as two VP projections. When negation negates the whole event, negation occupies SpecNegP over complex

VP that encodes the whole event. When negation has scope over the resulting state of the event, it merges in the NegP between the two VP projections having scope only the resulting state. I have further argued that NegP always moves to the specifier position of the VP external PolP even when its scope is the lower VP, because in the VP external position negation can modify the event encoded in VP and can convert any event into a stative situation, as it interacts outer aspect.

Notes

[*] I thank to G. Dalmi for discussing several aspects of propositional negation and to M. Brody, L. Kálmán, I. Kenesei, K. É. Kiss and Á. Nadasdy for comments and criticism.

[1] I will not discuss the semantic or the syntactic properties of negative words like *semmi* "nothing", *senki* "nobody" as they do not have negative force of their own.

[2] Cinque (1999) argues that negation can occur in several distinct positions in the clause. These position can be realised simultaneously (in certain cases contributing a single instance of negation, other cases contributing multiple instances of negation. which cancel each other out). In the examples discussed in this paper the two NegPs are related by the movement of a single instance of negation.

[3] *Nem* "not" can occur in three different positions in Hungarian. It can precede the universal quantifier, the focused constituent and the finite verb (É. Kiss (2001) and cited references there). This paper is only concerned with negation that precedes the verb and follows the universal quantifier and the focused constituent. as it seems that negation that precedes these constituents have different properties from negation that immediately precedes the verb. One relevant property is that it does not affect the event reading of the sentence. See the contrast between (i) and (ii), and the lack of it between (i) and (iii).

(i) *János egy órán it megevett egy almát.
János one hour for pref-ate an apple
'János ate an apple for an hour.'

(ii) János egy órán it nem evett meg egy almát.
János one hour for not ate pref an apple
'János did not eat up an apple for an hour.'

(iii) *Nem JÁNOS evett meg egy almát egy órán it.
not János ate ate-pref an apple one hour for
'It is not János who ate an apple for an hour.'

Examples (i), (ii) and (iii) show that when negation immediately precedes the verb. it can change the event type of the sentence, but when it precedes the focused constituent, the sentence has the same event reading as its positive version has.

[4] "Peter did not even start reading the book" and "swimming a mile" is one possible reading, the other is that "Peter started reading a book but did not finish it" and "he started swimming a mile but did not finish it" in (2a) and (2b), respectively.

[5] In Pustejovsky's theory events of transition corresponds to accomplishment and achievement events, but only accomplishment events are ambiguous in their interaction with negation. as

only the subevents (process and the result state) of accomplishment events provides scope for negation. independently. Achievement events encode only the change between two states.

[6] In Pustejovsky's theory events of transition are always complex events. Perfective events are necessarily events of transition the input of perfectivity is always an event of transition (Dahl (1995)).

[7] The reason why the prefix can independently undergo syntactic operations is due to the Bracket Retention Principle (Szabolcsi (1986)) in Hungarian.

[8] Notice that the role of vP (Chomsky (1995)) headed by v0 that hosts the light verb *cause* is not discussed here. but it is important to emphasise that neither VPI nor VP2 correspond to vP. VOI is occupied by the verb and V20 is occupied by the prefix.

[9] Events of transition in Pustejovsky's theory

[10] Durative events can be combined with for-adverbials, while terminative events can be combined with in-adverbials.

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A Phonetic Explanation of the Distributional Asymmetry between Aspirated and Glottalized Consonants

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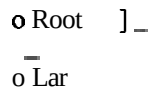
1. Introduction

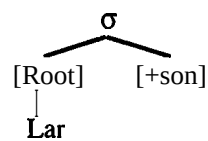
One of the most common phonological processes involving laryngeal features is laryngeal neutralization, whereby all laryngeal features are lost in syllable-final position. In models of feature geometry such as those proposed by Clements (1985) and Sagey (1986), the laryngeal neutralization process is expressed as the delinking of the laryngeal node, as shown in (1):

(1)



Lornbardi (1991) accounts for the restricted occurrence of laryngeal features by way of a positive constraint which states that laryngeal features are licensed in the following configuration:

(2)



In the framework of Optimality Theory the following constraint (3) and its ranking with respect to the Faithfulness constraint (4) would describe the neutralization phenomenon:

neutralization phenomenon:

(3) *Lar] σ
(4) *Lar] σ >> MAX-IO

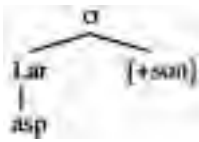
These proposals involving the laryngeal node suggest that all laryngeal features, i.e., [voice], [spread glottis], and [constricted glottis] show the same pattern of distribution with respect to neutralization. They assert that in the unmarked case laryngeally-marked consonants are restricted to syllable-initial position. Indeed it has been noted that in most cases of laryngeal neutralization all laryngeal features are neutralized, and this was the main motivation for grouping all laryngeal features under the class node Laryngeal. It is true that cases where only one feature is neutralized are less common. However, there are languages that have more than one laryngeal distinction and have the Laryngeal Constraint only on a single feature. In other words, there are some languages in which a three- or four-way laryngeal contrast among consonants in syllable-initial position is reduced to a two-way contrast syllable-finally.

For example, Hupa (Woodward 1964) shows a three-way contrast between plain voiceless, aspirated, and glottalized among stops and affricates. However, only a two-way contrast between the plain voiceless consonant and the glottalized consonant is found syllable-finally. The Laryngeal Constraint for Hupa can be proposed as follows:

(5) *[spread glottis]] a

Lombardi (1991) also notes a Hupa-type case and proposes that the constraint in such a language must mention the particular feature as in (6):

(6)



A constraint such as (5) or (6) would correctly restrict aspirated consonants to syllable-initial position. However, it does not explain why aspiration, but not glottalization is restricted to syllable-initial position. More importantly, the existence of this kind of constraint would not exclude the possibility of a constraint specifically marking the feature [constricted glottis] that glottalized consonants have.

In this paper, I address the question: Is there any pattern in the distribution of laryngeal features [spread glottis] and [constricted glottis]? More generally, what

are the phonetic factors that restrict laryngeal features to a particular position?

In the cross-linguistic survey of the laryngeal neutralization pattern, I find that when only one laryngeal feature is neutralized, there is an asymmetry between aspiration and glottalization. In languages with a single-feature neutralization, the syllable-final contrast is always between glottalized and non-glottalized segments. Only the aspirated and plain voiceless opposition is neutralized.

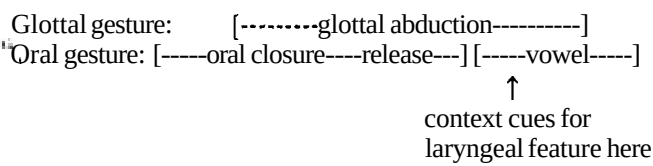
I propose that the asymmetry between the feature [spread glottis] and [constricted glottis] is due to their phonetic properties. I show that the glottalized consonant has more cues to convey its distinctiveness in syllable-final position than the aspirated consonant. In brief, the aspirated consonant has difficulty implementing its primary cue, VOT (Voice Onset Time), in syllable-final or preconsonantal position, whereas the glottalized consonant can realize its glottalization in the preceding vowel. This proposal is in line with Steriade's (1996) approach of Licensing by Cue which argues that the main factor involved in neutralization and licensing is the distribution of cues to the relevant features.

2. Phonetics of Glottalized and Aspirated Consonants

2.1. Aspiration vs. glottalization

Kingston (1985) claims that the glottal articulations in aspirated and glottalized stops are 'bound" to the release. Therefore, according to his theory;' the unmarked timing pattern in aspirated obstruents is that the peak of laryngeal gesture is timed to the release of oral constriction, which can be diagramed as follows (cited from Steriade 1996, also Ladefoged 1982):

(7) Unmarked timing pattern in aspirated obstruents



In the above case, the cues for aspiration are at the release phase with its following aspiration noise and also in the following vowel. It is well documented that aspiration is cued, among other things, by its effect on the voice onset time or offset time of a neighboring sonorant. When the aspirated consonant occurs syllable-finally, due to the lack of structure on which vowel-dependent cues can be realized, we might expect the rearrangement of the laryngeal gesture as in (8) so that the preceding vowel has cues for aspiration:

(8) Timing pattern in postvocalic preaspiration

Glottal gesture: [-------glottal abduction-------]
Oral gesture: [----vowel:---] [------oral closure----release-----]
↑
context cues for a
laryngeal feature here

However, it is not common that postaspirated consonants change the timing pattern as above when they occur in postvocalic position.

In the case of the glottalized consonant, the following is the preferred timing for oral and glottal constriction that Kingston suggests (cited from Steriade (1996)):

(9)

contextual cues
↓
Glottal gesture: [---constriction---][---adduction---
Oral gesture: [----oral closure ---release---][----vowel----------]

However, examining the phonetic facts about glottalized and aspirated consonants, we find much more variance in the realization of glottalized consonants than aspirated consonants. In the case of the glottalized consonant, the relative timing of the oral and laryngeal gestures, its effect on the neighboring vowels, and the degree to which the glottalic airstream mechanism is used differ from language to language. Importantly, in many languages the relative timing of oral and laryngeal gestures changes depending on whether the glottalized consonant is pre- or post-vocalic.

There are some languages in which the glottal closure is simultaneous with or precedes the oral closure. For example, in the glottalized consonants of Sarsi (Hoijer and Joel 1963) the glottal and oral closures are simultaneous and the oral release precedes the glottal release by a very brief time, both syllable-initially and syllable-finally. In Tsez (Maddieson et al. 1996), which is a Caucasian language, the vocal folds close firmly before the oral closure, and the preceding vowel shows an abrupt cutoff of voicing. According to Roach (1979), in British English where the glottalization of voiceless stops is common in contexts other than prevocalic, laryngeal closure precedes oral closure. In addition, some languages adjust the timing pattern of glottalized consonants to that of the preglottalized consonants in postvocalic position as follows:

(10)

contextual cues
↓
Glottal gesture: [-----constriction-----] [-----glottal closure-----
Oral gesture: [----vowel --------] [-----oral closure---

When the glottalized obstruent assumes the above timing pattern, the preceding vowel can easily or automatically laryngealize (creaky voiced or tinged with some glottal stricture) in anticipation of the full glottal closure or constriction. That is, the glottal closure causes the change in the phonation pattem of the preceding vowel. I propose in a later section that this phonetic aspect underlies the different distribution of glottalized and aspirated consonants.

23. Aspiration and syllable-final release

VOT is the major element in differentiating the aspirated consonants from the unaspirated. However, although the major reference point, i.e., VOT, is not available in postvocalic position, aspirated and unaspirated consonants may show contrast in syllable-final position in some languages, if not many. In Eastern Armenian, the difference between voiceless aspirated and unaspirated stops in syllable-final position is reported to be in the strength of the release (Ladefoged and Maddieson 1996): voiceless unaspirated stops are weakly released or not released at all, whereas aspirated stops have a shorter closure and a noticeable burst followed by noisy airflow that is sustained for some considerable time. This suggests that the release and a period of aspiration may suffice as cues for aspiration when a primary cue, i.e., VOT is not available.

In general, however, there is some confusion between aspiration and syllable-final release. In some languages all syllable-final or word-final stops are transcribed as aspirated stops. However, some linguists use the term aspiration to indicate a strong release, as in descriptions such as "a strong release sometimes approaching aspiration" (Woodward 1964:201). Consequently, it is difficult to tell what is a release and what is aspiration in syllable-final position.

Even though some languages successfully keep the distinction between aspirated and unaspirated consonants with syllable-final release, in many cases, it is likely that releasing the syllable-final consonants may result in the neutralization of aspirated and plain voiceless consonants. It seems that in many cases the cues for voiceless released consonants and aspirated consonants in final position are ambiguous. I propose that this ambiguity and the lack of VOT as a major cue for aspiration result in the neutralization of these consonants. Where there is a contrast maintained between voiceless and aspirated consonants, extra effort must be made to exaggerate the contrast.

3. Single-feature Neutralization: Asymmetry between Aspirated and Glottalized Consonants

To find out if there is any pattem in laryngeal neutralization phenomena, I examined the languages from Maddieson's (1984) sample of the world's

languages that are reported to have both aspirated and glottalized consonants. I found out that there are some languages in which a three-way contrast among consonants is shown only in syllable-initial position, and syllable-finally there is only a two-way contrast. Languages listed in (11) show this pattern:

(11) Hupa, Sarsi, Eyak, Tlingit, Tol, Takelma, Kashaya, Eastern Pomo

An interesting fact is that, in all these languages, the distinction between aspirated and plain consonants is lost in syllable-final position. In these languages that show this pattern of single feature neutralization, glottalized consonants, however, occur in syllable-final position as well as in syllable-initial position. In other words, in languages with a single-feature neutralization, the syllable-final contrast is always between glottalized and non-glottalized segments. Only the aspirated and plain voiceless opposition is netralized.

In cases where the distinction between aspirated and plain voiceless consonants is neutralized in syllable-final position, two different patterns are observed: 1. Aspirated consonants are not allowed in syllable-final position; 2. There is no surface plain voiceless consonant in syllable-final position. In this case aspirated consonants are transcribed syllable-finally. The second pattern seems to be unusual in that plain consonants (which are generally thought to be unmarked) are more restricted than laryngeally-marked consonants.(generally believed to be marked). In fact, some languages in which there are no syllable-final plain voiceless consonants are reported to have a syllable-final aspiration rule. Sierra Popoluca (Elson 1947) is one of those cases. In Sierra Popoluca aspirated consonants are not phonemic. As it was mentioned in Section 2.2, I point out that there is some confusion between syllable-final consonantal release and aspiration and that syllable-final aspiration can be interpreted as a strong release. Syllable-final release may be a strategy for boosting place of articulation cues which are generally weak in coda position. I argue that syllable-final consonantal release obscures the distinction between aspirated and unaspirated consonants and causes neutralization. Let us examine each language in detail.

4.1. Type 1: no aspirated consonant in coda

In Hupa (Woodward 1964) and Sarsi (Hoijer and Joel 1963), the distinction between the aspirated consonant and the plain voiceless consonant is neutralized and the aspirated consonant does not occur in syllable-final position.

For example, in Hupa, there is a three-way contrast between plain voiceless, aspirated, and glottalized among stops and affricates. Any consonant but /ŋ/ may begin a syllable (or a word) and all but aspirated stops and affricates are found in syllable-final position. According. to Woodward (1964), syllable-final consonants in Hupa are characterized by a strong release which is frequently a voiceless echo of the consonant or the preconsonantal element. In medial

biconsonantal combinations, the full release of the syllable-final first member separates the constituent consonants, marking the point of syllable division by a distinct hiatus. /t, k^{y}, q, ts, tʃ/ are reported to be articulated in final position with a strong release sometimes approaching aspiration (Woodward 1964: 201). /t', k^{y}', q', ts', tʃ' / are voiceless, fortis, and glottalized initially and finally.

4.2. Type 2: no unaspirated consonant in coda

In some languages where the distinction between aspirated and plain voiceless consonants is neutralized in syllable-final position, surface consonants that occur in syllable-final position are transcribed as aspirated consonants. Plain voiceless unreleased consonants are not found in syllable-final position. Relatively many languages -- Eyak, Tol, Takelma, Eastern Pomo, Kashaya and Tligit -- show this pattern. There are two main points to be made in this section. One is that the consonants that are transcribed as aspirated consonants in syllable-final position can be reinterpreted as consonants with a strong phonetic syllable-final release. The other, more important point is that glottalized consonants are different from aspirated consonants in that they have more cues to express laryngeal contrast in syllable-final position. The glottalization feature of consonants can be realized on the preceding vowel or in the glottal closure between the vowel and the consonant. This explains why we find more neutralization of aspiration than that of glottalization in syllable-final position. Let us take a look at individual lahguages.

Eastern Pomo (McLendon 1975) has the following consonant inventory:

(12) Eastern Pomo (McLendon 1975; Hokan)

p	t	t.	c	tʃ	k	q	?
p^{h}	t^{h}	$t.^{h}$	c^{h}	$tʃ^{h}$	k^{h}		
p'	t'	t.'	c'	tʃ'	k'	q'	
b		d					
	s			ʃ	x		h
		r					
m							
m							
w				y			
w				y			

The four-way contrast among voiced, voiceless unaspirated, aspirated, and

glottalized stops exists only syllable-initially. Syllable- and word-finally, only aspirated and glottalized stops contrast. Voiceless unaspirated stops, voiced stops, voiceless nasals, voiceless semivowels, and the spirant /h/ never occur in syllable-final posilion. The following illustrates the laryngeal contrast in syllable-initial and syllable-final position:

(13)	**/p'a:la:/**	'snail, slug'
	/p^{h}a:la/	'the one who goes last, or in the rear'
	/pa:laʔ/	'shovel'
	/ba:lay/	'blood'
	/si:lo:t^{h}ki:/	lick off
	/si:lot'ki:/	'mash up something in the mouth'

No voiceless unaspirated consonants are found syllable-finally. McLendon (1975) reports that in morpheme-final position, aspirated stops other than **/t.^{h}/** become the corresponding unaspirated stops when followed by a morpheme beginning with a vowel, as in (14):

(14)	[xap^{h}a:tipay]	'with drift wood'	/xap^{h}a:tip^{h}/	'drift wood'
	[c'otay]	kith a tule bog'	**/c'ot^{h}/**	**'tule** bog'
	[tʃ^{h}icay]	kith a root'	**/tʃ^{h}ic^{h}/**	'root'
	[xotʃa]	'two (things)'	/xotʃ^{h}/	'two'
	[ba: t.^{h} inka]	'got to be big'	/ba: t.^{h} ink^{h}/	'get big'

It is not clear, however, whether the underlying segment is a plain voiceless consonant that aspirates syllable-finally or the underlying segment is an aspirated consonant that deaspirates before vowels. In addition, syllable-final aspiration may be reinterpreted as release. It is unusual that an aspirated consonant becomes deaspirated in prevocalic position. It is rather more likely that the consonant described as aspirated is underlyingly unaspirated and becomes aspirated or released syllable-finally as shown in (15):

(15) a.	**/c'ot/**	'tule bog'
	[c'ot^{h}]	<------ syllable-final aspiration or release
b.	**/c'ot + ay/**	kith a tule bog'
	[c'otay]	

In discussing word-final aspiration in Klamath, Blevins (1993) mentions that obstruents are neutralized to aspirates or, more accurately, to stops which are released with simultaneous frication and aspiration. She adds that this can be viewed as a language-particular phonetic rule specifying word-final release. Elson (1947) notes that in Sierra Popoluca the stops **/p,** t, t^{Y}, **k/** are aspirated in

syllable-final position, if not followed by a phoneme of the same point of articulation. The condition that stops are aspirated when followed by a consonant with a different place of articulation suggests that they are released to compensate for weak place cues in coda position. "Aspiration" in syllable-final position is a phonetic/surface phenomenon which is not contrastive with syllable-final release, and may be understood as release. Similarly, in Eastern Pomo syllable-final aspirated consonants can be viewed as released consonants.

One phonetic study shows that there are some subtle differences between phonemic aspiration and an aspirated release. Maddieson et al. (1996b) report that word-final stops in Tlingit are utterance-finally released quite audibly with some sustained noise following the release burst, and consequently these stops have been interpreted as aspirated. However, they point out that the amplitude of the noise following these utterance-final releases is markedly less than that which occurs in initial aspirated stops. They also note that utterance-final consonants other than stops are also followed by a marked audible release and following noise. As they conclude, the noisy audible release does not indicate that the final stops belong to the aspirated category. I suggest that the same is true for the other languages where a syllable-final aspiration rule is reported.

Let us turn to the phonetic aspect of glottalized consonants. Many phonetic descriptions of glottalized consonants show that their cues are more mobile and can appear on adjacent vowels. With the mobility of the glottalization feature the occurrence of glottalized consonants is less restricted to a certain position in the syllable, compared with aspirated consonants whose primary cue is VOT.

According to McLendon (1975), glottalized stops and the glottal stop in Eastern Pomo are accompanied by glottal stricture in the articulation of any preceding or following vowels. He says that a syllable closed by a glottal stop or glottalized consonant is characterized by glottal tension throughout the whole of its articulation. This suggests that the glottalized consonant has its cue for glottalization in the preceding vowel.

A similar phonetic phenomenon is also observed in Takelma and Tol (Fleming and Davis 1977). Let us examine Takelma. Takelma (Sapir 1912, Lee 1991) has the following consonant inventory:

(16) Takelma (Sapir 1912, Lee 1991; Penutian)

P	t	k	k^w	?
$p^'$	t'	k'	k'^w	
P^h	t^h	k^h	k^{wh}	
	s	x		h
	ts'			
	l			
m	n			
w				

In Takelma, the distinction between aspirated and plain voiceless consonants is neutralized in syllable-final position by way of syllable-final obstruent aspiration as seen in (17):

(17) a.	seep-a?n	'I roasted it'
	seep^{h}	'he roasted it'
b.	xutu-m-alt-a?n	'I whistle to him'
	xutu-m-alt^{h}	he whistles to him'
	xutu-m-alt^{h}-k^{w}a .	he whistled to him'

Syllable-final obstruents in Takelma are always transcribed as their corresponding aspirated segments. However, it is not uncommon that authors transcribe heavy syllable-final release as aspiration. In addition, Lee (1991) claims that spirants /s/ and /x/ do not undergo the final aspiration rule, because they underlyingly have the feature [spread glottis], assuming that spirants inherently have the property of spread glottis usually found in aspirated stops. However, this also supports the idea that this may be in fact a phonetic phenomenon of final release. Release is a property that can be held by stops but not by fricatives and so it is natural that fricatives are not subject to this phonetic rule.

It is noteworthy that glottalized obstruents are also transcribed as aspirated in syllable-final position. Let us consider the following examples:

(18) a.	wa-akap'-in	'I shall make it tight'
	wa-aka?p^{h}	'make it tight'
b.	paa-xoot'-an	'I shall win over him'
	paa-xoo?t^{h}	kin over him'
	paa-xoo?t^{h}-ka?	'I won over him'

Notice that glonalized obstruents in syllable-final position become aspirated, or rather released, with a preceding glottal catch, i.e., /t'/ ---> [It^{h}], /p'/ ---> [$^{?}$p^{h}]. That is, if a glottalized obstruent occurs syllable-finally, it becomes a preglottalized released consonant. Lee (1991: 82) analyzes this process as Laryngeal Flop whereby the feature [constricted glottis] from the syllable-final consonant delinks and is relinked to the preceding nuclear timing slot. However, this phenomenon is just a phonetic one in which the final glonalized obstruent changes its timing pattern to become preglottalized. When glonalized consonants become $^{?}$C^{h}, release of the oral closure is preserved and the components that are already present in glottalized consonants of Takelma, namely a released closure and glottal stricture, are simply rearranged. Presumably, the preceding vowel may also be affected since it precedes the glottal catch. This parallels Eastern Pomo where the glottal stricture is heard in

the preceding vowel.

When a final consonant is released, the distinction between aspirated and plain consonants is easily neutralized, since aspiration and strong release are ambiguous without additional cues such as VOT or deliberate degrees of release. However, the glottalized consonant resists neutralization not only due to its perceptually distinct release but also due to adjustments of oral and laryngeal gestures that affect the preceding vowel.

4. Summary

So far I have shown that there is a tendency for the aspiration contrast to be neutralized in syllable-final position more frequently than a glottalization contrast. This is contrary to the claim that postaspirated consonants and ejectives typically neutralize in the absence of a following vowel or sonorant (Kingston 1985, Steriade 1996). I have suggested that the asymmetry between glottalization and aspiration, which has been neglected in any theory of laryngeal neutralization, is due to their cue distribution. Specifically, glottalization has more or stronger cues than aspiration in syllable-final position. In other words, a preceding vowel can carry the cues of glottalization to convey the laryngeal contrast, which makes it different from aspiration.

Recently, as the power of the constraints is getting bigger, the need for phonetically-grounded constraints has been proposed. I have not formalized the constraints as mentioning phonetic cues in this paper. I have just showed that some phonological phenomena such as laryngeal neutralization as discussed in this paper, can be better accounted for when we refer to the phonetic aspects and suggest that further research in this direction is needed.

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Perceived Foreign Accent along the /s/ to /z/ Continuum

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1 Introduction

When speaking a second language (L2), even very fluent speakers may be perceived by the native speakers of that language as having accented speech. There are many aspects of a signal that may produce the accented percept; any deviation from what is considered normal for a particular language may lead to the percept of an accent. These deviations may occur at any one or a combination of the many levels of language: semantics, syntax and morphology, phonetics and phonology. Of all these levels, pronunciation (phonetics & phonology) appears to be the most resistant to restructuring in the L2 (Scovel, 1969; Ervin-Tripp, 1974; Schumann 1978; Ellis, 1985; MacDonald, 1989). The purpose of the present study is to investigate the degree to which accent perception is affected by vowel and fricative durational changes in the acoustic signal along the /s/-/z/ voicing continuum in isolated words.

Previous research by Harriet S. Magen (1998) found that native English listeners do not appear to use voicing cues to determine accent when judging running speech. However, Magen s study used complex stimuli in which she co-varied several factors that could affect accent perception; therefore, it is difficult to rule out any potential cues to accent perception. The predictions of the present study are that English listeners will perceive speech to be accented or not by vowel, fricative and ratio durations for both /s/ and /z/, but that Spanish listeners will only perceive speech to be accented by vowel, fricative and ratio durations for /s/. Spanish at the phonemic level does not have a phonemic contrast between /s/-/z/ as English does. Moreover, while Spanish does have an allophonic [s]-[z] contrast. The current stimuli s allophonic environment evokes either the [s], or [h] allophone but, not the [z]. Therefore, Spanish speakers who are fluent English speakers will be unable to use durational voicing cues to make accentedness judgements.

2 Previous Research

Harriet S. Magen (1998) studied various phonetic and phonological factors of global accent perception. Magen investigated the following factors: initial epenthetic, non-initial epenthetic schwa, -ed ending, vowel quality (reduction, tense, lax), consonant (finals, deletions), manner (ts-s), and voicing (s-z). Results for Magen's perception study showed that listeners were sensitive to all of the parameters except the /s-z/ voicing cues.

Despite her global findings, there are reasons to question Magen s methodology. She used a sampling rate of 10kHz with a 4.5 kHz low pass filter setting and a 12-bit quantization rate. This is a sufficient sampling rate for many of the parameters that Megan tested but I believe this to be insufficient for testing the voicing of post vocalic /s-z/. By using only a 10kHz sampling rate important cues of high frequency fricatives /s/ and /z/ are eliminated. I suggest raising the sampling rate to 22kHz to accommodate fricatives /s/ and /z/. The low pass filter acts as an "anti-aliasing filter" again cuts out important high frequency information used in identification of /s/ and /z/. A solution to this problem suggested by Johnson (1997) is to double the sampling rate. A 22 kHz sampling rate is a better choice for studying the /s/ and /z/ fricatives because it allows a Nyquist frequency of 10 kHz (8 kHz with filtering) which is sufficient to include the high frequency spectra of sibilants.

Megan used a 12-bit quantization, which has a signal to noise ratio of 4,096:1. I suggest using a 16-bit quantization (65,536:1 signal to noise ratio) because it cuts down on noise that is introduced when digitizing. The alteration of the sampling rate, filters, and quantization bit-rate will improve the target stimulus and guarantee a truer recording of intended object of the study.

A second problem with Magen s study is that the speech stimuli were based on utterances of Spanish L2 speakers. Megan modeled the Spanish speakers English productions for /s-z/ to match the vowel/fricative ratio of a model English speaker. Her investigation was to see if correcting the voicing of /s-z/ would eliminate perceived accent and to what degree this improved. The drawback to using actual L2 stimuli is that it is accented along many dimensions making it very difficult to ensure that listening subjects are really responding to changes in duration, and not responding to something else already in the signal. I propose that reversing Megan's stimulus construction method, by using English speech as the starting point, will control for other accent variables. The English speech modifications should be modeled after the Spanish speaker's vowel/fricative ratio. As the English speech is altered to become more like that of the L2 user, accentedness scores should rise.

Magen digitized her stimulus by beginning with short durations and adding onto the length. In an attempt to achieve truer natural sounding digitized speech, I choose long durations for the vocalic and fricative portions of the

stimuli. These long portions were then cut down to match speaker background ratios of .5-2.0.

Wright, Frisch, and Pisoni (1999) review several studies that have found that the English listener attends to numerous cues in perceive obstruent voicing. The cue considered to be the primary voicing cue is periodicity. Vocal fold vibration produces periodicity, which cues voiced sounds. In the absence of vocal fold vibration there is an absence of periodicity, which cues voicelessness. Secondary cues are voice onset time (VOT), amplitude of aspiration or frication noise, presence of aspiration noise, and temporal (duration) cues. If stop consonants in question for voicing are in word initial position, VOT becomes the primary cue with secondary cues being presence of aspiration, amplitude of aspiration and relative amplitude of release burst. If consonants in question are post-vocalic, as in the case of the current stimuli, the duration and spectral properties of the preceding vowel provides the main voicing cues. Postvocalic consonant stricture is also a clue.

P. Denes (1955) conducted an initial study of duration used as a cue for voicing perception. Denes studied perception of voicing by investigating the duration cues of vocalic tokens with following fricative /s-z/ durations. Results showed that non-spectral characteristics such as relative duration of vowel and final consonant can be used as a cue to voicing in post-vocalic consonants, but that these cues are not independent of one another.

Marguerite MacDonald (1989) in a study of the difference between the phonology of Spanish and English, concluded that phonological aspects of the L1 become fossilized for the post-adolescent L2 user. This fossilization of the L1, or even the fossilization of an inter-language between the L1 and L2, cause deviations from the target. MacDonald points out that an area of great difficulty for the Spanish speakers of English is in the pronunciation of fricatives. Phonemically, Spanish only has voiceless fricatives where English has both voiced and voiceless fricatives. See the differences between tables 1 & 2. Notice that Spanish /s/ also can differ from /s/ of English along Place distinctions, though Place effects are not the object of the current project.

Table 1: Spanish Consonant Phonemes, after McDonald (1998)

	Bilabial	Labiodental	Dental	Alveolar	Palatal	Velar	Glottal
Stops	p b		t d			k g	
Fricatives		f	(s)	s		x	(h)
Affricate					tʃ		
Nasals	m			n	ɲ		
Lateral				l	ʎ		
Tap				ɾ			
Trill				r			
Glides					j	w	

Table 2: English Consonant Phonemes

	Bilabial	Labiodental	interdental	Alveolar	Palatal	Velar	Glottal
Stops	p b			t d		k g	
Fricative		f v	θ ð	s z	ʃ ʒ		h
Affricate					ʧ ʤ		
Nasals	m			n		ŋ	
Lateral				l			
Glide					j	w	

MacDonald not only points out the differences in fricatives between the two languages but, as well points out the differences between vowels of the two languages. MacDonald brings attention to the fact that Spanish vowels are generally short, tense, and monophthongal whereas the English equivalents are long, tense, and likely to be diphthongal.

Flege and Hillenbrand (1986) investigated the use of temporal cues for identification of /s/ and /z/ for native and non-native speakers. Their finding contradicted previous work by Flege (1984). Flege's previous work found that L1 Arabic speakers experienced in L2 English closely resembled L1 English listeners perception of /z/ voicing when either vowel was lengthened or fricative shortened however, inexperienced L1 Arabic speakers without experience in L2 English did not show an increase in judging /z/ when fricative alone was shortened. These findings led Flege to believe that with experience L2 users could perceive voicing difference by either vowel duration or fricative duration cue. Flege and Hillenbrand (1986) found that experience in L2 English isn't necessary for non-natives to use vowel duration as a voicing cue. The non-native listening subjects in this study were from Sweden, Finland, and France. The French whom have a /s-z/ difference like the English responded like the English to the vowel and fricative temporal cue changes. However, the Swedish and the Finnish subjects whom do not have the /s-z/ fricative difference, but do have a vowel difference for voicing did not respond to changes in fricative. The leap that I make from these findings in the (1986) study is that for an L2 user to be able to determine which productions in the L2 are ***accented*** or ***not,*** the L2 speaker must have those cues which are tested in their L1 phonology.

3 Production Experiment

The Spanish data for the stimulus models were based on recordings of a single native speaker of Spanish from Michuocan, Mexico. The stimuli were constructed from the recorded speech of a 37-year-old male volunteer from Omaha, Nebraska. The first stage was to measure vowels and fricatives of the two languages to establish the parameters for the stimuli.

3.1 Methods

The two speakers were recorded in a sound treated room. The microphone was positioned 1 inch to the left of the speakers mouth to prevent aspiration noises from distorting the recordings. The reading lists were made of minimal pairs in which all words changed word finally between alveolar fricatives voiced or voiceless. The minimal pairs were read from a list of single words, and from a list of carrier sentences. The sentence recordings were collected to see if there was a difference between rates of speaker. The two lists produced similar recording, and it was judged that the single word list was sufficient to use as stimuli. From the word list the minimal pair, niece /s/ and knees /z/ were used. The speech recorded by the two speakers was then digitized using a 22kHz-sampling rate, and 16 bit quantization rate.

Waveform and spectrographic analysis of the speech was conducted on the CSL 4300B. Steady state vowels preceding word final /s/ or /z/ were measured. Vowel duration was measured from the onset of f2 to the offset of f2. Frication duration was measured from the offset of f2 to the end of the /s/ and /z/ frication as visible on the spectrogram, plus 10ms of quiet to insure that no fricative noise was being cut off.

3.2 Results

The results for fricative duration measures show that there is a relatively large difference in the English productions of /s/ and /z/ -- about a 100 ms difference. While there is a slight difference in the Spanish speakers production of /s/ and /z/, the /z/ is actually longer than /s/. This trend is the opposite of the ideal" English /z/ production. Vowel duration results indicate again the relatively large difference for English between the vowel before an /s/ and the vowel before /z/-- about 75ms. While the Spanish vowel durations do follow the ideal" length for English /s/ and /z/, the difference between the vowel productions is only 25ms. Looking at the duration results as a ratios of fricative/vowel: there is a s-ratio is roughly 2 times that of the z-ratio for English, while the Spanish s-ratio is only 1.25 times that of English.

3 Perception Experiment

The stimulus minimal pair chosen for the perception experiment is niece and knees . The ideal English /s/ has a short vowel duration paired with a long fricative duration. The duration combination for English /z/ is a long vowel duration paired with a short fricative duration.

There are different hypotheses depending on the nature of the stimuli. For expected /s/, niece , there is one prediction: all listeners accent judgments of

/s/ stimuli will be similar regardless of native language or L2 experience. For Expected /z/, knees there are three predictions: 1) accent judgments of /z/ stimuli will be similar for all L1 English listeners, 2) accent judgments will be influenced by L1 English listeners experience with L2 Spanish, 3) L1 Spanish listeners accent judgments will be different from all L1 English listeners accent judgments.

3.1 Methods

In this study, there were 30 listeners who break down into groups of ten: English bilinguals (Spanish L2), English monolinguals, and Spanish bilinguals (English L2). The three groups differ by their place of origin, years of L2 study, years in L2 country and by L2 countries. English bilingual participants, whose details are shown in Appendix I, were either graduate students or faculty at the University of Washington. English monolinguals, whose details are shown in Appendix 2, were individuals currently living in Seattle, WA. Spanish Bilinguals, whose details are shown in Appendix 3, were graduate students or faculty at the University of Washington.

Stimuli were constructed by digitally editing the vowel waveform of the English speaker's production of "knees" and fricative waveform from his production of "niece". Cuts were made so as to shorten rather than lengthen the stimuli and the splice point was always at a zero crossing with appropriate phase angle to minimize the introduction of noise into the stimulus. The longest duration was 200 ms, and the shortest was 100. The 3 lengths of /s/ and three vowel lengths (200 ms. 150 ms, and 100 ms) were cross-spliced to create an /s/ to /z/ continuum with 5 stimulus steps with the following fricative-to-vowel ratios: 2, 1.33, 1, .75, .5. The stimulus where the /s/ was twice the length of the vowel roughly matched the measured English /s/ in "niece" and is considered the 'ideal-/sf. The stimulus with a fricative to vowel ratio of .5 roughly matched the measured English /z/ in "knees" and is considered to be the 'ideal-/z/'.

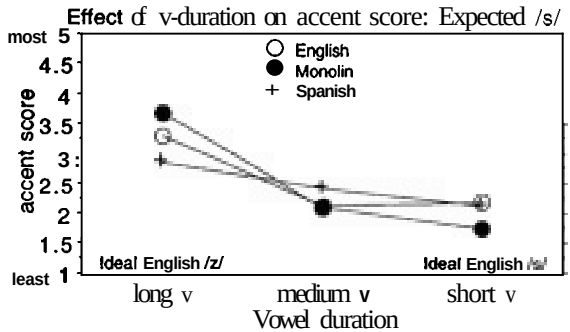
Stimuli were recorded onto standard audio cassettes for binaural presentation over headphones at a comfortable listening level. The stimuli were presented in three randomized blocks and the blocks were randomized for each listener. Listeners were given answer sheets with the words "niece" or "knees" followed with a rating scale from 1-5 where 1=least accent, 3=moderate accent, and 5=greatest accent. They were instructed to listen to stimuli and circle the number that best fit the accent level.

3.2 Results and discussion

Results were submitted to a factorial ANOVA with 'score' as the dependent variable, and language background (English-mono, English-bi, Spanish-bi), vowel duration (short, medium, long), fricative duration (short, medium, long),

f/v ratio (.5, .75, 1, 1.33, 2), and intended fricative (s, z) as the independent variables.

Vowel duration results for "niece", shown in Figure 1, indicate the same trend for all listener types. When the duration was appropriate for /s/ it had a low accent score and when it was more appropriate for /z/ it had a high accent score. While the Spanish listeners' slope is slightly flatter, there is no significant effect of L1 on accent perception where vowel duration is concerned.



vowel duration: expected /s/

	P-Value		
long v. medium v	<.0001	S	
long v. short v	<.0001	S	
medium v. short v	1.000		

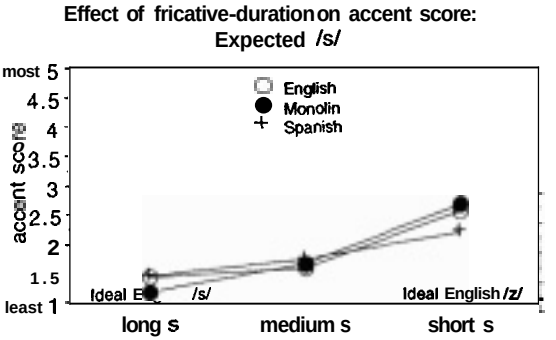
vowel duration: expected /s/

	P-Value
English Bilingual, Monolingual	.8372
English Bilingual, Spanish Bili...	.6439
Monoliiual. Spanish Bilingual	.7973

Figure 1. Effect of vowel duration on accent score for /s/.

Fricative duration results for "niece" are shown in Figure 2. Like the results for vowel duration, when the fricative was the appropriate length for /s/ the accent score was low and when it was more appropriate for /z/ the accent score was higher.

Remembering that the fricative/vowel duration ratio is the best predictor for perceptional cues of voicing for /s/ and /z/. (Denes, 1955). Across all three listener groups the trend shows that ideal /z/ ratio was judged as most accented and ideal /s/ ratio was judged as least accented. Results for the fricative to vowel ratio are shown in Figure 3. When listeners were expecting an /s/ the ratios patterned like the raw durations. There is a trend for the accent scores to be significantly higher when the ratios are more appropriate for a /z/ than for an /s/. There is no significant effect for L1. Therefore when listeners are expecting and /s/, which is phonemic in both languages and is the appropriate allophone in word final position in Spanish, Spanish and English listeners judge the stimuli in the same way: the shorter the /s/, the longer the vowel, or the smaller the fricative to vowel ratio, the greater the perceived accent.



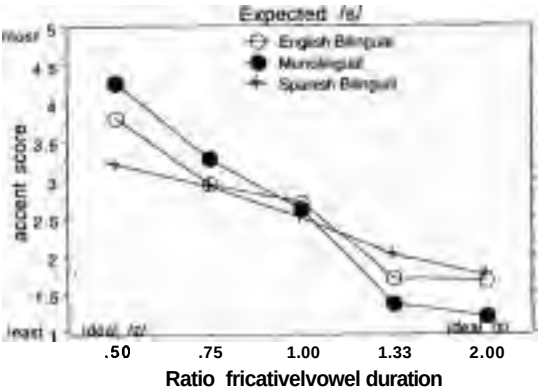
Fricative duration: expected /s/

	P-Value	
long s, medium s	.0627	
long s, short s	<.0001	S
medium s, short s	<.0001	S

Fricative duration: expected /s/

	P-Value
English Bilingual. Monolingual	.8449
English Bilingual. Spanish Bili...	.6599
Monolingual, Spanish Bilingual	.8069

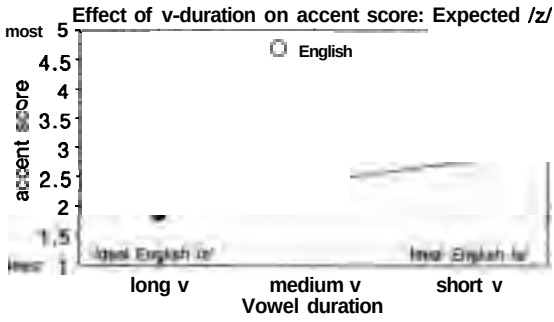
Figure 2. Effect of fricative duration on accent score for Is/.



fricative/vowel duration ratio: expected /s/

	P-Value
English Bilingual. Monolingual	.8271
English Bilingual, Spanish Bili...	.6232
Monolingual, Spanish Bilingual	.7848

Figure 3. Effect of fricative/vowel ratio on accent score for /s/.



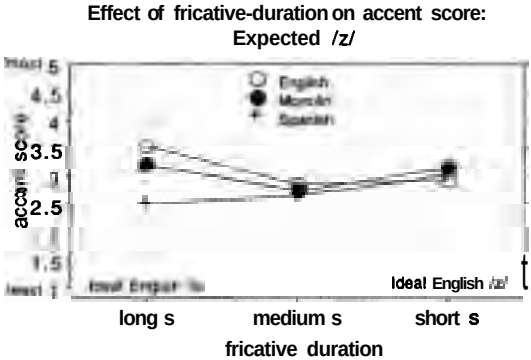
vowel duration: expected /z/

	P-Value	
long v, medium v	.0023	S
long v, short v	<.0001	S
medium v, short v	<.0001	S

vowel duration: expected /z/

	P-Value	
English Bilingual. Monolingual	.6115	
English Bilingual. Spanish Bili..	.0096	S
Monolingual. Spanish Bilingual	.0369	S

Figure 4. Effect of vowel duration on accent score for /z/.



Fricative duration: expected /z/

	P-Value	
long s, medium s	.0357	S
long s, short s	.7821	
medium s, short s	.0850	

Fricative duration: expected /z/

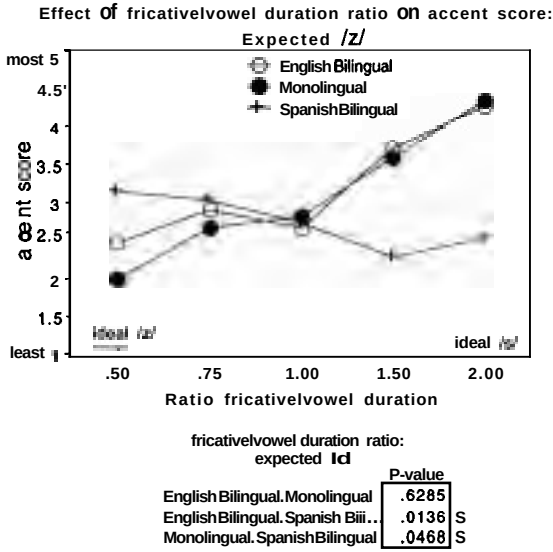
	P-Value	
English Bilingual, Monolingual	.6468	
English Bilingual, Spanish Bil..	.0202	S
Monolingual, Spanish Bilingual	.3611	

Figure 5. Effect of fricative duration on accent score for /z/.

Turning next to the condition where listeners expect to hear a **/z/,** the results for vowel duration are shown in Figure 4. Notice trend for **L1** English listeners to rate ideal /s/ as most accented and **/z/** as least accented. Trend for **L1** Spanish listeners **is** to rate ideal **/s/** as least accented and ideal **/z/** as most accented. The Spanish listeners expected /z/ results are similar to their expected **/s/** results.

There is a trend for English bilinguals to judge accent a little more extreme than the English monolingual. However, this is not a significant difference.

As is shown in Figure 5, there is a robust effect for L1 on accent perception when listeners expect /z/. Notice that the trend for L1 English listeners is opposite that for expected /s/. The English listeners responded to ideal /s/ as most accented and ideal /z/ as least accented when they were expecting the word "knees". The trend for the L1 Spanish listener is similar to the trend for expected /s/. The Spanish listeners found ideal /s/ to be least accented and ideal /z/ to be most accented for expected /z/ even when they were listening for the word "knees".



fricativelvowel duration ratio:
expected /z/

	P-value	
English Bilingual. Monolingual	.6285	
English Bilingual. Spanish Biii..	.0136	S
Monolingual. Spanish Bilingual	.0468	S

Figure 6. Effect of fricative /vowel ratio on accent score for /z/.

The results for the effect of fricative to vowel ratio are shown in Figure 6. The trend for all L1 English listeners was to judge ideal /z/ ratio as least accented and ideal /s/ ratio as most accented. The Spanish listeners trend shows the opposite of this with ideal /z/ ratio being judged as most accented and ideal /s/ ratio as least accented. Since this is the measure which most closely resembles the cues that listeners attend to, and since it accords with both the duration conditions, it is safe to interpret the results as indicating that when English listeners of both types anticipate a /z/ they are hear durations which are more appropriate for an /s/ as accented while Spanish L1 listeners cannot use this information to make accent judgements.

4 Conclusion

L1 English listeners use durational voicing cues to judge speech as accented. This finding applies to vowel duration, fricative duration and ratio durations for both /s/ niece and /z/ knees judgments. L1 Spanish listeners will use durational voicing cues to judge English speech as accented only when expecting /s/ niece. This finding applies to vowel duration, fricative duration and ratio durations.

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Appendix 1

English Bilingual: Differences

	Origin	Years of L2 Study	Years in L2 Country
Listener 1:	Gainesville, FL.	15	3- Bolivia
Listener 2:	Rhode Island.	10	1- Spain
Listener 3:	Seattle. WA	15	5- Chile
Listener 4:	San Diego, CA	18	3- Spain
Listener 5:	Seattle, WA	3	.5- Mexico
Listener 6:	Iowa	13	.33- Mexico
Listener 7:	Alabama	10	2.5-Spain
Listener 8:	California	34	22- Mexico
Listener 9:	California	13	3-Argentina
Listener 10	California	12	5-Spain

Appendix 2

English Monolingual: Differences

	Origin
Listener 1:	Milwaukee, WI.
Listener 2:	San Diego, CA
Listener 3:	Milwaukee, WI
Listener 4:	Montana
Listener 5:	Wyoming
Listener 6:	Houston, TX
Listener 7:	Cincinnati, Ohio
Listener 8:	Seattle, WA
Listener 9:	Wausau, WI
Listener 10:	Milwaukee, WI

Appendix 3

Spanish Bilingual: Differences

	Origin	Years of R Study	Years in L2 Country
Listener 1:	Mexico. Mexico	20	20 U.S.
Listener 2:	Lima. Peru	2	2-U.S.
Listener 3:	Mexico. Mexico	8	5-U.S.
Listener 4:	Cojumatlan, Mexico	4	4-U.S.
Listener 5:	Madrid. Spain	30	10-U.S.
Listener 6:	La Mancha, Spain	12	2-U.S./G.B.
Listener 7:	Madrid. Spain	15	3.5-U.S.
Listener 8:	Mexico, Mexico	17	17-U.S.
Listener 9:	Granada, Spain	6	1-U.S.
Listener 10:	Valencia, Spain	20	3-U.S./G.B.

Dans la langue, il n'y a que des différences: What would Consonant Inventories look like if they were Functionally Optimal?

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1. Introduction

This paper focuses on the deduction of continuant consonant inventories, specifically looking at the place of rhotics within these inventories, this according to functionalist principles. In a first part, I briefly introduce functionalism and sketch out its larger themes. Here, I provide a historical and present-day grounding for my own work. In the second and third parts, I define the articulatory and perceptual drives, respectively, and articulate constraints that result from them. In a final part, I deduce rhotic inclusion in a five-member continuant consonant inventory, that of Standard European French, and a six-member set, that of Southern Dutch.

2. Functionalism

Traditionally, linguists have tackled problems by first examining a set of data, which is described in terms of its regularities and irregularities. This is then applied to an existent or innovative theory from which an explanation is induced. I refer to traditional methodology as data dependent, as it has at its foundation a predetermined set of linguistic tokens, whence all description is borne. While such investigative processes do provide explanation for the data set concerned, they offer little in the way of heuristic power, i.e. such theories cannot provide explanation for the phenomenon itself and provide a larger perspective on the functioning of language vis-à-vis the question at hand.

Functionalism represents a departure, if not a complete reversal of traditional methodology. Here, universal principles form the basis of linguistic investigation. These derive from language external facts, such as biomechanical universals. These are subsequently used to generate local theories, i.e. theories applicable to the more limited question at hand, in our instance providing

explanation as to how language works. Such local theories are seen in this paper, as applied to inventory selection. Only after the generation of local theories—here articulated as constraints—is a comparison made of the theoretical output of constraint interaction to that of real language. This takes the form of a comparison of how language "should work," according to the local theories, and how it "does work," in comparison with real data.

In essence, functionalism views language as merely another human activity. Much like running, breathing or combating the common cold, linguistic behavior is governed by the human biological and cognitive facilities. Linguistic behavior specifically involves flesh and bone—in the production of signals—and neurological stimulation and organization—in the reception signal and processing of the signified. It is the function of these facilities that governs language by a priori restrictions on human activity.

One of the first works that can be described as functionalist is Passy **(1891).** His now-famous mantra, "*dans la langue, il n'y a que des différences*" or "in language, there are only differences" is not coincidentally the title of this paper.. By this, he infers that linguistic units are defined not by their similarities, but by their differences vis-A-vis all other concerned segments. Passy highlights two tendencies fundamental to language **(2):**

1. ***Le langage tend constamment à se débarrasser de ce qui esf superflu.*** "Language tends to constantly rid itself of superfluities."

2. ***Le langage tend consfamment à mettre en relief ce qui est nécessaire.*** "Language tends to constantly emphasize that which is necessary." **(227)**

These two principles are further expounded to include all instances of economy and emphasis (228), whence all changes are purported to derive. His thesis provides that change takes place due to either the primacy of economic articulatory gestures or the need for emphasis. Which of each of these wins out is context dependent. Opening a larger window onto the functioning of language as a human phenomenon, Passy finally notes that "on parle pour Ctre compris, et rien que pour Ctre compris" **(229: "We** speak in order to be understood, and only to be understood").

Martinet (1**955)** represents a return to the externally motivated ideals laid out by Passy, which were largely ignored during the first half of the twentieth century, again in a largely diachronic work. In Martinet's view, function is a distinctive linguistic operation, one deriving from the act of speech and not from the content thereof. He asserts that "en linguistique, l'activité dkrive de l'homme qui parle et non des unités phoniques ou de sens à qui I'on prête A des fonctions" **(39:** "in linguistics, the human activity derives from the speaker and not from sound units or from the meaning attributed to functions"). Martinet critiqued the contemporary penchant for binary oppositions and the integrationist presuppositions inherent to structuralists of the day as being unmotivated by the larger principles governing human activity **(72-74, 88-89).** Rather than repose his analysis on pre-conceived structures, Martinet asserts

articulatory economy as a primary catalyst for sound change. This is intrinsically linked to Zipf (1949) and his "principle of the least effort" (94). This assumes that, all other input and systemic requirements being equal, human activity will default to the least possible expenditure of positive energy to accomplish a given activity.

More recently, innovations in technology and in linguistic theory have lead to a return to many of the principles ignored since the times of Passy and Martinet. Schwartz et al. (1997) develop their theory of Dispersion and Focalization, which rests on principles of economical use of acoustic space. The guiding principle of this work harks to that of Passy, stating that the best use of acoustic or perceptual space will respond to needs for dispersion of elements within that space as well as the relative focalization of the space used, vis-à-vis the entire space available. Another important series of works is seen in Lindblom (1990) and Lindblom et al. (1995). The Hyper-Hypo (H&H) theory of speech production and variation underlines the tension between the drives for economy of speech gestures and the minimization of perceptual effort. Here, focus of linguistic theory is the on-line production of speech signals and their perception. Rather than assert a specific form as the target of production and perception, H&H assumes that speech is governed along a continuum. On the one hand, hyper events are ones are signal oriented, i.e. it is how a particular segment is produced that is given primacy in the speech event. On the other hand, hypo events are ones are content oriented, i.e. it is the meaning given to an event that is allowed to dominate. Hyper speech results in greater articulatory effort: hypo speech results in less perceptual salience.

Boersma (1998) is the first, and for the purposes of this paper, the most important, work combining phonology and functionalism. His book provides the methodological and theoretical framework for this paper, although he does not address the question at hand. Among the important premises put forth by Boersma is the rigorous distinction between the two drives inherent to linguistic production: articulation and perception. This division of labor derives from the polarity of the communicative process. On one end of the spectrum is a producer of communication, on the other a recipient. From these two functions all linguistic form is made possible. For that purpose, it is crucial to evaluate articulation and perception separately and to provide for their output in different stages. In the interest of brevity, I provide the basic principles of functionalism, as I have synthesized them from other works and apply them to this paper. These are provided in Appendices **A** and B.

3. The Articulatory Drive

The first communicative function I treat is the articulatory drive, also referred to as "articulatory implementation" by Boersma. The articulatory drive refers to

the physical movements of articulators at precise moments and in precise manners with the goal of communication. For the purposes of this paper, with its emphasis on spoken human language, the relevant articulators are the upper and lower mandible, the tongue, the lips, and the larynx during pulmonic egression. Movements of these articulators may be simple (i.e. imply only one set of articulators and one distal displacement of these) or complex (i.e. imply the coordinated movement of two or more articulator sets in two or more distal movements). Communication in this sense is carried out by articulation through the production of acoustic signals, destined to be interpreted as perceptual cues.

Articulation is broken down to include three factors fundamental to the production of distinctively different signals. Each concerns one facet of an articulator's movement from the inertial, neutral position. These are as follows:

a. target: place of movement or the destination of trajectories away from neutral or rest position of articulators

b. duration: positive, temporal length of articulator movements away from neutral

c. speed: velocity of articulatory movements away from neutral

These are a priori independent components, although their interdependence is implied by coordinated articulatory patterns: each can be crucial in the categorization of an articulation. The third consideration, speed, does not represent a crucial component of inventory selection and is ignored in this paper.

Given the principles outlined in Appendix **A,** it is possible to draw a number of conclusions vis-a-vis the types of movements that will be favored by the human articulatory mechanism. Basic to our argument is the fact that humans avoid the expenditure of energy, i.e. movement of an articulator away from neutral or rest position. The best, or most harmonious movements will be short, proximal to the neutral position, and involve simple movements. These will be reused in other gestural patterns or combinations thereof. These are referred to as optimal movements: optimal refers to the best means of accomplishing a task that is otherwise disfavored. The optimal inventory will provide for the greatest ease of articulation and the minimizing of articulatory effort

We assume that humans do not like to move from neutral (i.e., expend energy), but if they do this will be accomplished, ceteris paribus, in the most efficient manner possible. This leads to the articulation of the following, general optimization constraint:

*EFFORT: we are too lazy to do anything (Boersma 1998: 149, adapted)

The universal ranking hypothesis for *EFFORT is expressed as follows:

$\Rightarrow$ *EFFORT (x) $\gg$ *EFFORT (y) *iff* x $\gg$ y

This may be summarized as, "an effort (x) is more bad than an effort (y) if and only if (x) results in a greater positive amount of effort than does (y)."

For this paper, it is useful to develop the *EFFORT constraint only in regards to the target of movements and to the duration of these movements. Velocity is not a crucial issue. Two local articulatory constraints are appropriate for

considerations of inventory selection by the articulatory drive. These imply the reuse of distal movements, i.e. the efficient use of articulatory targets via the reuse of targets for multiple articulatory efforts, and the minimization of long movements. These constraints are expressed as follows:

> REUSE: reuse a movement from neutral and combinations of movements as much as possible
>
> *HOLD: an articulator is not held in a non-neutral position for any positive amount of time (Boersma 1998: 150)

The interaction of **REUSE** and *HOLD provide for the selection of optimal candidates in an inventory. This is accomplished by promoting shared trajectories and by disfavoring positively lengthy movements, respectively. In subsequent sections, local constraint interaction will be expressed in Optimality Theory (OT) compatible tableaux.

4. The Perceptual Drive

As suggested in 3, articulation is only one part of the communicative puzzle. The implicit result of articulation is an acoustic signal. This signal is physically realized as energy, measured in dB (intensity) and kHz (pitch) and is, assuming an undamaged auditory system, perceived by a second party. Perception is characterized by stimulation of the cochlea. These stimuli are processed by the human cognitive system and, given enough stimulation, regularities in the acoustic signal are categorized. The physical and psychological (or cognitive) propensity to turn acoustic cues resultant from articulatory events into interpretable units of meaning is the essence of the perceptual drive, also referred to as "perceptual specification" by Boersma (1998).

The perceptual drive is catalyzed by the presence or assumption of acoustic energy, i.e. the physical reality received and recognized. Here, it is useful to distinguish between two topics relevant to acoustic energy:

> a. the concentration of energy, i.e. the quantity of energy, as measured at certain points in acoustico-perceptual space (in kHz)
>
> b. the type of energy, i.e. qualities of the energy, as seen in energy patterns (dispersed, focused, dampened, vowel-like, burst, etc...)

Stevens (1989) shows that the best acoustic signals allow for the variation whilst reducing possible confusion. He provides evidence for regions of acoustic stability where minor variations in the articulatory input do not qualitatively correspond to variation in the output. Schwartz et al. (1997) suggest that the most effective organization of a vowel system will respond to the conflicting needs of dispersion and focalization (3). Firstly, members of a system should be sufficiently dispersed one from another, i.e. they should not be so similar with regard to either quantity or quality as to allow for confusion. Secondly, these members, when viewed as a whole, should use the total acoustic and perceptual

space available as efficiently as possible, i.e. should be focalized enough to eliminate superfluities.

As seen in the considerations given to the articulatory drive, the principles outlined in Appendix **A** provide a number of insights into what the best perceptual mechanism will involve. Questions of what sounds are best .to perceive and what group of sounds will be perceived as distinctive, while not involving exaggerated or superfluous perceptual effort, must be resolved by the functional system. Humans like to perceive elements that are distinct—i.e. that are not easily confused with other elements. At the same time, humans do not like to expend energy in the perception of these elements: should this expense be made necessarily, it will be limited to the greatest extent possible. In response to these considerations, we assert that the optimization of the human perceptual mechanism will promote ease of perception and penalize its confusion. At the same time, optimization favors dispersion of elements within acoustic space while that space is efficiently used. The optimal inventory responds to each of these tensions.

The most basic constraints resulting from the optimization of perceptual principles are seen in the following general constraints. The first states quite simply that, all other things being equal, acoustic signals will be perceived. The second introduces limitations on the processing of perception.

> PERCEIVE: perceive signals in acoustic space
>
> *CONFUSE: we are too petty to allow for confusion (Boersma 1998: 173)

Applied to the local domain of inventory selection by the perceptual mechanism, we turn' our attention to the articulation of local constraints. All previous work in this regard, including that of Lindblom (1972), Diehl and Lindblom (2000), Boersma (1998) and Schwartz et al. (1997) has focused on vowel inventories. The use of constraints here is tailored to the particular environment of consonant inventories, where considerations of acoustic quality and quantity are necessarily adapted to the physical nature of the segments in question. I have adapted the terminology from Flemming (1995). The first of these constraints treats the discrimination of the quality of acoustic elements; the second concerns itself with their quantity, as defined above.

> MINDIST n : there must be a minimum distance of n in the acoustic quantity of elements in the system
>
> MAINTAIN n : maintain n contrasts of acoustic quality between segments in the system

MINDIST states that there should be a minimal distance between acoustic signals in regards to their quantity (i.e., place of energy). For this paper, those segments that are relatively close are given a distance ranking of 1; those that are relatively diffused are given a ranking of 2. MAINTAIN states that there should be a minimal contrast between acoustic signals, in terms of their quality (type of sound). For this paper, relatively non-contrastive segments are given a

rating of 1; relatively contrastive segments are given a rating of 2. As with the local constraints pertaining to the articulatory drive, MAINTAIN and MINDIST interact in an OT framework to provide for the selection of an optimal perceptual candidate. These interactions are seen in 5 and 6.

5. An Example of a Five Member Inventory: Standard European French

The first example inventory examined in this paper consists of five members, four of which are pre-determined (the fifth being the rhotic member). The methodology outlined in this and the following parts assumes two crucial factors. The first is an assumption, that continuant consonants are secondary to their non-continuant counterparts. This assumption is grounded in part in observation of language acquisition — where stops are learned first and non-stops later — as well as by examination of consonant structure of human languages. Here, we note that the place of articulation of a continuant is nearly always matched to that of a non-continuant. The reverse is not true.

The second factor relevant to the deduction of rhotic inclusion in a larger set is a simplification of that set, this to effectively ignore voice quality distinctions. We assume that voice quality is a privative feature and not relevant to the generation of continuant members. The relevant members of the set are not to be read as voiced or voiceless, necessarily, regardless of the IPA character used.

The first inventory concerned is that of Standard European French, which consists of four members plus a rhotic. The French stop inventory is {dental t/d, p/b, k/g}, much like that of English. Note also that, in keeping with most phonetic and phonological work in the language, I use the symbol ʁ to mean a uvulovelar approximant or fricative, with no distinction in manner characteristics between the two.

Tableau 1 presents the output of local constraint interaction for the articulatory drive. Longer articulations, specifically trills ʘ and r and lengthened segments, here exemplified by ʁː violate *HOLD and are therefore eliminated. At the same time, ʘ and □ violate REUSE, as there are no matched articulatory gestures for either the uvular trill or the alveopalatal retroflex. Resulting from articulatory selection are therefore two candidates, ʁ and ɔ.

Tableau 2 presents the results of constraint interaction in the perceptual drive, providing for the interaction of constraints favoring quantitative distances and qualitative distinctiveness. Here, it emerges that all of the anterior elements, r, ɔ, and □, are eliminated as they violate higher-ranking constraints. All maintain insufficient distinctiveness, quality contrasts, whereas only □ violates MINDIST 1, due to its quantitative proximity to l, specifically. .

Given the interaction of articulatory and perceptual drives, the only commonly optimal candidate is ☯ꭥ❁. This matches data from French, assuming that ☯ꭥ❁ represents a uvulovelar continuant with no specification of approximant-to-fricative manner characteristics. French would not seem to favor one or the other drive, in terms of its systemic output: rather, the rhotic is integrated rather harmoniously into both drives.

6. An Example of a Six Member Inventory: Southern Dutch

A second example of rhotic inclusion is seen in the six-member continuant consonant inventory of Southern Dutch (4). As with the French data, articulatory and perceptual drives are considered separately. Here, differences arise from the assumed set of continuant consonants (that of Dutch is similar to French, with the addition of ☯↳❁) and the underling set of non-continuants (Dutch is identical to French, save for the voiced velar). Deduced output is compared with data of Southern Netherlandic. Here personal data as supplimented by Nooteboom & Cohen (1995), van de Velde (1994), Reenen (1994), and Rogier (1994).

Given the assumed continuous consonant set {I, v. z, ɬ, ↳} and the same six candidates as seen in 5, articulatory selection provides for the elimination of four candidates. Trills (☯⊛❁ and ☯r❁) violate *HOLD, as do intrinsically long segments. Uvular and alveopalatal retroflexes are also eliminated, as there is no shared place of articulation with any of the other consonants that make up the whole set. The results of articulatory selection in the six member inventory are given in Tableau 3.

Perceptual output for the six-member inventory shows many similarities to that of French. Here, however, we note that there is a different application of MAINTAIN and MINDIST than in 5. This is not due to data fitting, but rather to "stepped up" considerations of the relative distinctiveness of segments. Here, it is impossible to provide for the distinctiveness of any segment based on considerations within the larger system: due to the presence of ☯↳❁ in the Dutch system, the distinctiveness window is reduced. Therefore, ranking is considered within the sub-inventory alone, i.e. segments are ranked according to their distinctiveness and distance vis-à-vis other continuous consonants.

The output of the perceptual drive is shown in Tableau 4, where the perceptually optimal outputs for this inventory are ☯⊛❁, ☯r❁, and ☯○❁. Each of these is relatively more distinct and more distant, in terms of quality and quantity, respectively, from all others. ☯ꭥ❁ is relatively close to ☯↳❁, not surprising considering the similarities inherent in its articulation to the velar fricative. Likewise, ☯□❁ is relatively close to ☯l❁: both segments share qualitative (vowel-like formants) and quantitative (formant amplitude) characteristics that are similar.

The only commonly optimal output candidate for both articulatory and perceptual constraints is ☯☼❁. This responds very well for the southern forms of Dutch, where ☯☼❁ is most commonly used by speakers. However, actual language data shows tremendous variation. Areal and dialectal variations among Netherlandic-speakers are well known. In some areas, especially in northern varieties and around Amsterdam, ☯☮❁ has gained precedence as the favored form. In other areas ☯ℒ❁ is the dominant form, such as in The Hague and Limburg and in Stadgentenaars (urban Gent dialect). Socially, it is noted that apical articulations are associated with dialect and dorsal with standard in northern provinces (i.e., in the Netherlands, north of the Waal, Maas, and Rhine). Finally, language-internal variation is also common. Inter- and intra-speaker variation in this regard is based on phonotactics, giving such forms as absorbed r, schwa, apical/dorsal alternations. This results, for some speakers, in a fortis – lenis tension (e.g. trill-flap apical, trill-fricative dorsal).

The difficulties posed by this variation should not be seen as a negation of the present work. Additionally, more specific articulatory and acoustic data from actual speakers of each dialect might reveal differences in each of the assumed members, here given based on data synthesized from many works. It might also be preferable to provide multiplex ranks for MINDIST and MAINTAIN or to provide for their separate ranking within an OT framework. Clearly, this work advocates further investigation in each respect.

6. Discussion

It is important to note that the use of IPA symbols is meant only as an abbreviation, and not an absolute "target" or fixed articulatory or acoustic output. Lindblom (1990) notes that "there is no specific, acoustic or articulatory target… rather, we aim for significant contrastive 'discriminability'" (403). Actual speaker output will vary according to productive (physiological and cognitive) and receptive (social and communicative) constraints.

Likewise, inventory output distinguishes between optimal discriminations: what we have provided for here are merely the focal areas for a particular articulation and a particular acoustic pattern. Units (or members of an inventory) as we understand them are not intrinsically fixed entities, having substance in and of themselves. Rather, units are relationally defined, inasmuch as they are different from all other units. This is, not coincidentally, a restatement of Passy's original work: language is built around differences, not similarities.

There are a number of disadvantages inherent to the functionalist approach provided here. Firstly, it requires lengthy argument and articulation of principles to make even a minor point. Functionalism also demands greater understanding of non-linguistic principles, such as physics and biology. Finally,

this methodology represents a radical departure from structuralism and many of the traditions we have taken for granted.

I submit that these difficulties are overcome by the numerous advantages afforded by functionalism. In this theory and its resultant methodology, language is viewed compared to other human activities and is conceived of as a biological activity. This provides for greater insight into language as human behavior. Using functionalism, wc gain greater insight into "how language works," and not just how a particular language seems to function. Finally, functionalism considers the fundamental tension between articulation and perception, a longstanding debate in the phonetic and phonological communities. This tension is not resolved, per se, but mitigated, as functionalism provides for the simultaneous interaction of both function and form.

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Notes

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(2) All translations from the French are mine.

(3) Schwartz et al. **(1997)** builds upon Lindblom's **(1972)** theory of adaptive dispersion. The latter study emphasized only the first of the two tensions proposed in the former.

(4) Southern Dutch is also referred to as Flemish, a term also used by Netherlandic linguists to refer to the dialects of West and East Flanders. Southern Dutch refers to the generalized form of Dutch spoken in Belgium and, to a lesser extent, in those areas of the Netherlands south of the Waal, Maas and Rhine rivers. To avoid confusion, I use the term Southern Dutch throughout this paper.

(5) L & M = Ladefoged and Maddieson **(1996);** N & C = Nooteboom and Cohen **(1995)**

	REUSE	*HOLD
⇒{l, v, z, C*, ∅}		
{l, v, z, C, ∅:}		*!
{l, v, z, C, ⊛}	*!	*!
{l, v, z, C, r}		*!
⇒{l, v, z, C, ○}		
{l, v, z, C, □}	*!	

Tableau 1. Articulatory Output; five member inventory of French

	MINDIST 1	MAINTAIN 1	MINDIST 2	MAINTAIN 2
⇒{l, v, z, C, ∅}			*	*
⇒{l, v, z, C, ∅:}			*	*
⇒ {l, v, z, C, ⊛}			*	*
{l, v, z, C, r}		*!		
{l, v, z, C, ○}		*!		
{l, v, z, C, □}	*!	*!		

Tableau 2. Perceptual Output; five member inventoly of French

	REUSE	*HOLD
⇒ {l, v, z, ♠, ♿, ○}		
{l, v, z, ♠, ♿, r}		*!
{l, v, z, ♠, ♿, ⊛}	*!	*!
⇒ {l, v, z, ♠, ♿, ∅}		
{l, v, z, ♠, ♿, ∅:}		*!
{l, v, z, ♠, ♿, □}	*!	

Tableau 3. Articulatory Output; six member inventoly of Southern Dutch

	MAINTAIN 1	MINDIST 1	MAINTAIN 2	MINDIST 2
⇒ {l, v, z, ♠, ♿, ○}			*	*
⇒ {l, v, z, ♠, ♿, r}			*	*

⇒ {l, v, z, ♠, ☜, ⊛}		
{l, v, z, ♠, ☜, ∅}	*!	*!
{l, v, z, ♠, ☜, ∅:}	*!	*!
{l, v, z, ♠, ☜, □	*!	*!

Tableau 4. Perceptual Output; six member inventory of Southern Dutch

Appendix A. Acoustic Characteristics

	energy: type	energy: concentrations (in kHz)	Source (5)
l	vowel-like, clear formants	± 400, ● 1800, ± 3000	L & M 1996: 194
v	widely dispersed	2000—5000+	Stevens 1999: 394
z	relatively focused	3800—5200	Stevens 1999: 400
☪/♠	relatively focused	2200—3500	Stevens 1999: 408
☜	vowel-like, dampened formants	± 700, ±1600, ± 3000	N & C 1995: 78-9
	vowel-like, dampened formants	± 1000, ± 1500, ± 3000	L & M 1996: 233
⊛	vowel-like, intermittent formants	± 500, ± 1600, + 3000	Lindau 1985: 160
☼/r	vowel-like, intermittent formants	±500, ±1200, ± 2000	Lindau 1985: 160-2
□	vowel-like, clear formants	± 500, ± 1500, ● 2500	Lindau 1985: 163

Appendix B. Articulatory Properties

	articulators	shared articulatory pattern
l	tongue tip, alveolar/dental ridge	tongue-to-ridge of ☯t/d✹
v	lips, front incisors	lip closure of ☯p/b✹
z	tongue blade, alveolar ridge	tongue raising of ☯t/d✹
☪/♠	tongue blade, post-alveolar ridge	tongue raising of ☯c/ɟ✹
☜	tongue bodyldorsum, velum	tongue-to-velum of ☯k/g✹
∅	tongue body/dorsum to uvulo-velar region	tongue-to-velum of ☯k/g✹
⊛	tongue dorsum to uvula	tongue-to-velum of ☯q/ɢ✹
☼/r	tongue tip, alveolar/dental ridge	tongue to ridge of ☯t/d✹
□	tongue blade, retroflexed at post-alveolar area	tongue position of a ⊞/↓✹

Appendix C. Functionalist principles

Principle 1: Human interaction requires communication, from communication arises the need to be understood.

Principle 1.a: Communication requires specification of communicated information.

Principle 1.b: Communication requires articulation — the activation of some gestural mechanism — to be realized.

Principle 1.c: Communication requires the perception of articulation.

Principle 1.c.bis: Effective communication requires the perception of articulation be correctly corresponded to the originally specified information.
Principle 2: Specification, articulation, and perception are independent, biologically motivated variables.
Principle 3: Specification is a lexical domain.
Principle 4: Humans will, ceteris paribus, avoid the expenditure of energy.
Principle 5: Humans will, ceteris paribus, distinguish between items that are dissimilar and confuse items that are alike.
Principle 5.a: Humans perceive items that are dispersed (i.e. that are acoustically as different as possible).
Principle 5.b: Humans make no more distinction than absolutely necessary between items.
Principle 6: Communication is neither determined nor motivated by Principles 1 through 5; rather, communication is so governed. It is from the positive implications manifest in Principles 1 – 5 that possible communication arises.

Appendix D. Implications of functionalist principles

Implication 1: Humans speak in order to communicate (i.e. to communicate a message – in order to be understood, in Passy's terms).
Implication 2: Human speech is governed by biomechanical universals.
Implication 3: Humans will not, ceteris paribus, make difficult gestures when speaking.
Implication 4: Humans perceive best, ceteris paribus, those sounds that are the most different.
Implication 5: The best speech events are ones that result in the least amount of energy expenditure, but which allow for the maximization of distinction between one event, or portion of that event, and all other events, or portions of the same event.
Implication 6: Speech events are categorized (i.e. the humans involved in them seek out regularities and attach to these regularities values that may be applied to further speech acts). The categorization of speech is a priori an emergent property of regular communication.

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Adverbs and Functional Heads in Turkish: Linear Order and Scope*

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1 Introduction

Our goal in this paper is to investigate the linear order and scope of adverbs and functional heads in Turkish. especially with reference to Cinque's (1999) recent proposal that there is a universal hierarchy of functional heads. We argue that the Turkish data motivate semantic scope rather than a fixed hierarchy as the main determinant of the linear order of adverbs and functional heads.

We start by outlining the basics of Turkish morphosyntax, and Cinque's theoretical proposal. Then we discuss adverbs in Turkish, and show that the order in which multiple adverbs occur depends upon their relative scope. This is followed by a discussion of tense/aspect/mood suffixes; we argue that similar principles determine the orders in which they occur. Finally we suggest that language-particular morphological restrictions can introduce idiosyncrasies into the picture.

2 Outline of Turkish Morphosyntax

Turkish is often cited as a prototypical SOV language, and indeed this is the most common word order:

(1) Emine elma-yı ye-di.[1]
Ernine apple-ACC eat-PAST.3sg
'Emine ate the apple.'

However, any of the six possible permutations of the words in (1) could be preferred according to the pragmatic context. Factors determining word order include focus, topicalization, backgrounding, definiteness and specificity (Erguvanlı 1984; Kornfilt 1997).

As in many nonconfigurational languages, arguments are related to the verb through case marking.

Turkish is an exclusively suffixing language. Verbs are marked for tense, aspect, mood and polarity (TAMP), and subject agreement. Usually there are at least two suffixes per verb, and often many more. A simple example is given in (2) and a more complex example in (3):

(2) Istanbul-a gid-iyor-um.
Istanbul-DAT go-PROG-1sg
'I am going to Istanbul.'

(3) Istanbul-a git-me-yecek-ti-m.
Istanbul-DAT go-NEG-FUT-PAST-1sg
'I wasn't going to go to Istanbul.'

Suffixes often mark some combination of TAMP values, for example, the progressive aspect in (2) implies present tense. There are also derivational suffixes (passive, causative, etc.) which won't be relevant in this paper.

Note that extensive vowel harmony, voicing assimilation, and other phonological processes, result in considerable variation in the surface forms of morphemes.

3 Cinque's Proposal

In an important recent book, Cinque (1999) has shown that the linear order of adverbs and functional heads cross-linguistically is much more systematic than had previously been assumed. Specifically, he proposes that there is a universal hierarchy of functional heads, and that particular adverbs or functional elements always occur in particular places in this hierarchy.

Here is one of the Cinque's versions of the hierarchy:

(4) *[frankly* $\text{Mood}_{\text{speech act}}$ *[fortunately* $\text{Mood}_{\text{evaluative}}$ [*allegedly* $\text{Mood}_{\text{evidential}}$ [*probably* $\text{Mod}_{\text{epistemic}}$ [*once* T(Past) [*then* T(Future) [*perhaps* $\text{Mood}_{\text{irrealis}}$ [*necessarily* $\text{Mod}_{\text{necessity}}$ [*possibly* $\text{Mod}_{\text{possibility}}$ [*usually* $\text{Asp}_{\text{habitual}}$ [*again* $\text{Asp}_{\text{repetitive(I)}}$ [*often* $\text{Asp}_{\text{frequentative(I)}}$ [*intentionally* $\text{Mod}_{\text{volitional}}$ [*quickly* $\text{Asp}_{\text{celerative(I)}}$ [*already* T(Anterior) [*no longer* $\text{Asp}_{\text{terminative}}$ [*still* $\text{Asp}_{\text{continuative}}$ [*always* $\text{Asp}_{\text{perfect(?)}}$ [*just* $\text{Asp}_{\text{retrospective}}$ [*soon* $\text{Asp}_{\text{proximative}}$ [*briefly* $\text{Asp}_{\text{durative}}$ [*characteristically(?)* $\text{Asp}_{\text{generic/progressive}}$ [*almost* $\text{Asp}_{\text{prospective}}$ [*completely* $\text{Asp}_{\text{SgCompletive(I)}}$ [*tutto* $\text{Asp}_{\text{PlCompletive}}$ [*well* Voice [*fast/early* $\text{Asp}_{\text{celerative(II)}}$ [*again* $\text{Asp}_{\text{repetative(II)}}$ [*often* $\text{Asp}_{\text{frequentative(II)}}$ [*completely* $\text{Asp}_{\text{SgCompletive(II)}}$ (Cinque 1999: 106)

This huge hierarchy basically takes the place of TP. The location of AgrSP relative to these functional heads seems to vary from language to language and even within languages. Adverbs occupy specifier positions, whereas heads are realized morphologically. The theory implies that affixes are picked up by the verb which must undergo movement up the tree.

Cinque's proposed hierarchy is based primarily on data from Italian and French, generally pairs such as this:

(5) a. Alle due, Gianni non ha solitamente mica mangiato, ancora.
'At two, Gianni has usually not eaten yet.'

b. *Alle due, Gianni non ha mica solitamente mangiato, ancora.
'At two, Gianni has not usually eaten yet.' (Cinque 1999)

Data from numerous other languages, including Turkish, are also cited.

4 Adverbs in Turkish and their Relative Ordering

The canonical position for adverbs in Turkish is immediately before the verb:

(6) Ahmet hızlı koş-uyor-du.
Ahmet quickly run-PROG-PAST.3sg
'Ahmet was running quickly.'

However in practice, there is a great deal of flexibility.

When there is more than one adverb, there is usually a preference for one possible order over the other, or often one of the options is simply ungrammatical. We systematically examined pairs of adverbs from about a dozen semantic classes. In most of the clear cases, the ordering restrictions go in the direction predicted by Cinque's hierarchy. Here are some examples:

(7) a. Acıkcası muhtemelen gel-me-yeceg-im.
frankly probably come-NEG-FUT-1sg
'Frankly, I probably won't come.'

b. *Muhtemelen acıkcası gel-me-yeceg-im.
probably frankly come-NEG-FUT-1sg
'Probably I frankly won't come.'

(8) a. Her zaman iyi yaz-ar.
always good write-AOR.3sg
'He always writes well.'

b. *Iyi her zaman yaz-ar.
Good always write-AOR.3sg
'He well always writes.'

These ordering restrictions equally make sense in terms of the meanings of the adverbs involved. *Acıkcası* 'frankly' is an illocutionary adverb and logically takes scope over muhtemelen 'probably': the speaker is being frank in saying that she will probably not come; she is not probably saying that frankly she won't come. Similarly in (8), writing well is what he always does, it is not that he is good at "always-writing".

In other cases, both scope relations seem logically possible, and correspondingly both adverb orderings are possible:

(9) a. Ahmet şimdi akıllıca teslim ol-du.
Ahmet now wisely surrender be-PAST.3sg
'Ahmet has now wisely surrendered.'

b. Ahmet akıllıca şimdi teslim ol-du.
Ahmet wisely now surrender be-PAST.3sg
'Ahmet has wisely now surrendered.'

These kinds of pairs are difficult to reconcile with Cinque's hierarchy, where subject-oriented adverbs such as *akıllıca* 'wisely' are supposed to occur below temporal adverbs anchored to speech time. In these kinds of cases, the adverbs seem to modify the verb "on different planes," so it makes little or no difference in which order they apply.

But the most interesting cases are those where order does matter:

(10) a. Ders-e gel-dig-imiz-de, Can {her zaman/genelde}
class-DAT come-NOM-1pl-LOC Can {always/usually}
zaten ora-da-dır.
already there-LOC-3sg
'When we get to class, Can is {always/usually} already there.'

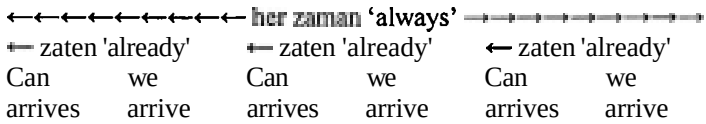
b. ??Ders-e gel-dig-imiz-de, Can zaten {her zamadgenelde) ora-da-dır.

(11) a. Can zaten (her zaman/genelde} ders-e gel-ir.
Can already {always/usually} class-DAT come-AOR.3sg
'Can already {always/usually} comes to class.'
(e.g. so we don't need to remind him to attend)

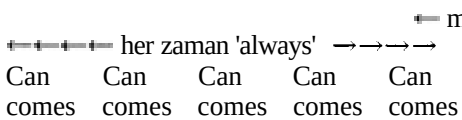
b. ??Can {her zamadgenelde} zaten ders-e gel-ir.

In Cinque's hierarchy, 'usually' outranks 'already', which in turn outranks 'always'. But the data show that *genelde* 'usually' and her *zaman* 'always' behave alike, and zaten 'already' can occur either above or below them according to scope. The context in (10) calls for one scope, whereas the context in (11) calls for the other. The semantic scope of the adverbs, which we suggest directly predicts the observed ordering facts, can be diagrammed as follows:

(12)



(13)



These data (which hold in English too) do not seem to receive an adequate account in terms of Cinque's hierarchy. Cinque does postulate some lower heads which duplicate the functionality of certain higher heads; these are marked with "(II)" in (4) above. It is always going to be possible to accommodate any observed ordering facts simply by duplicating heads. However, if heads can be duplicated as required, the motivation for having a hierarchy in the first place is called into question.

5 Tense/Aspect/Mood Suffixes

There are about seven common TAM suffixes in Turkish (see Yavaş 1980 for detailed discussion):

(14)	-DI	past
	-mIş	reported past, anterior, evidential
	-Iyor	progressive
	-Ar/-Ir	aorist
	-(y)AcAk	future
	-mAlI	necessitative (obligation, inference)
	-(y)Abil	abilitative (ability, possibility)

It is often possible to stack two of these, sometimes three. An example is given in (15):

(15) Ahmet dün oku-yor-du.
Ahmet yesterday read-PROG-PAST.3sg
'Ahmet was reading yesterday.'

Sometimes an auxiliary *ol-* 'be' needs to be inserted, because only the past -Dl and *-mIş* in its evidential sense can attach directly to already-suffixed verbs:

(16) a. Ciineyt yarın oku-yor ol-acak.
Ciineyt tomorrow read-PROG be-FUT.3sg
'Tomorrow Ciineyt will be reading.'

b. *Cüneyt yarın oku-yor-acak.

The abilitative *-(y)Abil* is quite differently morphologically to the other six suffixes in (14), since it does not by itself derive a well-formed word, so forms in *-(y)Abil* always requires further suffixation.

(17) a. Deniz gel-ebil-ecek.
Deniz come-ABIL-FUT.3sg
'Deniz will be able to come.'

b. *Deniz gel-ebil.

We examined all possible pairings of suffixes to see what orderings are acceptable. Most often, only one of the two orders is possible. For instance, the following permutation of (15) is completely ungrammatical:

(18) *Ahmet dün oku-du-yor.
Ahmet yesterday read-PAST-PROG.3sg
'Ahmet is having read yesterday.'

This case conforms to Cinque's hierarchy, where Past is much higher than Progressive. Many other pairs are also found only in the order predicted by Cinque.

However, there are also some telling exceptions. The future and the aorist suffixes can occur in either order:

(19) Saat iki-de Can genelde yi-yecek ol-ur.
hour two-LOC Can usually eat-FUT be-AOR.3sg
'At two o'clock, Can is usually about to eat.'

(20) On sene sonra **hala** bu lokanta-ya gid-er **ol-acak.**
ten year after still this restaurant-DAT go-AOR **be-FUT.3sg**
'In ten years, he will still be going to this restaurant.'

Once again there is a clear difference in meaning which follows straightforwardly from the outer suffix taking scope over the inner one. In Cinque's hierarchy, Future takes scope over Habitual (where the aorist must be placed), so (19) is unexpected. One entirely reasonable possibility would be to say that *-(y)AcAk* in (19) fills the Proximative head, which is lower than Habitual. But again, having more than one position for each morpheme, depending on the scope it needs to receive, does not appear to be very explanatory. Under this account, it would be an accident that the morpheme which fills the Proximative head in (19) and the morpheme which fills the Future head in (20) have exactly the same form, i.e. *-(y)AcAk.* However, if we allow semantic scope to determine order, then the same future tense morpheme is involved in both sentences, only its position relative to the aorist varies according to the interpretation.

Some interesting issues arise with the abilitative suffix *-(y)Abil.* It has two distinct senses: ability and possibility. In its 'ability' sense, it scopes under all the **tense/aspect** suffixes. This can be seen in **(17a)** above, as well as in the following example:

(21) **Ahmet** gel-ebil-di.
Ahmet **come-ABIL-PAST.3sg**
'Ahmet was able to come.'

The 'possibility' sense is only possible when *-(y)Abil* is followed by the aorist, in which case the aorist loses its habitual interpretation (see **Savaşır** 1986):

(22) a. **Ahmet** gel-mig **ol-abil-ir.**
Ahmet **come-ANT** **be-POSS-AOR.3sg**
'Ahmet might have come.'

b. ***Ahmet** gel-mi$ **ol-ur.**
Ahmet come-ANT **be-AOR.3sg**
'Ahmet has come.'

The ungrammaticality of **(22b)** demonstrates that the aorist generally has to be interpreted as habitual in this context. The fact that a present perfect interpretation is possible in **(22a)** shows that the aorist loses its habitual force when it follows *-(y)Abil.*

In its 'possibility' sense, *-(y)Abil* appears inside the past suffix (23) but outside the future suffix (24):

(23) a. Abla-m şarkı söylü-yor ol-abil-ir-di.
sister-lsg song sing-PROG be-POSS-AOR-PAST.3sg
'My sister might have been singing songs.'

b. *Abla-m şarkı söylü-yor-du ol-abil-ir.
sister-lsg song sing-PROG-PAST be-POSS-AOR.3sg
'My sister might have been singing songs.'

(24) a. Ahmet gel-ecek 01-abil-ir.
Ahmet come-FUT be-POSS-AOR.3sg
'Ahmet might come.'

b. *Ahmet gel-ebil-ir ol-acak.[2]
Ahmet come-POSS-AOR be-FUT.3sg
'Ahmet might come.'

This is problematic for Cinque's hierarchy, where Past immediately dominates Future. There are potential sites for epistemic modals both above and below Past and Future, but not in between. Interestingly, the past suffix does take logical scope over the possibility modal suffix in (23), as expected on the basis of the surface order: the implication is that the doubt took place in the past. For instance, the speaker could be reporting a situation in which she was standing outside her sister's door, wondering if it was her sister singing inside. But for doubt in the present, an adverb must be used:

(25) Abla-m belki şarkı sbyl-iiyor-du.
sister-lsg maybe song sing-PROG-PAST.3sg
'Maybe my sister was singing songs.'

A still more complex case is the following:

(26) Gel-e-me-yebil-ecek.[3]
come-ABIL-NEG-ABIL-FUT.3sg
'She will in the future be able to be unable to come.'

The abilitative equivalent in the negative is *-(y)A*, realized as *-e* in this case. Both abilitatives must be in the sense of ability, not possibility, because there is no aorist suffix. This sentence requires a very particular kind of context. An example would be if there were a tedious meeting which she will be obliged to attend, such that making herself unable to attend would be something she would plausibly strive for. The sentence is interesting because the very fact that two abilitative suffixes are possible suggests that there cannot be a single head which hosts this kind of root modal.

6 Morphological Restrictions

Besides semantic scope, sometimes certain orders are ruled out for morphological reasons which appear to be somewhat idiosyncratic. There is no reason why future should be unable to take scope over obligation, yet the following sentence is ungrammatical:

(27) *Ahmet gel-meli ol-acak.
Ahmet come-OBLIG be-FUT.3sg
'Ahmet will have to come.'

The semantic plausibility is confirmed by the following paraphrase using nominalization, which is perfectly grammatical:

(28) Ahmet-in gel-me-si gerek-ecek.
Ahmet-GEN come-NOM-3sg necessary-FUT.3sg
'Ahmet's coming will be necessary (i.e. Ahmet will have to come).'

The ungrammaticality of (27) appears to come down to the "boring" fact that forms in *-mAll* cannot appear as complements of the verb *olmak* 'to be'.

The placement of the question marker -mI in Turkish may be another example of a language-particular morphological fact overriding any universal ordering principles. In simple sentences, it occurs after the TAM suftix:

(29) Bil-iyor-mu-sun?
know-PROG-QST-2sg
'Do you know?'

But if there are two TAM suffixes, the question marker falls in between them:

(30) Can gel-ecek-mi-y-di?
Can come-FUT-QST-AUX-PAST
'Was Can going to come?'

It is unclear what scope a question particle should logically have with respect to TAM categories. In Korean, according to Cinque (1999: 53), question particles occur in the very outermost position, presumably filling the $\text{Mood}_{\text{speech act}}$ head. As far as we are aware, the Turkish ordering exemplified in (30) is quite unusual.

We do not want to claim that an account in terms of semantic scope can predict the position of the question particle in Turkish. Rather, it seems to be a language-particular morphological fact about *-mI* that it attaches to the innermost TAM suffix.

7 Conclusions

We have argued in this paper that the ordering of adverbs and functional heads in Turkish is determined primarily by semantic scope. A universal hierarchy of functional projections (Cinque 1999) appears to be too restrictive to account for the data, at least without unmotivated duplication of functional heads. Our discussion has been quite informal, but the data do serve to suggest that a substantive theory of the possible relative semantic scopes of adverbs and functional morphemes is going to be a crucial ingredient in an account of the surface orders in which these elements are found cross-linguistically.

Notes

* We would like to thank Tim Stowell, Jason Riggle and WECOL participants for many useful comments and discussions.

1 Examples are in Turkish orthography. Capital letters in forms of morphemes indicate alternating segments. The following abbreviations are used in the glosses: ABIL abilitative; ACC accusative; ANT anterior; AOR aorist; AUX auxiliary; DAT dative; FUT future; GEN genitive; LOC locative; NEG negative; NOM nominalizer; OBLIG obligation; PAST past; pl plural; POSS possibility; PROG progressive; QST question; sg singular.

2 This sentence is grammatical, with a different meaning, if *-(y)Abil* is interpreted in its abilitative sense. Note also that (17a), in which the abilitative and future are stacked directly, is grammatical too.

3 This sentence (word!) comes from Cinque (1999: 198), though the gloss and translation do not. Cinque has the sentence glossed as if *-(y)Abil* is in its 'possibility' sense, which, as discussed in the text, is not a possible interpretation.

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"Transitive Intransitives"

Martina Wiltschko
University of British Columbia

1 The Problem: (In)transitive Marking in Halkomelem[1]

Halkomelem is a Central Coast Salish language, spoken in the Fraser valley of British Columbia The empirical properties I am concerned with in this paper have to do with the morpho-syntax of argument-structure. In particular, looking at Halkomelem verbs, we observe the following. Roots are generally PATIENT-oriented (i.e. they are unaccusative; see Hukari 1976; Davis 1998). AGENT-oriented intransitive predicates (that is unergatives) are suffixed by a so called *"intransitive"* suffix (e.g. *-em; see* Galloway 1993). And finally, transitive predicates are suffixed by a so called *"transitive"* suffix (e.g. *-t;* see Galloway 1993). Examples are given in the table below:

(1) Morpho-syntax of argument structure in Halkomelem (see Galloway 1993: 245f.):[2]

ROOT (=UNACCUSATIVE)		"INTRANSITIVE" (=UNERGATIVE)		"TRANSITIVE"	
ikw'	'lost'			*ikw'-et*	'throw sthg away'
q'óy	'die'			*q'óy-t*	'kill sthg/so'
qw'él	'cooked'	*qw'él-em*	'barbecue'		
		th'á-m	'chew'	*th'á-t*	'chew sthg'

Given this generalization we are faced with the following problem. Both "transitive" and "intransitive" predicates appear to license a direct object as in the following sentences:[3]

(2) a q'óy-t-es te Strang te sqelá:w *"transitive"*
kill-tr-3s det Strang det beaver
'Strang killed the beaver.'

b. tsel qwél-em te sth'óqwi *"intransitive"*
1sg.s barbecue-intr det fish
'I barbecue the fish.'

If "intransitive" suffixes encode "intransitivity", then why do they have "transitive" properties; in other words why can "intransitives" occur with an object? To solve this

problem, it is crucial to provide a detailed analysis of these "transitive" and "intransitive" suffixes, which I will do in the next section.

2 The Proposal

I will assume without further discussion that all *roots* in Halkomelem are unaccusative.[4] In other words, roots are only associated with an internal argument (namely the PATIENT/THEME; see Hukari 1976; Davis 1998). For the examples in (3)a this leaves us with the argument structure in (3)b:

(3) Halkomelem roots

a.			b.
	péqw	'broken in two'	<PATIENT/THEME>
	xélh	'hurt'	
	sás	'get hit, mashed'	
	ɬkw'	'lost'	
	q'óy	'die'	
	qíq'	'apprehend caught'	(Galloway 1993: 245)

As for "transitive" and "intransitive" unergative predicates, (4), I propose (5):

(4) a. "transitive" suffixes

tl'xw-et	'cover sthg'
qws-et	'push sthg into water'
tás-et	'mash sthg (berries)'

(Galloway 1993: 245f.)

b. "intransitive" suffixes:

qw'él-ém	'barbecue'
lóy-ém	laugh'
hás-em	'sneeze'

(Galloway 1993: 250f.)

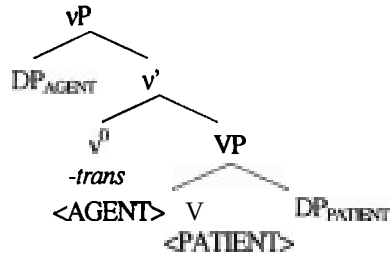
(5) The argument structure of "transitives" and "intransitives"
"Intransitive" and "transitive" suffixes introduce the external argument of the predicate (=AGENT/CAUSE).

(5) states that both "intransitive" and "transitive" suffixes introduce the external argument. Accordingly, these suffixes function as secondary predicates introducing the AGENT/CAUSE argument (in the sense of Kratzer 1994). But then the question remains as to why the two classes of predicates are different, i.e. why they are classified as "intransitive" and "transitive" suffixes, respectively. To answer this question, I propose (6):

(6) The difference between "transitives" and "intransitives"
a. Transitive" suffixes are attached in the syntax.
b. "Intransitive" suffixes are attached in the lexicon.

The assumptions in (5) and (6) combined imply the following representations for "transitives" and "intransitives", respectively:

(7) "Transitives"

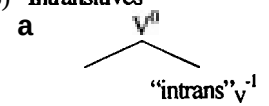


According to (7), the internal argument (PATIENT) is introduced by the verbal root within the VP and is assigned to the VP-internal DP-argument, which is realized as a direct object Furthermore, the external argument (AGENT) is introduced by a separate syntactic head (labeled v^0) which functions as a secondary predicate. This argument is assigned to the DP in the specifier position of v (SpecvP). Thus, combining the verbal root with a syntactic head which introduces the external argument yields a "transitive" predicate.

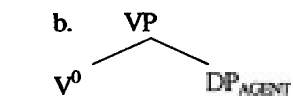
Now, let us turn to the so called "intransitive" suffixes, which according to (5) and (6) introduce the external argument just like "transitive" suffixes. However, rather than introducing the external argument in the syntax, "intransitive" suffixes introduce the external argument in the lexicon. This implies the representations in (8):

(8) "Intransitives"

a



b.

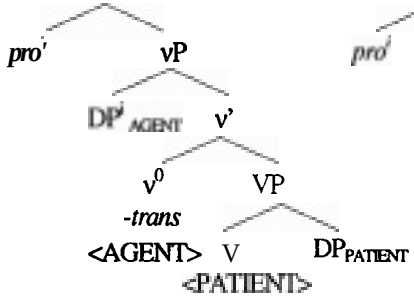


The "intransitive" suffix *-em* is attached to the root in the lexicon (i.e. below V^0). Since, by hypothesis the "intransitive" suffix is of category V, it derives a verb. As the head of the complex verb it determines its category and argument-structure. This implies that the argument structure of the derived verb is that of an *unergative "intransitive"* (8)b. Given the assumption that syntax cannot "see" inside lexically derived words, the complex verb behaves as a syntactic atom. Thus, assuming that the external argument is introduced in the lexicon derives an unergative "intransitive" verb. In the next sections, I will show how this proposal accounts for the properties of "transitive" and "intransitive" verbs in Halkomelem.

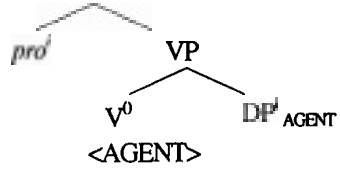
3 Differences between "Transitives" and "Intransitives"

Comparing the proposed structure of "transitive" and derived "intransitive" predicates reveals that there is a significant difference in syntactic structure in that only "transitives" are associated with the vP projection (see Wiltschko to appear for detailed discussion):

(9) a.



b.



If "transitives" and "intransitives" differ syntactically, we expect that this difference manifests itself empirically. This is indeed what we find, looking at the agreement pattern of Halkomelem. Only verbs with a "transitive" suffix *can* license object agreement (see Gerdts 1988 among others). In (10) we find the object agreement paradigm of "transitives":

(10)	sg.	pl.	
1.	may-th-ox-chexw	may-t-óxw-chexw	
2.	may-th-omé-tsel	mayt-olé-tset	
3.	máy-t-es	máy-t-es	from Galloway 1993: 178

Crucially, "intransitive" predicates differ from "transitives" in that they do not license object agreement. No matter whether the object agreement ending is inserted in a position following or preceding the "intransitive" suffix *–em*, the result is ungrammatical.

(11) a. *qwel-em-óx tú-tl'ò
barbecue-intr-1sg.o det-3Indep
'He barbecued me.'

b. *qwel-óx-em tú-tl'ò
barbecue-1sg.o-intr det-3Indep
'He barbecued me.'

Object agreement is (by hypothesis) associated with v^{0}.[5] Consequently, "transitives" but not "intransitives" *can* license object agreement. Accordingly, the lack of v derives the "intransitive" properties of verbs with "intransitive" suffixes.

4 "Intransitive Objects"

Having discussed how the "intransitive" and "transitive" properties of the derived predicates follow from our analysis, we can now return to the original problem, namely the problem of "intransitive" objects.

4.1 The problem of "intransitive" objects

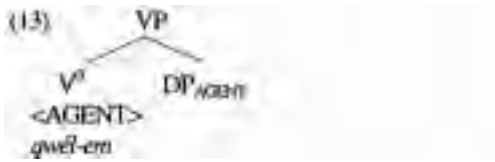
Recall from section 1 that verbs that are suffixed with a so called "intransitive" suffix seem to license a direct object. The examples are repeated below, for convenience:

(12) a q'ó:y-t-es te Strang te sqelá:w "*transitive*"
kill-tr-3s det Strang det beaver
'Strang killed the beaver.'

b. tsel qwél-em te sth'óqwi "*intransitive*"
1sg.s barbecue-intr det fish
'I barbecue the fish.'

If -em derives an unergative "intransitive" predicate as in (13) as argued above, then why do these predicates have "transitive" properties: why can they occur with an object?

(13)

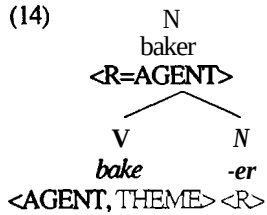


In order to answer this question, it is useful to briefly look at English nominalizations.

4.2 Nominalization in English

English deverbal nouns like *baker* can be analyzed in the following way:

(14)



According to (14), the verb bake is associated with an AGENT and a THEME argument. The head of the derived noun *–er* is associated with the R-argument (see Williams 1981). This R-argument is identified with the AGENT argument of the verb. Given that the nominal suffix functions as the head of the derived noun, its argument structure percolates. Since the structure in (14) is not syntactically transparent, the original internal argument of the verb (the THEME) can no longer be assigned directly as shown in (15):

(15) a. Peter baked the bread.
b. Peter is a baker (*the bread)

However, English provides two strategies to save the structure in (15)b, that is the internal argument of bake can be assigned in one of two ways: either by compounding (i.e. incorporation; (16)a) or by means of inserting the proposition of ((16)b):

(16) a Peter is a bread-baker b. Peter is a baker of bread

In the next subsection, I will show that both these strategies are available in Salish for "intransitive objects". In Lillooet (=Northern Interior Salish) "intransitive objects" are incorporated at LF, whereas in the Island Halkomelem, they are preceded by a preposition.

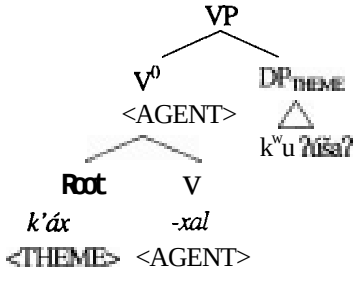
4.3 "Intransitive objects" in Lillooet

In this subsection, I will argue that "intransitive objects" in Lillooet are assigned by means of incorporation. In this language the "intransitive object" is necessarily preceded by a special determiner *k*^{w}*u* (Matthewson 1998, Davis 1998)[6]:

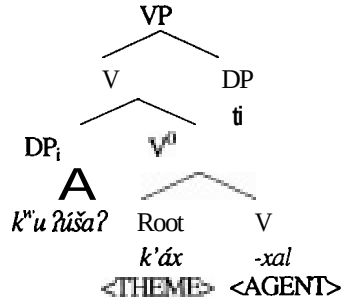
(17) k'áx-xal k^{w}u=ʔúša?
dry-intr det=huckleberry
'S/he dried some huckleberries.' (Davis 1998 22, ex 55)

Note that from (17) alone we cannot conclude that "intransitive objects" are incorporated. However there are two arguments in favor of this assumption. First, the interpretation of "intransitive objects" in Lillooet is non-specific or generic (see Davis 1998). This is of course reminiscent of the interpretation of the object in compounds like bread-baker. Secondly, it has been argued on independent grounds that *k*^{w}*u* NPs undergo semantic incorporation (see Werle 2000). I will thus assume that "intransitive objects" in Lillooet form a compound with the verb at LF, as shown below:

(18) Syntax:



LF:



4.4 "Intransitive objects" in Halkomelem

In this section we will return to Halkomelem. First, consider the Island dialect of Halkomelem. Here, an "intransitive object" is introduced by an oblique determiner as shown below:

(19) nem? can q̓ʷəl-əm ʔa tᵒə sceeɬtən.
go 1sg.s barbecue-intr obl det salmon
'I am going to barbecue the salmon (Hukari 1979: 158 ex 2)

However, recall that in Upriver Halkomelem, the "intransitive object" is neither preceded by a preposition nor is it restricted to a non-specific/generic interpretation:

(20) tsel qwél-em te sth'óqwi
1sg.s barbecue-intr det fish
'I barbecue the fish.'

In this section, I will argue for the assumption that in Upriver Halkomelem "intransitive objects" are introduced by a covert preposition. Evidence for this claim comes from several considerations. It is a general property of Upriver Halkomelem that it has lost the oblique preposition which still shows up in the Island dialect (see Galloway 1993). That is, in all of the environments where we find an oblique preposition in Island Halkomelem, it does not occur in Upriver. First, consider passive agents. In Upriver Halkomelem, no preposition precedes the AGENT DP of a passive sentence (21)a, whereas in Island Halkomelem the same "ʔə" appears as in "intransitive objects" (21)b:

(21) a kw'éts-l-óm te Linda *Upriver Hk*
see-tr-2sg.pass-intr det Linda
'You were seen by Linda.'

b. ni ləm-əθ-á.m ʔa ɬə sɬéni? Island Hk
aux look-tr-2obj-introbl det woman
'You were looked at by the woman.' (Gerdts 1989: p. 186, ex. 3)

Secondly, consider ditransitive constructions. If a verb is suffixed by an applicative suffix (*-elhts*), then the indirect object (i.e. the benefactive) appears as the direct object and the original direct object (i.e. the THEME) is realized as an oblique. Again we observe that only in the Island dialect but not in the Upriver dialect the preposition "ʔə" is inserted:

(22) a lhíts'-elhts-th-oné-tscl-cha te sméyeth
cut-ben-tr-2sg.o-1sg.s-fut det meat
'I'll cut off the meat for you.' (Galloway 1993: p.260)

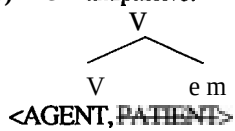
b. ni? can ɬəkʷəɬcət tᶠa nə syeʔyə ʔa tᶿə sc'ĕst
aux 1sg.s break.in.two det 1sg.poss friend obldet stick
'I broke the stick for my friend.' (Hukari 1976: 108 (66))

I conclude that "intransitive objects" in Halkomelem are realized by means of a covert preposition.

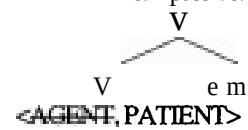
5 An Antipassive Analysis?

In this section, I will briefly *compare* the present analysis to a previous analysis by Gerdts 1988, 1993 and Gerdts and Hukari 1998 in which the so called "intransitive" suffix of Island Halkomelem is analyzed as a middle or anti-passive suffix. The simplified idea of such an analysis is that an antipassive suffix suppresses the internal argument of the verb it attaches to, much like a passive suffix suppresses the external argument:

(23) a antipassive:



b. passive:



Note that in both cases, the suppressed argument can reappear as an oblique argument. That is, an antipassive sentence allows for an oblique PATIENT (24)a, whereas a passive sentence allows for an oblique AGENT(24)b:

(24) a nemʔ can qʷəl-əm ʔa tᶿə sceeltən.
go 1sg.s barbecue-intr obl det salmon
'I am going to barbecue the salmon (Hukari 1979: 158 ex 2)

b. ni ləm-əθ-á.m ʔa tə sténiʔ
aux look-tr-2obj-introbl det woman
'You were looked at by the woman.' (Gerdts 1989: p. 186, ex. 3)

In what follows, I will discuss three problems the antipassive analysis has to face and which are immediately addressed under the present analysis.

5.1 A morphosyntactic mismatch

It is a crucial prerequisite for the antipassive analysis that roots are treated as underlyingly transitive. That is, they must be associated with the argument structure below:

(25) Halkomelem roots: <AGENT, THEME>

If they were not underlyingly transitive, then the antipassive suffix could not suppress the internal argument This means that under the antipassive analysis, transitives cannot be analyzed as derived predicates whereas unaccusative predicates (which contain only a THEME/PATIENT argument) must be analyzed as derived. The problem with this analysis has to do with the fact that the morphological properties of the predicates under consideration point into the exact opposite d i t i o n . That is, "transitive" predicates are morphologically complex, whereas unaccusatives are morphologically simplex.

Note that the present analysis predicts exactly this state of affairs. That is, roots are analyzed as underlyingly unaccusative (with the argument structure <PATIENT/THEME>. This implies that "transitives" are derived, which is indeed what we find morphologically.

5.2 Homophony with the passive morpheme

In Halkomelem the "passive" morpheme and the "intransitive" suffix are homophonous: *-(e)m*. Under the antipassive analysis, this is quite an unexpected homophony, given that the same morpheme would suppress either the external or the internal argument However, under the present analysis, a "suppresses" the argument of the predicate it attaches to. In particular, the "intransitive"-em "suppresses" the argument of the root, which corresponds to the internal argument The "passive" *-em* attaches to the "transitive" suffix in the lexicon and thus suppresses the argument of this "transitive suffix", which corresponds to the external argument (see Wiltschko 2001 for a detailed discussion).

5.3 Agent control

So far, we have only discussed the "intransitive" suffix *–em* and the "transitive" suffix *–t*. However, there is more than one suffix in each category. That is, Halkomelem has (at least) two "intransitive" suffixes (*–els, –em*) and two "transitive" suffixes (*-t, -l(exw)*). Apart from "transitivity" and "intransitivity", respectively, these suffixes encode information about the external argument, namely the degree of control the AGENT/CAUSE has over the event (see among others Thompson 1985). As for "transitive" predicates the relevant distinction is exemplified in (26). Verbs suffixed with the "transitive" suffix *–t* are best translated as 'on purpose' whereas verbs suffixed with the "transitive" suffix *–l(exw)* are best translated as 'by accident':

(26)

Full Control		Limited/no Control	
xlh-et	'hurt *so* on purpose'	*xelh-lexw*	'hurt by accident'
kw'ats-et	'look at sthg'	*kw'ets-lexw*	'see sthg/sbdy'
ákw'-et	'throw sthg away'	*ákw'-lexw*	'lose sthg'

(Galloway 1993: 245f.)

Turning to "intransitive*"predicates, we observe a similar (but less productive) distinction. Consider the examples in (27) and Galloway's description of the two respective suffixes:

(27)

Full Control		Limited/no Control	
lhótqw-em	'is being boiled'	*lhetqw-áls*	'boil'
hóqw-em	'smell, give off smell'	*hóqw-els*	'smelling, sniffling'
q'átx-em	'make a rattling sound'	*q'etx-áls*	'to rattle; to shivaree or wake newlyweds'

(Galloway 1993: 252)

"The semantics of -áls is also interesting. All the examples show that the subject is a semantic agent doing the action on purpose[...]the -áls intransitive has the meaning 'not on purpose, happen to, accidentally'." (Galloway 1993: 254)

Let us now look at these data in the light of the two analyses under consideration. For the antipassive analysis, it is quite unexpected that the morpheme that suppresses the internal argument at the same time encodes information about the external argument. Furthermore, it is also unexpected that there are two "antipassive" suffixes and two "transitive" suffixes which differ along the same dimension, namely the degree of control of the subject over the event.

The facts are however consistent with the present analysis. First, it is expected that the morpheme introducing the external argument encodes information about the external argument. Secondly, it is expected that there are two "intransitive" suffixes and two "transitive" suffixes, which differ along the same dimension, namely degree of control of the subject over the event. Under the present analysis, both types of suffixes have the same function, namely to introduce the external argument. And finally, the difference in productivity/compositionality between "transitive" and "intransitive" suffixes is expected given their difference in level of attachment. "Intransitive" suffixes are attached in the lexicon and consequently, it is expected that the result is more lexicalized.

6 Conclusion and Consequences

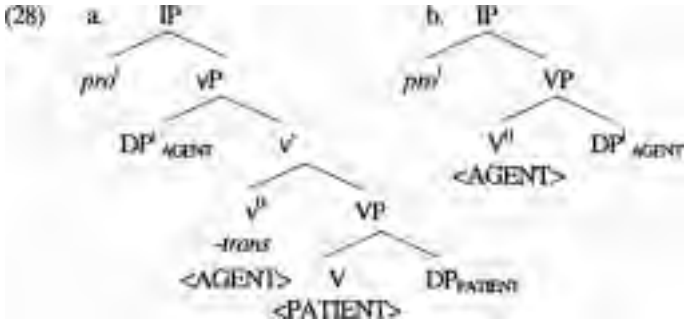
Given the present analysis, there is one question, which comes to mind immediately, that is: How do we define "transitivity" and "intransitivity", respectively?

In Halkomelem, both "transitive" and "intransitive" (=unergative) predicates are derived: "intransitive" suffixes derive "intransitive" (unergative) predicates as a byproduct of their morphosyntax, whereas "transitive" suffixes derive "transitive" predicates as a byproduct of their morphosyntax. Note also that (in)transitivity in Halkomelem cannot be defined semantically because sometimes formally "intransitive" predicates imply an argument which is being acted upon (cf.: *th'á-t* = 'chew something' and *th'á-m* = 'chew').

This leads us to conclude that the notion of (in)transitivity in Halkomelem is defined strictly syntactically in the following way. A "transitive" construction is defined as one

where vP is present whereas an "intransitive" construction is defined as one where vP is absent:

(28)



Given this assumption there is a further implication of our analysis. Note that under this proposal, "transitive" subjects are associated with a syntactic position, which is not available for other arguments. This immediately sets apart "transitive" subjects from "intransitive" subjects and objects. This further predicts that Halkomelem has ergative properties as a byproduct of the morphosyntax of "(in)transitive" suffixes (see Wiltschko to appear). This prediction is indeed borne out Halkomelem has the following ergative properties. The agreement pattern for 3rd person is ergative (see Gerdts 1988, among *others):*

(29) a. may-th-óx-es — *"transitive" 3rd subject*
help-tr-1sg.o-3erg
'He helps me.'

b. yó:ys (túTl'ò) — *"intransitive" 3rd subject*
work det-3Indep
'He works.'

c. máy-t-tsel — *"transitive". 3rd object*
help-tr-1sg.s
'I help him' (Galloway 1980: 126)

The determiner *tl'* is restricted to "transitive" subjects (Wiltschko 2000):

(30) a. q'ó:y-t-es tl' Strang te sqelá:w
kill-tr-3s det.obl Strang det beaver
'Shang killed the beaver.'

b. *q'ó:y-t-es te spá:th tl' Strang
kill-tr-3s det bear det.obl S m g
'The bear killed Strang.'

c. *í:mex tl' Strang
walk det.obl Strang
'Strang is walking.' (Wiltschko 2000: 262 ex 52/53)

Quantifier extraction is impossible out of "transitive" subjects (see Gerdts 1988):

(31) a. *mékw' hélp'ex ye pú:s te sth'óqwi "trans." *subject*
all eat.cont detpl cat det fish
'All the cats ate the fish.'

b. mékw' ítet ye pú:s "*intrans.*" *subject*
all sleep detpl cat
'All the cats are sleeping.'

c. mékw' lép'ex-es te pú:s te sth'óqwi "*trans.*" *object*
all eat-3s det cat det fish
'The cat ate all the fish.' (Wiltschko 2000: 13 ex.32/33)

In sum, the present analysis, allows us to derive the "transitive" and "intransitive" properties of verbs suffixed with "transitive" and "intransitive" suffixes, respectively. It furthermore derives the fact that "intransitive" verbs can license an object and finally as a byproduct it derives the ergative properties of Halkomelem, without further assumptions.

Notes

[1] I would like to thank the Halkomelem elders Rosaleen George and Elizabeth Herrling for sharing their knowledge of the Halq'eméylem language with me. In addition, I would like to thank Strang Burton, Henry Davis, Rose-Marie Déchaine for helpful comments. Research on this paper was sponsored by the Academy of Science, Vienna (APART 435)
[2] Unless otherwise indicated, Halkomelem data are from the Upriver (Stó:lō) dialect (spoken around Chilliwack, BC).
[3] Abbreviations used are as follows: 1 = 1st person; 2 = 2nd person: 3 = 3rd person; aux = auxiliary: ben = benefactive; cont = continuative; det = determiner; erg = ergative; fut = future: indep = independent pronoun; intr = intransitive marker; o = object; obl = oblique; pass = passive; pl = plural; poss = possessive; s = subject; sg = singular; tr = transitive marker.
There are a number of apparently underived unergatives. I follow Davis 1998 in assuming that they involve zero-derivation. See for example Gerdts 1991 for a different view.
[5] This is consistent with Gerdt's 1989 finding that transitive suffixes and object agreement are morphologically fused.
[6] For exceptions to this generalization see Davis & Matthewson to appear.

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L2 Acquisition and a Dual-Mechanism Approach to Morphology

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1 Introduction

In his 1999 book Words and Rules: The Ingredients of Language, Steven Pinker posits a dual-mechanism approach to the acquisition and representation of morphology. Within a dual-mechanism system, regular morphology is generated by lexical rules, whereas irregular forms are stored in memory. Pinker's examples from English and other languages support his theory in terms of native speakers, but he does not extend this theory to second language acquisition.

The goal of this current study is to test the dual-mechanism approach in second language acquisition defined by Pinker for first language acquisition, specifically by looking at the present formation in Spanish at different levels of L2 learners. Based on the stages of acquisition of present morphology in Spanish, we investigate whether a dual-mechanism approach works for explaining second language acquisition, or whether a unitary approach is preferable. A similar study was conducted by Beck (1997) with native speakers of English and English L2 learners. The results of her study confirmed a dual-mechanism approach for both native and non-native speakers.

At this stage of our research, we concentrate our study on intermediate level students of Spanish. Eventually, however, we will extend the study to include beginners and advanced learners. At the intermediate level, we hypothesize that students will have already internalized the regular rule(s) for producing present morphology, so that the students' use of morphology will not be random or missing, but will be different from that of native speakers.

We investigated the Reaction Time (RT) of the oral production of verbs in the present tense (third person singular) by using a computerized voice-activated program we developed. The sample included regular and irregular verbs, of high and low frequency, for a total of 40 items.

Based on Pinker's dual-mechanism approach, our study of intermediate Spanish L2 learners tested the following hypotheses:

(1) Regular forms are generated by rules. Therefore, there will be no difference in RT between high and low frequency regular forms, since the rule(s) for producing regular forms would apply at the same rate for all forms.

(2) Irregular forms are stored in memory. Therefore, high frequency irregulars will be generated faster than low frequency irregulars, noted by a difference in RT.

We will also analyze if there is any correlation between categories to see if overall regular high frequency verbs are produced at a different rate than irregular high frequency verbs. This would show if there are two different processes where the rule is accessed faster or slower than forms stored in memory.

1.1 The dual-mechanism approach to L1

Pinker (1999) describes a dual-mechanism model for L1 acquisition of morphology, part of it rule-based and part of it rote memory, and uses English past-tense and plural morphology to exemplify his model.

Pinker's model is based on the hypothesis that regular forms do not have to be stored in the lexicon, but rather are computed when needed by rules. Irregular forms, on the other hand, have to be stored in the lexicon in a pattern associator model. The existence of an irregular form in memory will block the regular rule from applying.

A form that blocks the application of a rule must be retrievable. Children must reinforcé their memory of the irregular forms for blocking to be successful, and then they move to an adult-like state with correct regulars and correct irregulars. "Human memory profits from repetition," (Pinker 1999: 197) so adults, having lived longer, have indeed made a stronger memory trace for irregular forms, especially for the common ones.

Pinker hypothesizes that words and rules are accessed at the same time, simultaneously looking up the word in memory and activating the rule. "From your brain's point of view. no verb is either regular or irregular until it has been looked up in memory and discovered to have, or to lack, a special past-tense form." (Pinker 1999: 131)

According to this hybrid mechanism, people assemble regular forms with the rule on the fly, whereas irregular forms are retrieved from memory where they are stored as separate words linked to their stems. Thus, frequency should be a factor in retrieving irregular forms. The most frequent irregulars are expected to have stronger associative links and are expected to be quicker to retrieve than infrequent irregular forms.

Pinker cautions that the dual-mechanism does not mean that people are incapable of storing in memory regular past-tense forms, only that people do not

depend on them. In fact, he cites some studies that have found frequency effects in regular forms, and even an anti-frequency effect in that high frequency regular verbs are slower to produce than low frequency regular verbs, but never slower than the irregular group as a whole. Pinker explains this anti-frequency effect as the stored versions inhibiting the application of the rule especially when the task includes many irregulars which encourage the subjects to resort to memory (see Pinker 1999: 137). Frequency also makes a difference when regular verbs are similar to irregular verbs and the application of the rule is slowed down by temporary false matches (see Pinker 1999: 131).

In short, a dual system operating simultaneously predicts that frequency will always be a factor in retrieving irregular forms. Frequent forms are retrieved faster than infrequent ones due to a stronger memory trace between stem and form. For regulars, frequency is not expected to play a role but might in some cases depending on the task and on the word. However, regulars will always be retrieved faster as a group than irregulars. [1]

A different kind of approach is that of a unitary representation, where all inflection is hypothesized to be stored in the same manner and no distinction in representation is made between regular and irregular forms, namely a connectionist pattern associator memory. Every input and output than **can** be connected **is** connected by a neural network. We memorize a set of outputs for each set of inputs **(i.e.** ***sing-sang*** class of verbs, ***walk-walked*** set of verbs) and then generalize the pattern to apply similar inputs to similar outputs. When faced with a nonce verb such as "spling", we may generate the past tense "splang". This may be expected due to the patterned nature of irregulars. Under'this approach, there would be no significant difference in RT between regular and irregular verbs because they would all be generated by rote memory. The significant difference would be between groups determined by frequency (high vs. low, for both regular and irregular).

What is more interesting and controversial, according to Pinker, is what happens with regular forms. Pattern associator models fail to generalize the application of the regular rule to novel forms, unlike human beings who tend to apply the regular rule when there is no memory trace to rely on (see Pinker 1999: 143-146).

1.2 The dual-mechanism approach to L2

1.2.1 Study of German plurals

Clahsen (1995) uses a dual-mechanism approach to describe his morphology research on the acquisition of German plurals by non-native speakers. His question was whether there were qualitative differences between regular and irregular morphology by looking at the production accuracy of German plural nouns and their interaction with compounds in a longitudinal study with subjects from various language backgrounds.

The plural system for nouns is complex in German. There are eight plural allomorphs and the selection of allomorphs is somewhat arbitrary. The L2 learners in his study definitely treated regular and irregular plurals differently as shown in their use of compounds, which in German can consist of irregular plurals but never regular plurals. The L2 learners did overregularize many irregular plurals. but rarely did so in compounds. Since compounding is sensitive to the regular vs. irregular distinction, Clahsen concluded that the L2 learners in his study were obviously aware of the difference and internalized them differently, even though for non-compounds they performed poorly. He hypothesized that irregulars are marked as such in the lexicon and that specific lexical rules precede general rules. Clahsen concentrated solely on accuracy of production and did not look at RTs, nor did he take frequency of regulars into account.

From our perspective, the interesting result is that subjects consistently treated regular and irregular plurals differently and not whether lexical rules precede the regular rule application (see endnote 1).

1.2.2 Reaction time study of English past tense morphology

The research done by Beck (1997) specifically deals with L1 and L2 acquisition of regular and irregular verb morphology in English. According to Beck, there are at least two possibilities for the source of deficits in regular inflectional morphology. The first type of deficit is what Beck refers to as Type I, which involves a problem with generating regular inflectional forms and attaching them to verb sterns. A deficit in feature checking is referred to as a Type II deficit, which could include a problem with the features or with an inability to allow for verb raising (such as a problem with forming a chain).

In her study Beck tested only for a Type I deficit, since testing for a Type II defect would involve syntactic context. She tested the RT for producing regular and irregular verb morphology with both native and non-native speakers of English. Beck's hypotheses for native speakers point to a dual-mechanism approach, in that native speakers generate regular forms by rules, so there should be no frequency effect, but store irregular forms in memory and therefore frequency should make a difference.

Her hypotheses for L2 learners are that they do not/cannot generate rules and therefore both regular and irregular forms depend solely on memory. Beck concentrates on the behavior of regulars since the effect or not of frequency will determine, according to her, whether regular forms are generated by rule—no frequency effect-or by associative memory. Given the nature of associative memory, the more times a form is heard, the more easier it will be to store/retrieve it. Thus, Beck hypothesizes that high frequent regulars and irregulars will be produced faster than low frequent regulars and irregulars for the non-native speakers. In other words, Beck believes that there will be no difference between regulars and irregulars as a group because non-native

speakers will use only associative memory for both. However, she fails to prove this point because she does not discuss or compare the data from the two groups.

Beck conducted three series of experiments using a voice-activated software program to determine how fast the speaker can orally produce the past-tense form of a given verb shown visually on the screen. The first test included 60 verbs, made up of 15 high frequency regular and 15 high frequency irregulars. coupled with 15 low frequency regulars and 15 low frequency irregulars. The second and third tests included only regular verbs, 15 high frequency and 15 low frequency, and distractors in order to avoid parrot-like responses. The subjects in her studies did not form a homogenous group in terms of their language background or length of residency in an English-speaking country, but all of them had a minimum score of 530 on the TOEFL.

In the first test, the native speakers did as expected with the irregular forms in that the frequent past tense forms were produced more quickly than the low frequency forms. For the regular forms, however, the results were unexpected because there was an anti-frequency effect: high frequency regulars took more time than low frequency regulars. If a rule generates all regular forms, both frequent and non-frequent forms, the rule should generate just as fast for all forms. Moreover, the results of non-native speakers also showed a significant anti-frequency effect for regular verbs (and no significant role of frequency for irregulars). Beck gives little importance to explaining this anti-frequency effect, and the goal of her subsequent tests is to get rid of it by manipulating the verbs in the list and adding distractors. (For an explanation of the anti-frequency effect consistent with a dual-mechanism approach, see Pinker's discussion above.)

The results of Beck's second test with only regular verbs and distractors showed no difference between high frequency and low frequency verbs for native speakers, but still a significant anti-frequency effect for non-natives. She blames this effect on the nature of some of the verbs used which could be interpreted by non-natives as derived verbs which might take more time to retrieve.

In her third and final test, she finally succeeded in eliminating the anti-freq'uency effect for both the natives and non-natives, since the results show no difference between high frequency and low frequency regular verbs for either set of speakers.

Beck's conclusion is that there is no Type I deficit—non-native speakers seem to have internalized a rule for generating inflectional morphology, so they do not solely depend on memory to produce morphology. But given that non-native speakers do behave differently than native speakers in terms of their overall grammatical correctness and correct use of morphology, it could be very possible that there is a Type II deficit, involving feature checking. This kind of deficit would not be testable using the method of verb production out of context, since verb raising will affect the position of the verb in a clause and other noticeable differences on the surface. Beck leaves this up for further study.

In her attempt to eliminate the anti-frequency effect in the data, Beck lost sight of the fact that an anti-frequency effect for regular verbs can be explained in a dual-mechanism approach. As described above, Pinker explains that a hybrid system does not disallow high-frequent verb forms to be stored in memory. A stored regular form can slow down the rule application.

It is interesting to note that in all three tests, the regular forms were produced significantly faster than the irregulars from the first test for both natives and non-natives. We feel that this is an important oversight that would only lend more support for a dual-mechanism approach.

2 Current Study

2.1 Design

The current study investigates the RT of the oral production of verbs in the third person singular present tense indicative in Spanish by intermediate L2 learners whose native language is English. To record the RT, we developed a Visual Basic program with voice activation. In this program the infinitives appear on the screen in the same randomized order for all participants, and the participants are to speak the present indicative third person singular into the microphone. The program records the sample and marks the interval of time in milliseconds between stimulus and response.and then triggers the next verb to appear on the screen. As a trial run for the software, we first ran this test on 12 first-year Spanish students.

The test consists of 40 verbs, divided into four categories based on present tense morphology for third person singular indicative: 10 high frequent regulars, 10 low frequent regulars, 10 high frequent irregulars, and 10 low frequent irregulars. The 40 verbs chosen for this study were based on frequency counts in Juilland and Chang-Rodriguez (1964) and also on our experiences as Spanish teachers to ensure that high or low frequency really reflected the forms that L2 speakers would have encountered. In Spanish, as in most languages, many of the most common verbs are irregular, but it is hard to find irregulars amongst the least common verbs (see Pinker, 1999). Thus all of the uncommon irregulars we used for Spanish are of the stem-changing classes, whereas the common irregulars are often suppletive forms such as ***ser*** (to be) and ***ir*** (to go). We did not include compound verbs that follow the irregular pattern of the root such as ***obtener*** (to obtain) and ***componer*** (to compose) from ***tener*** (to have) and ***poner*** (to put) respectively because the right forms will not tell us whether analogy was important or not. However, we did include ***compensar*** (compensate) in the list of low frequency regular verbs which looks like an irregular compound verb to see whether analogy plays a role for non-native speakers. We tried to maintain a representative balance of the three Spanish verb

classes in all the categories (see Appendix A). We randomized the list using a basic computerized permutation program.

The participants were 10 intermediate Spanish L2 adults whose L1 is English and who have studied Spanish in both traditional classrooms and also in a more naturalistic setting in the same intermediate conversation class. There were five men and five women in the study, and the average age was 43. All have spent significant time abroad (more than 2 months). Given 10 participants and 40 samples each, our results are based on approximately 400 samples. Some samples had to be disregarded due to false starts (coughs, "uhhh", etc.) and others were disregarded because the microphone did not record the sounds and the participant had to repeat his/her answer. We noticed that for some students, as their confidence went down so did the volume of their speech.[2]

2.2 Results

In general terms, our study shows that L2 learners can indeed generate inflectional morphology. Given the task of conjugating verbs in third person singular present indicative, every student gave a conjugated form for every verb without exception. The question is whether we can claim that L2 learners treat morphology in a dual-mechanism approach.

We first averaged the RTs for each verb and then we used these averages to calculate the group mean for each set. This way of treating the data minimizes variations between subjects and gives each verb equal weight when it comes to calculating the mean per group. The results are summarized as follows (see Appendix B for details):

(3) Mean averages per group

Group	Correct Responses	RT Average*
Regular frequent	83	10.0
Regular infrequent	75	12.6
Irregular frequent	62	14.5
Irregular infrequent	32	16.5

* where 10 = 1 second; 12.6 = 1.26 seconds, and so forth.

We performed a series of t-tests on the data to see if we obtained significant differences between regulars and irregulars, and within groups according to frequency.[3] As we expected, overall regulars were faster than irregulars as a

group. The t-test showed that there is a statistically significant difference between the two groups. This confirms that subjects treat regular and irregular verbs differently:

(4) **Regular** verbs vs. Irregular verbs

Regular	$\xi = 11.3$	SD 2.1	(n=20)
Irregular	$\xi = 15.5$	SD 5.4	(n=20)

$p < 0.01$

Additional support for positing a rule for regular forms comes from what speakers do with low frequent verbs, both regular and irregular, as discussed later on.

When controlling for frequency, we found that it seems to be a factor, but not in the way we expected. We found a difference between low and high frequency **only for regular verbs** as shown in (5) and (6):

(5) Regular frequent vs. Regular infrequent

Frequent	$\xi = 10.0$	SD 1.5	(n=10)
Infrequent	$\xi = 12.6$	SD1.9	(n=10)

$p < 0.01$

(6) Irregular frequent vs. Irregular infrequent

Frequent	$\xi = 14.5$	SD 4.5	(n=10)
Infrequent	$\xi = 16.5$	SD 6.2	(n=10)

$p \geq 0.01$ ($p = 0.43$)

There is a statistically significant difference between the two sets of regular verbs, but **not** between the two sets of irregular verbs. Our hypothesis was that if regulars are produced by a **rule,** frequency should not be a factor because the **rule should** apply at the same rate. However, the role of frequency in the regular group can be explained by the assumption that a hybrid mechanism does not prevent people from storing regular forms in memory even when the **rule** gets them the same result, and/or by a stronger trace to the regular rule dependent on frequency. We could hypothesize that for intermediate speakers, there is indeed a rule for the regular forms, but since the low frequent regulars were produced significantly slower than the high frequent regulars, the rule does not appear to produce at the same rate. The trace to the rule might be strengthened in high frequent regulars, which might cause them to be generated faster than low frequent regular verbs.

In the group of irregulars, as shown in (5), there is a 43% probability that the difference between the groups is due to random variability and not to frequency. This goes against the prediction that frequency must have an important effect in irregulars. The unexpected results for the irregular verbs could be due to the

relatively small number of irregular infrequent verbs that were produced correctly. Only 32 out of 88 samples were correct, or 36%. Given the high percentage of incorrect answers, we analyzed the responses to see if there was a pattern of overregularization which would provide additional support for a dual mechanism.

First we looked at how many irregulars were made regular. In the frequent irregulars only one verb was made regular (1 out of 100 forms) *encontrar→ *encontra* (finds). On the other hand, there were instances of regularization for all ten low frequent irregulars. For one verb, ***morder,*** there was only one case of regularization, *morder→*morde* (bites). With the remaining nine verbs it was between 40 and 90% regularization (see Appendix C). These irregular infrequent verbs were so unfamiliar to the subjects that we hypothesize there was no memory trace for the irregular form, so the regular rule applied as default. The RTs of all the incorrectly regularized low frequent irregulars as a group are significantly lower than for the group of irregulars as a whole. In other words, subjects are treating these verbs as unknown regulars in that they are applying the general regular rule with a corresponding faster RT.

In short, the results so far support a dual-mechanism approach in that regular and irregular groups behave significantly different, with RTs being faster for regular verbs than for irregular ones, and that subjects tend to apply the rule as the default when they have no memory trace of an unknown irregular form.

To further disprove any possibility that simple analogy or a unitary approach relying only on rote memory can account for the data, we also looked at how many regulars were made irregular. There were only two instances where an (infrequent) regular verb was made irregular, the verb ***compensar*** (to compensate). If a pattern associative memory were working, then we would have expected more regulars made irregular (*forjar*, *rozar*, *emitir*, etc.) analogous to the irregulars that have similar vowels in the stem that change. In the case of ***compensar,*** given that ***pensar*** is a high frequency (irregular) verb, one could expect a higher rate of people interpreting it as a compound verb which generally maintains the irregular pattern, such as ***detener, componer, deshacer, conrradecir, convenir.*** The fact that we only saw two instances of the low frequency regular ***compensar*** made irregular goes against a theory based on analogy alone such as a pattern associative memory.

As mentioned above, we did run the test on two native speakers, for a total of 80 samples. In general, the native speakers produced all the forms faster than non-natives, and the regulars faster than irregulars. Given the small number of samples at this stage of our study, we cannot really state whether there is a significant difference between low and high frequency in both groups, but it seems that there is no significant difference in regulars as expected.[4]

3 Conclusions

In our test we set out to confirm two hypotheses repeated here for convenience:

(1) Regular forms are generated by rules. Therefore, there will be no difference in RT between high and low frequency regular forms, since the rule(s) for producing regular forms would apply at the same rate for all forms.

(2) Irregular forms are stored in memory. Therefore, high frequency irregulars will be generated faster than low frequency irregulars, noted by a difference in RT.

Our hypotheses derive from a dual-mechanism approach for the acquisition and representation of morphology. The dual-mechanism approach postulates that there would be a difference overall between regular and irregular forms, with regulars being generated faster as a result of two different mechanisms applying simultaneously: a rule-based one for regulars, and a rote memory pattern associator for irregulars.

The results obtained in our study so far suggest a confirmation that regular morphology is generated, and presumably stored, differently than irregular morphology given the significant difference obtained between both groups as a whole.

We found a somewhat unexpected significant difference between high and low frequency verbs in the group of regulars which might appear as a contradiction to (I). However, given the possibility suggested by Pinker (1999) that high frequent regulars can be stored in memory, and our own hypothesis that the memory trace to the rule might be stronger as a function of frequency, this difference may not disprove a dual-mechanism approach. Additional support for a different, rule-based, mechanism operating for regulars, was the high percentage of overregularization observed in low frequent irregulars.

On the other hand, our results so far do not confirm our second hypothesis. Frequency does not seem to be a significant factor in the irregular group. The difference between low and high frequent irregular verbs was not statistically significant. The number of correct responses for the group of infrequent irregular verbs was very low (36%). We concluded that this sample might not be statistically relevant.

This paper constitutes the preliminary findings of an ongoing study. We hope to include more intermediate and advanced L2 speakers, as well as a larger number of native speakers in order to have a better sample. In addition to extending our study of RTs, further study of morphology produced in a context, such as longitudinal studies like Herschensohn (2001), will provide more insight to the nature of L2 acquisition of morphology.

Acknowledgements

We are very grateful to Emilio Mayorga for his help with the statistics and to Ron Yaden for his help in developing the software for our study.

4. Notes

[1] This is also explained by memory and rule application being simultaneous. If memory scanning applied before the rule, irregulars would be retrieved always faster than regulars which never happens.

We also ran the test on two native speakers of Spanish and have looked at the results, but this does not represent a large enough sample to have valid statistical data.

We also conducted additional t-tests where each response in a group (a unique response given by a subject for one particular verb) received an equal weight. That is, in this case we did not average responses by verbs before calculating group statistics. The results obtained were similar.

[4] The RT means for native speakers were the following:

Frequent regular	= 7.7
lnfrequent regular	= 7.9
Frequent irregular	= 9.2
Infrequent irregular	= 8.3

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Appendix A: Verb List

Verbs and their frequency (Juilland & Chang-Rodriguez, 1964). From a corpus of 25,000 sentences / 500,000 words from a variety of written sources - dramas, plays, essays, technical, journals, newspapers.

High Frequency Regular	Low Frequency Regular	High Frequency Irregular	Low Frequency Irregular
comer→come "eats"	calar→cala "perforates"	decir→dice "says"	cegar→ciega "blinds"
creer→cree "believes"	compensar→ compensa "compensates"	encontrar→ encuentra "finds"	colgar→cuelga "hangs"
deber→debe "ought"	cuajar→cuaja "clots"	estar→está "is"	forzar→fuerza "forces"
escribir→ escribe "writes"	emitir→emite "emits"	ir→va "goes"	helar→hiela "freezes"
estudiar→ estudia "studies"	forjar→forja "builds up, creates"	pensar→piensa "thinks"	herir→hiere "hurts"
hablar→habla "speaks, says"	fundir→funde "melds"	poder→puede "is able"	morder→ muerde "bites"
llamar→llama "calls"	ladrar→ladra "barks"	querer→quiere "wants"	regar→riega "waters"
llegar→llega "arrives"	rozar→roza "grazes"	ser→es "is"	regir→rige "governs"
llevar→lleva "carries, wears"	turbar→turba "stirs up"	tener→tiene "has"	sembrar→ siembra "plants"
vivir→vive "lives"	yacer→yace "lies"	venir→viene "comes"	torcer→tuerce "twists"

Appendix B: Mean RTs per Group

Table 1: Frequent regular

Verb	Total Correct Answers	Mean RT*
comer	10	11.4
creer	7	9.6
deber	7	10.0

Table 2: Infrequent regular

Verb	Total Correct Answers	Mean RT
calar	10	11.4
compensar	5	14.6
cuajar	9	16.3

escribir	8	10.3
estudiar	7	12.4
hablar	8	8.5
llamar	10	9.9
llegar	8	10.5
llevar	8	**10.4**
vivir	10'	7.1
	Average	10.0

emitir	8	13.4
forjar	8	12.5
fundir	8	10.4
ladrar	9	10.8
rozar	8	14.0
turbar	4	11.3
yacer	6	11.2
	Average	**12.6**

Table 3: Frequent irregular

Verb	Total Correct Answers	Mean RT
decir	5	15.6
encontrar	9	11.4
estar	3	12.7
ir	7	20.4
pensar	9	11.3
poder	7	12.4
querer	10	11.5
ser	7	24.6
tener	9	**11.8**
venir	5	13.2
	Average	14.5

Table 4: Infrequent irregular

Verb	Total Correct Answers	Mean RT
cegar	4	13.8
colgar	3	11.7
forzar	4	14.8
helar	3	13.3
herir	3	22.3
morder	9	14.9
regar	1	22.0
regir	1	30.0
sembrar	3	11.0
torcer	1	11.0
	Average	**16.5**

* where 11.4 = 1.14 seconds; 9.6 = 0.96 seconds, and so forth.

Appendix C: Regularized Low Frequent Irregulars

Verb	Target Answer	Total Valid	Correct	Regularized	%	Mean RT
cegar	ciega	8	4	4	50.0	12.5
colgar	cuelga	7	3	4	57.1	11.8

forzar	fuerza	9	4	5	55.6	13.6
helar	hiela	7	3	4	57.1	10.8
herir	hiere	10	1	4	40.0	20.5
morder	muerde	10	9	1	10.0	15.0
regar	riega	10	1	9	90.0	13.2
regir	rige	8	2	5	62.5	15.0
sembrar	siembra	10	3	7	70.0	11.6
torcer	tuerce	9	1	8	88.9	15.5
					Average	**13.9**

Glides in Korean Syllables[1]

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1 Introduction

The position of on-glides within syllables has been controversial in Korean phonology: Some researchers (such as Y. Lee 1994; C.-G. Gim 1987) argue that Korean on-glides occur under onset (called the onset hypothesis); others (such as **H.-S.**Sohn 1987; C.-W. Kim & **H.-Y.**Kim 1991) that they occur under nucleus (called the nucleus hypothesis). The aim of this paper is to investigate whether on-glides occur under onset or nucleus. In this paper, I will argue that they occur under both onset and nucleus depending on presence of a preceding tautosyllabic consonant: when there is a tautosyllabic consonant before them, they occur under nucleus, whereas they occur under onset when they are syllable-initial glides.

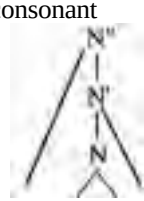
2 Syllable Structure and Types of Syllables

I adopt **Levin's** (1985) syllable structure in this paper. The following are the position of on-glides claimed in this paper:

(1) Position of on-glides[2]

a. Onset in syllable-initial position

b. Nucleus after a tautosyllabic consonant



In Korean, syllables have the form of **(C)(G)V(C)**. The following are all possible types of Korean syllables:

(2) Types of syllables

a. [V]$_\sigma$	e.g., [o] 'five'	[i] 'teeth'
b. [CV]$_\sigma$	e.g., [na] 'you'	[ku] 'nine'
c. [VC]$_\sigma$	e.g., [ak] 'million'	[ip] 'mouth'
d. [CVC],	e.g., [kaŋ] 'river'	[tal] 'moon'
e. [GV]$_\sigma$	e.g., [je] 'yes'	[we] 'why'
f. [GVC],	e.g., [jək] 'station'	[wag] 'king'
g. [CGV]$_\sigma$	e.g., [p*jə] 'bone'	[hwa] 'anger'
h. [CGVC],	e.g., [pjak] 'wall'	[kwaŋ] 'storage'

3 Glides in Syllables

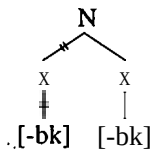
In the above section, I have claimed that glides are both onset and nuclear segments depending on their position within a syllable. Since they occur in different positions within a syllable, they may have different characteristics. This can be illustrated well when they are followed by front vowels. The /j/ after a tautosyllabic consonant is optionally deleted before a front vowel /e/, whereas it is not deleted in syllable-initial position, which is shown in the following:

(3) /j/ before a front vowel /e/[3]

a. /je/ → [je] 'example', not *[e]
   /jesan/ → [je.san] 'budget', not *[e.san]
b. /p^{h}je/ → [p^{h}je] ~ [p^{h}e] 'bother'
c. /kje/ → [kje] ~ [ke] 'a traditional mutual financial association'
   /kjesan/ → [kje.san] ~ [ke.san] 'calculation'
d. /salje/ → [sa.rje] ~ [sa.re] 'reward'

As shown in (3a), the syllable-initial /j/ cannot be deleted before a front vowel /e/, whereas the ones after a tautosyllabic consonant are optionally deleted. In other words, by the current hypothesis they have different characteristics with respect to syllabification: a syllable-initial /j/, which is an onset segment, cannot be deleted whereas the one after a tautosyllabic consonant, which occurs under nucleus, can be optionally deleted. The following analysis illustrates this:

(4) OCP effect within nucleus (optional)



The above analysis shows that the OCP effect holds in this case where the x-slot and the segment with [-bk], namely U], are optionally deleted before another [-bk] segment. This process occurs under nucleus, hence this is the evidence that the /j/ occurs under nucleus when it follows a tautosyllabic consonant, and it occurs under onset when it does not follow any consonant within a syllable. For example, in the case of /jesan/, where there is no preceding consonant before the glide [j], the glide is not deleted because that occurs under onset. There is a well-known cross-linguistic fact that syllables with onsets are less marked than the ones without onsets. Therefore, /jesan/ does not become *[e.san] since the first syllable of this word, otherwise, would end up with an empty onset. If a cluster /Cj/ were assumed to be in onset position, deleting /j/ would yield a simple but filled onset. No motivation is found for this process. The argument that supports nuclear /j/ here is based on the fact that the vowel's quality is crucial, suggesting that the /j/ is in the nucleus in /Cje(C)/. Therefore the only explanation for that is to relate /j/-glide to the following vowel. That is, they both occur under nucleus when there is a preceding tautosyllabic consonant.

The /w/ also shows different characteristics when it occurs before front vowels, depending on its position within a syllable: /w/ remains unchanged when it occurs in syllable-initial position, whereas it is changed to [q] before front vowels /i/ and /e/ when it follows a tautosyllabic consonant[4]. In the following examples, /w/ occurs before /i/:

(5) /w/ before a front vowel /i/

a. /wi/ → [wi] 'above', not *[qi]

b. /twi/ → [tqi] 'back/after'

c. /kwi/ → [kqi] 'ear'

d. /cwi/ → [cqi] 'rat'

e. /nwi/ → [nyi] 'who'

As shown above, the syllable-initial /w/ is not changed whereas the ones after a tautosyllabic consonant are changed to [q] before a front vowel /i/. The same is true when /w/ occurs before the other front vowel /e/, which is shown in the following:

(6) **/w/** before a front vowel **/e/**

a. /we/ → [we] 'why', not *[ye]

b. **/tweta/ → [tɥe.ta]** 'to become'

c. **/k*we/ → [k*ɥe]** 'wisdom'

d. **/cwe/ → [cɥe] 'sin/crime'**

e. **/swe/** → [sye] 'iron'

f. **/nwe/** → [nye] 'brain'

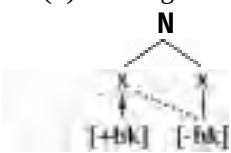
Again, the syllable-initial **/w/** is not changed whereas the ones after a tautosyllabic consonant are changed to [y] before a front vowel **[e].** It should be noted that **[ɥ]** is an allophone of **/w/** since [w] and **[ɥ]** are in complementary distribution: [y] occurs only between a consonant and a front vowel, whereas [w] occurs elsewhere: for example, between a consonant and a non-front vowel **(e.g., [kwa.il]** 'fruit', not ***[kɥa.il]),** and in word-initial position. The following is the formalization of the rule:

(7) Change of **/w/** to **[ɥ]**

/w/ → [y] / [+cons] __ [-cons]
[-back]

As shown in (5) and (6) above, **/w/** after a tautosyllabic consonant gets fronted before front vowels, whereas the syllable-initial **/w/** does not undergo this process since it is under onset. In other words, there is a regressive assimilation, namely, fronting of **/w/** to [y] due to the influence of the following front vowels, within nucleus. This process is obligatory. The following is the analysis:

(8) Fronting of **/w/** to **[ɥ]** within nucleus (obligatory)



This is the evidence that glides occur under nucleus when they follow a tautosyllabic consonant, whereas they occur under onset when they do not follow a consonant within a syllable. If both a syllable-initial consonant and the following **/w/** occur under onset, why is **/w/** changed to [ɥ] in one case and remains [w] in the other case? No motivation is found. The best explanation comes with the following vowels. Therefore, both **/w/** and a following vowel occur under nucleus when they follow a tautosyllabic consonant.

In the following sections, I give more evidence that syllable-initial glides are onset segments whereas glides after a tautosyllabic consonant are nuclear segments.

3.1 Syllable-initial glides as **onset** segments

The next piece of evidence for syllable-initial glides as onset segments comes from **/p/-irregular** verbs. When those verbs are followed by a stative suffix **/ə/,** lpl becomes [w]. The following illustrate this process:

(9) plw alternation with stative suffix **/ə/**[6]

a. **/təp + ə/ → [tə.wə]** 'hot'
   cf., **/təp + ko/ → [təp.k*o]** 'hot and'
b. **/kup + ə/ → [ku.wə]** 'to bake'
   cf., **/kup + ko/ → [kup.k*o]** 'to bake and'
c. **/cup + ə/ → [cu.wə]** 'to pick up'
   cf.,/cup + kol → **[cup.k*o]** 'to pick up and'
d. **/mip + ə/ → [mi.wə]** 'to hate'
   cf., lmip + **ko/ → [mip.k*o]** 'to hate and'

It is obvious that **/p/** is a consonant. And onset and coda positions are usually for consonants. In the above examples [p] alternates with [w]: [p] occurs in coda position when there is a following consonant, whereas [w] occurs in syllable-initial position when it is followed by a vowel. In other words, **/p/** becomes [w] in onset and [p] in coda[7]. Therefore, the syllable-initial [w] is an onset segment. One might argue that [w] is always under nucleus. However, since the syllable-initial [w] shown above is derived from the consonant **/p/,** it is not motivated that it occurs under nucleus.

Hiatus resolution is also evidence for syllable-initial glides as onset segments. As Y. Lee **(1994:138)** argues, syllables without onset are marked **cross-**linguistically, and hence when vowels are adjacent to each other, glides are inserted sometimes to avoid syllables without onset, which is shown in the following:

(10) Glide insertion for hiatus resolution[8]

a. **/kal** + ka + e + jo/ → **[kal.kə.je.jo]** 'I will go'
   /ha + a / → **[ha.jə]** 'to do (stative)'
   cf., **/mək + ə/ → [mə.kə]** 'to eat (stative)'
b. **/cin.se** + a/ → **[cin.se.ja] 'Cinse!** (vocative)'
   cf., lcinsuk + a/ → **[cin.su.ka] 'Cinsuk!** (vocative)'

If the second vowel is high, it is changed to a glide. which is shown in the following (The first example is cited from Y. Lee (1994:138) except the cf.):

(11) Glide formation for hiatus resolution

a. /c^{h}iu + a/ → [c^{h}i.wa] 'to clean'	cf., *[c^{h}i.u.a]
k^{h}iu + a/ → [k^{h}i.wa] 'to bring up'	cf., *[k^{h}i.u.a]
/peu + ə/ → [pe.wə] 'to learn'	cf., *[pe.u.ə]
/s*au + ə/ → [s*a.wə] 'to fight'	cf., *[s*a.u.ə]
b. lmei + a/ → [me.jə] 'to choke'	cf., *[me.i.ə]
/moi + ə/ → [mo.jə] 'to gather'	cf., *[mo.i.ə]
/p^{h}ai + ə/ → [p^{h}a.jə] 'to be dug'	cf., *[p^{h}a.i.ə]
(where /ə/ is a stative suffix.)	

As Y. Lee (1994:138) says, when two syllables are adjacent to each other, if the second one does not have an onset, glide insertion or formation occurs to avoid hiatus. Since they occur in syllable-initial position, this is evidence that syllable-initial glides are onset segments.

3.2 Glides after a tautosyllabic consonant as nuclear segments

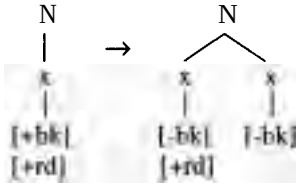
As I claimed before, glides after a tautosyllabic consonant are nuclear segments. One piece of the evidence comes from diphthongization within nucleus, which is shown in the following (where the examples (12b) and (12d) are cited from H.-S. Sohn (1987:74) except the cf.'s)[9]:

(12) Diphthongization within nucleus[10]

a. /kucəl/ → [ku.cəl] ~ [kɥi.cəl] 'phrase'
   cf., /ucəŋ/ → [u.cəŋ], not *[wi.cəŋ] or *[ɥi.cəŋ] 'friendship'
b. /cukita/ → [cu.ki.ta] ~ [cɥi.ki.ta] 'to kill'
   cf., /ukita/ → [u.ki.ta], not *[wi.ki.ta] or *[ɥi.ki.ta] 'to insist'
c. /sokoki/ → [so.ko.ki] ~ [sɥe.ko.ki] 'beef
d. /koki/ → [ko.ki] ~ [kɥe.ki] 'meat'
   cf., /oki/ → [o.ki], not *[we.ki] or *[ɥe.ki] 'obstinacy'
e. /mosita/ → [mo.si.ta] ~ [mɥe.si.ta] 'to escort'
   cf., /osita/ → [o.si.ta], not *[we.si.ta] or *[ɥe.si.ta] 'to come'

It is obvious that vowels occur under nucleus. In the above examples, rounded vowels alternate with diphthongs when they occur after a tautosyllabic consonant, but they do not in syllable-initial position. This is the evidence that glides after a tautosyllabic consonant are nuclear segments. The following is the analysis:

(13) Diphthongization within nucleus



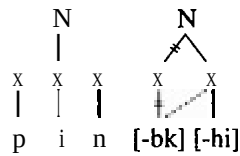
Another piece of evidence comes from H.-S. Sohn (1987). She provides some examples where a postconsonantal glide followed by a vowel optionally becomes a monophthong, which she calls nucleus degemination. The following examples illustrate this (H.-S. Sohn, 1987:162):

(14) Nucleus degemination

a. /kjə/ → [kja] ~ [ke] 'chaff
b. /pinjə/ → [pi.njə] ~ [pi.ne] 'stick hairpin'
c. /mjəni̯li/ → [mjə.ni̯.li] ~ [me.ni̯.li] 'daughter in law'
d. /pjəlak/ → [pjə.lak] ~ [pe.lak] 'thunder'
e. /p*jam/ → [p*jam] ~ [p*em] 'cheek'"

She claims that this process is accounted for by degemination of two segments within nucleus. She provides the formalization of this process, which is shown in the following (H.-S. Sohn, 1987:162):

(15) [pi.njə] ~ [pi.ne]



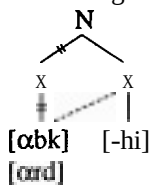
According to H.-S. Sohn (1987:162), a glide followed by a vowel yields a single vowel, and so both the x-slot and the segment are delinked. She claims that this process can be explained when both a glide and a vowel occur under the same nucleus. In the following, I provide some other examples:

(16) a. /tu + a + la/ → [tu.ə.ra] ~ [twə.ra] ~ [to.ra] 'put! (command)'

b. /cu + a + la/ → [cu.ə.ra] ~ [cwə.ra] ~ [co.ra] 'give (command)'

As shown in the examples in (14) and (16), not only /jə/ and /ja/ but also /wə/ is denuclearized: /wə/ becomes /o/. It should be noted that the denuclearized vowels, namely [e] and [o] have the same [round] feature that the original glides have. That is. /j/ and [e] have the same [-round] feature whereas /w/ and [o] have the same [+round] feature. Therefore, H.-S. Sohn's (1987) analysis shown in (15) should be changed to explain the cases for both /j/ and /w/. The following analysis illustrates this:

(17) Nucleus degemination (revised)



It should also be noted that in all of the examples in (14) and (16), glides occur after a tautosyllabic consonant. The nucleus degemination does not work for syllable-initial glides[12]. The following illustrate this:

(18) a. /jəlɨm/ → [jə.rɨm], not *[e.rɨm] 'summer'

b. /pujə/ → [pu.jə], not *[pu.e] 'name of a place'

c. /wənca/ → [wən.ca], not *[on.ca] 'atom'

d. /kuwəl/ → [kuwəl], not *[ku.ol] 'September'

Therefore, syllable-initial glides are onset segments whereas glides after a tautosyllabic consonant are nuclear segments.

Another piece of evidence comes from metathesis followed by fronting of features within nucleus. The following illustrate this (where the example (19b) is cited from H.-S. Sohn (1987:163))[13]:

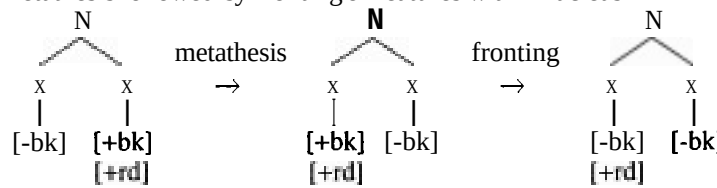
(19) a. /kjupəm/ → [kju.pəm] ~ [kɥi.pəm] 'law'
cf. /jusan/ → [ju.san] 'inheritance', not *[wi.san] or *[ɥi.san]
b. /p*jocok/ → [p*jo.cok] ~ [p*ɥe.cok] 'sharp'
c. /mjo/ → [mjo] ~ [mqe] 'tomb'
cf. /jose/ → [jo.se] 'fortress', not *[we.se] or *[ɥe.se]
d. /k^hjuripuin/ → [k^hju.ri.pu.in] ~ [k^hɥi.ri.pu.in] 'Madam Curie'[14]
e. /tepju/ → [te.pju] ~ [te.pɥi] 'debut'

In the above examples, a /j/ followed by a back rounded vowel alternates with a [ɥ] followed by a front unrounded vowel. However, syllable-initial glides do not undergo these changes. As explained before, /w/ becomes [ɥ] between a consonant and a front vowel. Then, we can analyze the above examples as in the following:

(20) a. /kju.pəm/ → [kwipam] → [kɥi.pəm]
b. /p*jo.cok/ → [p*wecok] → [p*ɥe.cok]
c. /mjo/ → [mwe] → [mqe]
d. /k^hju.ri.pu.in/ → [k^hwi.ri.pu.in] → [k^hɥi.ri.pu.in]
e. /te.pju/ → [te.pwi] → [te.pɥi]

The following is the analysis for these phonological processes:

(21) Metathesis followed by fronting of features within nucleus



As shown above, metathesis occurs within nucleus, and also fronting of [w] to [q] before [-bk] segment occurs within nucleus. Since this process occurs only after a tautosyllabic consonant, this is evidence that glides after a tautosyllabic consonant are nuclear segments.

4 Glides as Both Onset and Nuclear Segments Found in Other Languages

While I have been doing this research, I have found that not only Korean but also other languages show that syllable-initial glides are onset segments whereas the ones after a tautosyllabic consonant are nuclear segments. In this section, I cite some research conducted on Spanish, Slovak, and French.

4.1 Spanish examples

Harris and Kaisse (1999) researched Spanish on-glides. I discuss their work in this section. In most dialects of Spanish, syllable-initial glides are optionally or obligatorily changed to obstruents, whereas the ones after a tautosyllabic consonant are not. The following illustrate this (Harris & Kaisse, 1999:127):

(22) a. crec-/io/ → cre.c[jó] 's/he grew'
b. cre-/io/ → cre[.jó], cre[.ǰó], cre[.ɟó][15], cre[.ž́ó], cre[.ǰ́ó] 's/he believed'

As shown above, a syllable-initial glide [j] alternates with obstruents. Their obstruent forms are different from dialect to dialect, from context to context. This is evidence that syllable-initial glides are onset segments.

They also provide evidence that glides are nuclear segments when they occur after a tautosyllabic consonant. In the following examples, mid vowels /e/ and /o/ are diphthongized under stress (Harris & Kaisse, 1999:128):

(23) Diphthongization of mid vowels

a.	v[e]nímos 'we are coming'	vs.	v[jé]nen 'they are coming'
b.	tr[o]nába 'it was thundering'	vs.	tr[wé]na 'it is thundering'

It is well known that verbs have stress on penultimate syllables in Spanish, which is also the default case for most Spanish words. The above verbs also have stress on penultimate syllables. In Spanish, stress depends on syllable count and weight. In other words, stress assignment follows syllabification. In the above examples, since the diphthongization is caused by stress, it is obvious that the source vowels /e/ and /o/ are under nucleus before diphthongization. If the glide made by the diphthongization remains under nucleus, no other explanation is needed. However, if we consider that the glides move to onset position, where other consonants are already placed after syllabification, we need to explain what motivates this process. No motivation for this process is found (Harris & Kaisse, 1999:128). This is evidence that glides after a tautosyllabic consonant are nuclear segments.

Harris and Kaisse (1999:130) also mention that Slovak has the same phenomena. That is, glides are onset segments in syllable-initial position, whereas they are nuclear segments after a tautosyllabic consonant within a syllable. In the following section, I cite the cases found in Slovak.

4.2 Slovak examples

Citing Rubach (1998), Harris and Kaisse (1999) discuss that in Slovak a heavy syllable undergoes shortening after another heavy syllable. This process does not occur after a syllable with an initial glide, but does with a postconsonantal glide followed by a vowel. The following illustrate this (Rubach, 1998:170):

(24) a. No shortening: žen + ám [žena:m] 'woman' (dat.pl)[16]
b. Shortening: min + am [mi:nam] 'mine' (dat.pl)
c. Shortening: vŕb + am [vr:bam] 'willow' (dat.pl)
d. Shortening: riek + am [riekam] 'river' (dat.pl)[17]
kôr + am [kuoram] 'surface' (dat.pl)
čiar + am [čiaram] 'line' (dat.pl)

The dative plural suffix has a long vowel in the underlying representation. It appears when the stem has a short vowel, which is shown in the example (24a). The examples in (24b) and (24c) show that a long vowel and a long syllabic consonant trigger shortening of the vowel of the following syllable. In the examples in (24d), a diphthong, which occurs after a tautosyllabic consonant. also triggers this process. This is evidence that glides after a tautosyllabic consonant are nuclear segments since they pattern with long vowels and long syllabic consonants, which are obviously nuclear segments.

Consider the following examples (Rubach. 1998:171):

(25) jiríčk + a [jiri:čka] 'linnet'

In the above example, the long vowel /i:/ does not undergo shortening. If the syllable-initial [j] were under nucleus with the vowel [i], the second syllable would have undergone shortening. However, this is not the case since the syllable-initial [j] is under onset. In conclusion, Slovak syllables also show the same pattern as Korean and Spanish syllables. In the following section, French examples are explained.

4.3 French examples

In French, glides are also both onset and nuclear segments. However, unlike Korean, Spanish, and Slovak, French has an underlying contrast between glides (Harris & Kaisse, 1999:130). This is explained by presence and deletion of the vowel of the article *le* /lœ/. Tranel (1987) provides the following examples (cited from Harris & Kaisse, 1999:130):

(26) a. le whiskey [lœ wiski] 'the whiskey' vs. l'oiseau [lwazo] 'the bird'
b. le yod [lɪs jod] 'the yod' vs. l'iode [Ijod] 'the iodine'

According to Harris and Kaisse (1999:130), and Tranel (1987:117), in words like ***whiskey*** and ***yod,*** glides occur in onset position, and hence the article /lœ/ does not undergo deletion of its vowel. In words like ***oiseau*** and ***iode,*** glides occur under nucleus, and hence the vowel in /lœ/ is deleted. Since there is no phonetic difference between glides in the examples of both (26a) and (26b), the distinction must be lexically specified (Scullen 1993, cited from Harris & Kaisse 1999:130). Although French does not pattern with Korean, Spanish, and Slovak, it should be clear that glides are both onset and nuclear segments in French.

5 Conclusion

In this paper I have argued that glides are both onset and nuclear segments depending on their position within a syllable: syllable-initial glides are onset segments, whereas the ones after a tautosyllabic consonant are nuclear segments. I have provided the evidence from glides before front vowels, p/w alternation, hiatus resolution, diphthongization within nucleus, nucleus degemination, and metathesis followed by fronting of features within nucleus.

I also mentioned that Korean is not the only language that shows glides as onset segments in syllable-initial position but nuclear segments after a tautosyllabic consonant. Languages such as Spanish, Slovak, and French also differentiate between syllable-initial glides and those after a tautosyllabic consonant. Therefore, glides are both onset and nuclear segments cross-linguistically.

While I have been doing this research, I have noticed that many examples provided by onset hypothesis supporters have syllable-initial glides, whereas the ones by nucleus hypothesis supporters mostly have glides after a tautosyllabic consonant. This is not surprising since glides are onset segments in syllable-initial position, whereas they are nuclear segments after a tautosyllabic consonant within a syllable. This is shown by many examples provided before, and is also true cross-linguistically.

Notes

[1] A detailed version of this paper was presented to the University of Washington Working Papers in Linguistics (Vol. 20). I would like to thank Ellen Kaisse, who has contributed many valuable

comments on this paper. I also thank Sharon Hargus. Richard Wright. David Corina, and Lesley Carmichael for reading the draft of this paper and for their advice and criticism. All remaining errors are my own.

[2] In Korean, [ji], [ɰi], [wɨ], [wu]. and [wo] are impossible sequences of diphthongs. For detailed explanation, see H.-S. Sohn (1987).

[3] H.-S. Kang (1998) provides a phonetic analysis of this phonological process in detail. He also explains it using a feature geometry approach. Although he and I use different approaches, we both analyze this process as an outcome of the OCP effect.

[4] Many researchers (such as K.-O. Kim 1978 and H.-S. Sohn 1987 among others) use the symbols [ü] and [ö] instead of [ɥi] and [qe], respectively. They claim that [(C)wi] and [(C)we] are in free variation with [(C)ü] and [(C)ö], respectively. Their transcriptions for [kqi] 'ear' and [k'qe] 'wisdom', for instance, are [kwi] ~ [kii] and [k'we] ~ [k'ö], respectively. K.-O. Kim (1978) claims that [(C)wi] and [(C)we] are derived from the underlying /(C)ü/ and /(C)ö/ by some phonological rules (e.g., /ö/ → [öi] ([i] insertion) → [öe] (lowering) → [we] (glide formation)). H.-S. Sohn (1987) claims the opposite of it: for example. /(C)we/ ([+rd], [-bk. -hi]) → [(C)ö] ([+rd, -bk, -hi]) by nucleus degemination. However, my intuition as a native speaker of Korean does not agree with them. It might be possible that there were the monophthongs /ü/ and /ö/ in the history of Korean. But in modem Korean they do not exist. For example, [k'qe] should not be transcribed as [k'o]: while Korean speakers are pronouncing this word, their lips are rounded first and then spread, and hence they are diphthongs. It should not be transcribed as [k'we] either: when /k'/ is produced, the front of the tongue touches the hard palate instead of the velum, with the tip of the tongue against the lower teeth. which is the typical pronunciation of palatal sounds as explained by Ladefoged (2001:144). This is due to the influence of the following [-bk] segment, namely [ɥ]. Therefore, the correct transcription is [k'qe]. Later. I will explain that /w/ becomes [ɥ] between a consonant and a front vowel. W. Huh (1985) also uses [(C)ɥi] and [(C)ɥe].

[5] The consonant /c/ should be understood as an alveopalatal affricate in this paper.

[6] This phonological process works only with /p/-irregular verbs. /p/-regular verbs do not show this process: for example. /cip + e l → [ci.pə] 'to pick up'.

[7] This is more complicated than it appears. Y.-K. Kim-Renaud (1974) and S.-C. Ahn (1985) claim the /p/ analysis, whereas H.-S. Sohn (1987) and Y. Jeong (1998) claim the /w/ analysis. I follow the /p/ analysis in my paper. Actually, /p/ remains in syllable-initial position in the Kyungsang dialect: for example, /tʌp + ə/ → [tə.pə] 'hot'. In any case. it is obvious that [w] alternates with [p]. I take this as evidence that syllable-initial glides are onset segments.

[8] I use my own examples here, but the basic idea is from his arguments.

[9] In H.-S. Sohn (1987:74), the examples (12b) and (12d) are transcribed as: /cukita/ → [ciikita], and /koki/ → [k öki]. She explains these with vowel fronting before front vowels. But I do not agree with these transcriptions. The first vowels should be transcribed as diphthongs [ɥi] and [qe], respectively, since while Korean native speakers arc pronouncing these words, they show lip rounding followed by spreading. These examples undergo fronting with diphthongization, and hence, /u/ → [ɥi] and /o/ → [ɥe], respectively.

[10] The argument for this process might be weak since it is restricted to only a few words (less than 30 words, to my knowledge). However, it should be noted that the diphthongization is possible after consonants with almost all types of manners and places of articulation.

[11] She transcribes this word as: [p'jam] ~ [p'æm]. But in Korean , /æ/ and /e/ have been merged to /e/, and hence I use /e/. For detailed analysis, see Y. Hong (1987. 1991).

[12] H.-S. Sohn (1987) argues that glides are nuclear segments only.

[13] She transcribes this example as: /p'jocok/ → [p'ö.cok] to explain nucleus degemination. I do not agree with her transcription and analysis.

[14] The examples (19d) and (19e) are loan words. They are originally French words where the first vowel in (19d) and the second vowel in (19e) are both [i]. It is not clear whether they were borrowed from French or English. This vowel became [ju] and [qi] in Korean. This means that Korean speakers do not produce the monophthong /ü/.

[15] [ʝ] and [ʒ] are voiced palatal obstruents, which have [+cont] and [-cont] features, respectively. For further explanation, see Harris and Kaisse (1999: 121-122) and papers cited therein.

[16] Rubach says that the accute accent indicates a long vowel in the Slovak orthography.

[17] In the transcriptions provided by Rubach (1998). [ie], [uo], [ia] are diphthongs.

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Inverse Linking Without LF-Movement

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1 Inverse Linking Constructions (ILCs)

In this paper, I will cast a fresh look at the syntax and semantics of so-called 'Inverse Linking Constructions' (henceforth: ILCs).* ILCs were first extensively discussed in May (1977) and are illustrated in (1ab):

(1) a. [$_{DP}$ One apple in [$_{QP}$ every basket]] is rotten.

b. [$_{DP}$ Some man from [$_{QP}$ every city$_i$]] despises it$_i$.

ILCs are DPs which contain a quantified NP (QP) which is selected by a preposition. ILCs have three characteristic properties: (i.) they are ambiguous between a 'surface' scope reading and an 'inverse' scope reading, on which the embedded QP takes scope over the indefinite or numeral expression (3ab); (ii.) on the inverse reading, the DP-internal QP can bind a pronoun outside the ILC (4ab)'; ILCs are restricted to non-specific DPs (Fiengo & Higginbotham 1981). The inverse reading is impossible with specific DPs, as shown in (5).

(3) One apple in every basket is rotten.
a. There is one apple which is in every basket and which is rotten.
b. In every basket, there is one apple which is rotten.

(4) Some man from every city$_i$ despises it$_i$.
a. For every city y, some man from y despises y.
b. *There is a specific man from every city who despises it.

(5) This picture of everybody is now on sale.
*For everybody y, this picture of y is on sale.

The properties of ILCs have often been put down to the application of a covert movement operation at the syntactic level of 'Logical Form' (LF) (May 1977, 1985, Fiengo & Higginbotham 1981, Heim & Kratzer 1998, Fox 2000). This

LF-movement raises the embedded QP to a position from where it can take scope over the numeral/indefinite expression, and from where it can bind a variable outside the ILC.

In this paper, I argue that ILCs need not, and in fact should not be analysed in terms of LF-movement. The LF-movement analysis is replaced with a 'surface analysis', which treats ILCs as structurally ambiguous at surface structure in the spirit of Huang (1982), and which furthermore is empirically more adequate than the LF-analysis. The decrease in syntactic complexity is bought at the expense of additional complexity in the semantic component..

The structure of the paper is as follows. In 2, I present the LF-movement analysis as found e.g. in May (1977, 1985) and Heim & Kratzer (1998). In 3, I raise three kinds of problems for this anaiysis. In 4.1 present the surface analysis of ILCs, which is shown to account for the properties of ILCs. In 5, I touch on some problems and extensions of the analysis, before concluding in 6.

2 The LF-Movement Analysis

May (1977, 1985) and Heim & Kratzer (1998) assume the surface structures in (6) for the ILCs in (1):[2]

(6) a. $[_{DP}$ One $[_{NP}$ apple $[_{PP}$ in $[_{QP}$ every basket]]]] is rotten.
#'There is one apple which is in every basket and which is rotten.'

b. $[_{DP}$ Some $[_{NP}$ man $[_{PP}$ from $[_{QP}$ every city$]_i]]]$ despises $\mathbf{it_i}$.
#'There is some man who is from every city and who despises it.'

LF-movement for interpretive reasons (e.g. scope) is optional (Fox 2000) and need not apply. In this case, the QP remains in situ. It takes surface scope under the numeral/indefinite expression (cf. 6ab), and is unable to bind a variable outside the ILC (6b). If LF-movement applies, the QP raises across the indefinitelnumeral expression. In May (1977), the QP is extracted from the embedding DP. In May (1985) and Larson (1985). it only adjoins to the embedding DP. The latter option is illustrated in (7ab). (7ab) show that the raised QP takes scope over the indefinite/numeral expression at LF, and it is able to bind a variable outside the ILC, arguably under c-command.[3]

(7) a. $[_{DP}\ [_{QP}$ every basket], $[_{DP}$ one apple $[_{PP}$ in $t_1]]]$ is rotten.

b. $[_{DP}\ [_{QP}$ every city$]_1\ [_{DP}$ some man $[_{PP}$ from $t_1\ ]]]$ despises $\mathbf{it_1}$.

3 Problems for the LF-Movement Analysis

There are three kinds of problems for the LF-movement analysis of ILCs. The first problem arises in connection with contradictory evidence regarding the landing site of the raised QP. An analysis without LF-movement would avoid such a contradiction. Secondly, crosslinguistic considerations argue against an LF-analysis of ILCs. An analysis without LF-movement would make possible a unified treatment of English and German ILCs. Third, there is evidence that the surface structure of ILCs on their inverse reading is not as indicated in (6ab). If the QP takes scope over the numeral/indefinite expression at surface structure already, LF-movement (for scope reasons) becomes obsolete.

3.1 Contradictory evidence concerning the landing site of LF-movement

May (1985) and Larson (1985) present empirical arguments to the effect that the QP is not extracted out of the embedding DP in ILCs. Larson shows that certain inverse readings that would result from extracting the QP out of the DP are not attested. I illustrate his argument with the somewhat simpler example in (8).

(8) One apple on every plate is too much.

(8) means that is too much that every plate is such that there is one apple on it, where the universal quantifier takes scope over the numeral. The universal QP does not extract out of the DP in (8), however, for such movement would result in the LF-structure in (9a), with the unattested reading in (9b).

(9) a. [every plate]$_i$ [$_{IP}$ [$_{DP}$ an apple on t_i] is too much.]
b. *'Every plate x is such that an apple on x is too much.'

That is, there should be no apple on any plate. The existence of sentences like (8). and a general ban on extraction out of subject DPs (cf. May 1985). form empirical evidence in favour of an analysis which does not extract the QP out of the embedding DP (cf. 7ab above).

On the other hand, Fiengo & Higginbotham (1981) assume extraction of the QP out of the embedding DP. For them, the non-specificity of ILCs (cf. 5) follows from a general ban on extraction from specific DPs, illustrated in (10).

(10) *Whom did he read this book of?

Hence, assuming LF-movement for ILCs leads to contradictory assumptions about the landing site of this movement. Extraction of QP out of the embedding DP accounts for one set of data (the specificity effects). Adjunction of QP to DP accounts for another set (the unattested readings). In light of this contradiction, it appears more promising to do without LF-movement altogether.

3.2 Cross-linguistic considerations

The second problem arises from cross-linguistic considerations. (11ab) show that German has ILCs which are syntactically and semantically parallel to their English counterparts. The only plausible reading for (11ab) is the inverse scope reading. However, German shows at best weak evidence for scope driven LF-movement elsewhere in the grammar. On a neutral intonation, (12) seems to lack an inverse scope reading (Sæbø 1995, Krifka 1998).

(11) a. [Ein Apfel in jedem Korb] ist verrottet.
one apple in every basket is rotten (=1a)

b. [Ein Mann aus jeder Stadt_i] verachtet sie_i.
One/some man from every city despises it (=1b)

(12) Ein Arzt behandelte jeden Patienten.
A/some doctor treated every patient
*'For every patient, there was a (different) doctor who treated him.'

The absence of an inverse scope reading for (12) can be taken as an argument against scope-driven LF-movement in German. The question arises, then, why scope-driven LF-movement in German should apply in the case of ILCs (11ab), but not in other syntactic configurations (12).

Concluding, the structural and interpretive parallelity of English and German ILCs calls for a unified analysis. A surface analysis could account for ILCs in both languages as well as for the absence of an inverse reading for (12).

3.3 Evidence for a different surface structure with inverse readings

The third problem concerns the surface structure of ILCs on the inverse reading as given in (6ab). The problem comes in form of an unexpected asymmetry which shows up in the presence of other postnominal modifiers, e.g. relative clauses or other PPs. It shows that inverse readings are possible if and only if the PP containing the QP (henceforth 'QPP') occurs in DP-final position (i.e. following all other postnominal material). In contrast, all non-final QPPs must be interpreted as PP-modifiers and give rise to surface readings only.

Regarding the relative order of QPPs and relative clauses (RCs), the inverse reading with ILCs is possible if and only if the QPP occurs in DP-final position (13a). If the QPP precedes the RC, the inverse reading is unavailable (13b).

(13) a. One person [$_{RC}$ who was famous] [$_{QPP}$ from every city] died last year.
'Every city y is such that one famous person from y died last year.'

b. #One person [QPP from every city] [RC who was famous] died last year.
#'One person who came from every city and who was famous died.'

The non-existence of an inverse reading for (13b) is unexpected on the LF-analysis, which takes all postnominal PPs to be modifiers right-adjoined to N'. LF-movement of the QPP should be equally good in (13ab), contrary to fact.

Regarding the relative order of QPPs and other PP-modifiers, the same holds. Ordinary PP-modifiers can occur in any order (14ab), while inverse readings with ILCs (with the prepositions in, on, from) are contingent on the DP-final occurrence of the QPP (15ab).[4]

(14) a. one slave [PP with good manners] [PP from Syria] was freed.
b. one slave [PP from Syria] [PP with good manners] was freed.

(15) a. one slave [PP with good manners] [QPP from every province] was freed.
b. #one slave [QPP from every province][PP with good manners] was freed.

If QPPs on the inverse reading were ordinary PP-modifiers (right-adjoined to N'), the difference between (15a) and (15b) would be unexplained. LF-movement should apply equally well to both QPPs, contrary to fact.

In this section, it has been shown that QPPs which give rise to inverse readings differ syntactically from other postnominal modifiers. They cannot freely change places with other modifiers, but must be DP-final. This suggests that the surface structure of ILCs - on the inverse reading at least - is not that in (6ab). With a different surface structure for ILCs, however, we need not fall back on LF-movement in order to account for the wide scope of the embedded QP. The correct scopal relationship may hold at surface structure already. In the following, I argue that ILCs do not have 'inverse' readings in the literal sense.

4 A Surface Analysis for ILCs

In this section, I propose a surface analysis for ILCs. In the spirit of Huang (1982), I assume that ILCs are structurally ambiguous at surface structure. The two readings of ILCs derive from two different surface structures which are string-identical. The proposed analysis can account for all properties of ILCs, in particular the DP-final occurrence of QPPs on the "inverse" reading.

Although I consider both readings of ILCs as surface readings, I will continue using the terms "surface" and "inverse" reading as convenient labels for the relevant readings. In 4.1, I briefly look at the "surface" reading of ILCs. In 4.2, I present the syntactic analysis of ILCs on the "inverse" reading. In 4.3, I present

the semantic analysis of the "inverse" reading of ILCs. In 4.4, it is shown that the analysis proposed can account for the properties of ILCs.

4.1 The "surface" reading of ILCs

The surface reading of ILCs is illustrated again in (16).

(16) [A trip to every European capital] was fantastic.
'There was a trip directed to every EC which was fantastic.'

I adopt the standard analysis of "surface" readings, which is found e.g. in May (1985) and Heim & Kratzer (1998), and which was illustrated in (6ab) above. The PP to *every* European capital is analysed as a PP-modifier in sister position to the head noun. The indefinite article a is located in D^0.

(17) [$_{DP}$ A [$_{NP}$ trip [$_{PP}$ to [$_{QP}$ every European capital]]]] was fantastic.

Semantically, the "surface" reading of ILCs is derivable by means of a type-driven compositional semantics as found in Heim & Kratzer (1998). The QP undergoes type-raising, allowing for combining the values of QP and P in situ. The PP as a whole is a modifier to the head noun. Predicate modification combines the meaning of the PP with that of the head noun. Finally, the result serves as argument to an existential quantifier (possibly denoted by a).

4.2 The "inverse" reading of ILCs I: The syntax

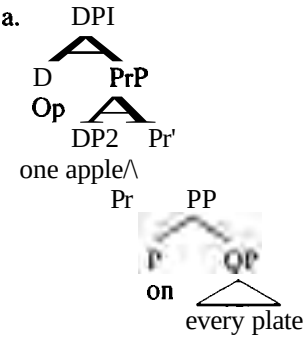
As argued above, the syntactic structure of ILCs with "inverse" readings (cf. 18ab) is more complex than the structure in (17).

(18) a. One apple on every plate is too much.

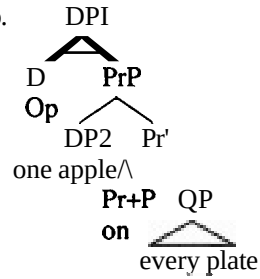
b. One apple in every basket is rotten.

In particular, the base-structure of the DPs in (18ab) is as in (19a). The surface structure is as in (19b):

(19) a.



b.



The syntactic structures in (19ab) exhibit the following properties. To begin with.. the PP on every plate is not adjoined to N' (as modifiers are), but it is base-generated as the syntactic predicate of a small clause structure PrP. This PrP is selected by a phonetically empty operator in D. The DP2 one apple is the subject of PrP. Semantically, the predicate PP predicates a place of this subject.

The existence of DP-internal predication is independently motivated. Predicative small clauses which are inside DP and selected by a functional head have been postulated by Abney (1987) for gerundive constructions (John singing the Marseillaise), by Kayne (1994) for DPs containing relative clauses, and by den Dikken (1998) for the N-of-a-N construction (an idiot of a doctor).

Finally, the P-head of the PP incorporates into the head of the small clause Pr, forming a complex predicate (Baker 1988). A similar process is found with applicatives and dative shift (Baker 1988), P-to-V incorporation in particle verb constructions, as well as incorporation of a dative P into copular be in possessive have constructions (den Dikken 1992).[5]

4.3 The "inverse" reading of ILCs II: The semantics

The semantic analysis of the "inverse" reading of ILCs is based on two assumptions: (i.) DPs in non-argument position can denote predicates, as in John is *a plumber*; (ii.) Skolem functions from individuals to individuals (type <e,e>) play a crucial role in the analysis (henceforth: 'function analysis').

The function analysis of "inverse" readings is illustrated first for (18a), which forms the simplest case. (18a) involves a mapping from plates into apples on these plates. It is too much if every plate is mapped to one apple on it. Instead, only some plates must be mapped to one apple on them. On this view, (18a) is a statement about functions mapping plates to apples. It specifies that certain mappings are not OK.

I would like to argue that it is the complex head [Pr+P] in (19b) which introduces functions into the semantic representation of (18a). The denotation of [Pr+P] takes the denotations of the small clause's predicate and subject (QP and

DP) as its semantic arguments and maps them onto a set F of functions $f_1..f_n$. The values of QP and DP2 define the function, i.e. their values determine which functions $f_1...f_n$ can be elements of F. The QP-denotation determines the input of $f_1...f_n$, while the DP2-denotation determines the output of $f_1...f_n$ (together with the denotation of P). The denotation of Pr+P is given in (20a). Stepwise functional application (henceforth 'FA') of (20a) to the denotations of QP and DP2 yields (20b) and (20c). (20c) is the denotation of the small clause PrP.

(20) a. $[[\text{Pr+on}]] = \lambda Q_{\ldots}\lambda P_{\ldots}\lambda f.\ Q(\lambda x.P(f(x)) \wedge \text{on'}(f(x),x))$

b. $[[\text{Pr+on every plate}]] = \lambda P_{<e,t>}.\lambda f.\forall z[\text{plate'}(z) \rightarrow (P(f(z)) \wedge \text{on'}(f(z),z))]$

c. [[one apple Pr+on every plate]] =
$\lambda f_{<e,e>}.\ \forall z\ [\text{plate'}(z) \rightarrow (\text{one\_apple'}(f(z)) \wedge \text{on'}(f(z),z))]$

The PrP *one apple on ever)!plate* in (20c) denotes a set of Skolem functions $\{f_1, f_2, f_3, f_4, \ldots\}$ of type <e,e> which map plates into apples on them. In a last step, the empty operator in D (21a) existentially quantifies over this set of functions. The DP denotes a proposition (21b) with the truth conditions in (21c).

(21) a. $[[\text{Op}]] = \lambda F_{\ldots}\ \exists f\ F(f)$

b. $[[\text{DP}]] = \exists f\ [\forall z\ [\text{plate'}(z) \rightarrow \text{one\_apple'}(f(z)) \wedge \text{on'}(f(z), z)]] = 1$ iff

c. there is a function which maps every plate to one apple on it.

The proposition denoted by DP is an appropriate argument for the (syntactic) predicate *too much,* which (like *necessary, enough)* is an operator of type <t,t> over propositions. The entire clause *One apple on every plate is too much* is true iff it is too much that there is a function from every plate to an apple on it, which is true iff every plate has one apple on it. The introduction of functions from individuals to individuals therefore correctly derives the meaning of (18a).

The function analysis can be extended to derive the "inverse" reading for the ILC in (18b), the structure of which is repeated in (22).

(22) $[_{DP}\ Op_2\ [_{PrP}\ [_{DP}$ one apple] [[Pr+in] $[_{QP}$ every basket]]]] is rotten.

The semantic derivation of (22) is as above up to the level of PrP. PrP denotes a set of functions from all the baskets to individual apples contained in them.

(23) $[[\text{PrP}]] = \lambda f_{<e,e>}.\ \forall z\ [\text{basket'}(z) \rightarrow \text{one\_apple'}(f(z)) \wedge \text{in'}(f(z), z)]$

The difference lies in the semantic value of the silent operator Op_2 in D. Op_2 existentially quantifies over a set of functions F, too, but in addition it attributes a property P (anticipating the VP-denotation) to the values of f (here: individual apples) (cf. 24a). The value for the entire DP is given in (24b).

(24) a. $[[Op_2]] = \lambda F_{\langle e,t\rangle,\langle e,e\rangle}.\lambda P_{\langle e,t\rangle}.\exists f\,[F(f) \wedge \forall x[dom(f)(x) \rightarrow P(f(x))]]$

b. $[[DP]] = [[Op_2]]([[PrP]]) = \lambda P_{\langle e,t\rangle}.\exists f\,[\forall z\,[basket'(z) \rightarrow one\_apple'(f(z)) \wedge in'(f(z), z)] \wedge \forall x[dom(f)(x) \rightarrow P(f(x))]]$

Finally, the denotation of DP functionally applies to the VP-denotation:

(25) a. [[One apple in every basket is rotten]] = $\exists f\,[\forall z\,[basket'(z) \rightarrow one\_apple'(f(z)) \wedge in'(f(z),z)] \wedge \forall x[dom(f)(x) \rightarrow rotten'(f(x))]] = 1$ iff

b. there is a function f from baskets to apples in them and the values of f for all baskets are rotten,

which is true iff in every basket there is one rotten apple.

Summing up, it was shown that the function analysis correctly derives the "inverse" readings of ILCs, taking as input the DP-internal small clause structure in (19b). The analysis proposed puts more burden on the semantic component, while making the syntax less complex in that there is no need for LF-movement. All readings of ILCs are derivable from surface structure.

4.4 Accounting for the properties of ILCs and further predictions

The surface analysis captures the following properties of ILCs.

First, the right-peripheral position of QPPs with inverse readings follows from their status as syntactic predicates of a small clause PrP. As such, they must follow all postnominal modifiers of the noun phrase in SpecPrP.

Second, "inverse" readings are possible only with proper QPs inside the QPP because [Pr+P] requires an element of type <et,t> as its first argument.

(26) a. Two students in every class / most classes got an 'A'.
'For every class / most classes x, two students in x got an 'A'.'

b. #Two students in some / many / five classes got an 'A'.
*'In some/ many/ five classes x, two students in x got an 'A'.'

Third, the semantics of Pr require the DP in SpecPrP to be predicate-denoting, hence non-specific. This restriction to predicate-denoting DPs accounts for the non-specificity of ILCs (cf.5). It also correctly predicts that ILCs with non-

specific, **i.e.** type-denoting definite **DPs,** such as **(27),** are possible as well (cf. Fiengo & Higginbotham 1981).

(27) [The mother of every drowned soldier] wept bitterly.

An assumption implicit in the analysis of **ILCs** was that numerals and indefinites in **SpecPrP** denote predicates over pluralities, which can be constructed as second order predicates over sets (type **<et,t>).** Since proper **QPs** are of the same type (Winter 1999). they are correctly predicted to occur in SpecPrP.[7]

(28) Every student / exactly one student in every class passed.

In contrast, specific (referring) definite **DPs** do not allow for "inverse" readings because their determiners are located in the highest D-head and incompatible with the semantics of **PrP.** This was shown in (5).

Fourth, because the semantic analysis of "inverse" readings is more complex than that of "surface" readings, we expect "inverse" readings to be a marked option (a last resort). It follows that "inverse" readings are easily available only with those prepositions (*for*, on, from) that do not allow for a sensible "surface" reading (29). With prepositions that allow for a sensible "surface" reading (**e.g.** with to or about), "inverse" readings are hard, if not impossible, to get (cf. 30).

(29) Some man from / in every city fell ill.

(30) A trip to every city was fantastic.
   a. 'There is one trip directed to every city which was fantastic.'
   b. ??'For every city x, there is a trip to x which was fantastic.'

Fifth, the function analysis of "inverse" readings extends to bound variable readings as illustrated in (1b), repeated as (31).

(31) $[_{DP}$ Op_3 $[_{PrP}[_{NP}$ Some **man**] $[[_{Pr}$ **Pr+from**] $[_{QP}$ every **city**$_i$]]]] $[_{VP}$ loves **it**$_i$].

The third instantiation of the function analysis differs from the second in that D is occupied by an operator **Op₃,** which existentially quantifies over a set of functions F, at the same time attributing a relation R (the VP-denotation) to all members o f f s domain and to their values (cf. 32). The relation R is obtained by A-abstraction over the pronoun's index at the VP-level (Bittner 1994).

(32) $[[Op_3]] = \lambda F \lambda R\, \exists f\, [F(f) \wedge \forall x[dom(f)(x) \rightarrow R(x)(f(x))]]$

(33) a. [[Some man from every **city**$_i$ loves **it**$_i$.]] = $\exists$f [$\forall$z [city'(z) $\rightarrow$ man'(f(z)) $\wedge$ from'(f(z),z)] $\wedge$ $\forall$x[dom(f)(x)$\rightarrow$[love'(f(x),x)]] = 1 iff

b there is a function f from cities to men from these cities and for every city it holds that its function value (i.e. a man) loves that city,

which is true iff for every city z, there is at least one man from z who loves z. The function analysis of bound variable readings also explains the contingency of variable binding on the "inverse" reading (cf. 4ab). The function introducing head [Pr+P] is simply not base generated on the surface reading.

Summing up, this section has shown that the surface analysis of ILCs can account for their characteristic properties. It has also been shown that the semantic analysis of the "inverse" reading can be extended to bound variable readings as well. The additional computational complexity is reflected by the marginality of bound variable readings (cf. footnote 1).

5 Open Questions and Possible Extensions

A number of questions arise. One is if there is independent evidence for the existence of the operators Op_2 and Op_3 which, unlike overt determiners in D, are non-conservative. If not, could the same semantic result be obtained without these operators, e.g. by a construction specific mechanism? A second question is what triggers A-abstraction over the pronoun's index in the VP in (31)? Somehow, the index of the QP must percolate up to DP, triggering A-abstraction on DP's sister, the VP.

Setting these questions aside, the surface analysis may be applicable to other configurations which exhibit "inverse" readings, and have been argued to involve a predicative small clause structure. Candidates are the presentational sentence in (34a), and the French double object construction in (34b).

(34) a. A guard was standing in front of every building.
b. Le professeur a donné le même livre à Zoe, à Sophie, et à Claire.
The professor has given the same book to Z., to S., and to C..

Hoekstra & Mulder (1990) suggest a small clause analysis for presentational sentences. In our terms, their structure for (34a) would spell out as (35a). Bowers (1993) suggests the small clause analysis in (35b) for double object constructions. Interestingly, Vergnaud & Zubizarreta (1992) also derive the distributive effect from the presence of predication.

(35) a. [A guard], was [$_{PrP}$ t_1 [$_{Pr}$ standing] [$_{PP}$ in front of every building]].
b. Le professeur a donné [$_{PrP}$ [$_{DP}$ le meme livre] Pr [$_{PP}$ à Z., à S., et à C.]].

The structural resemblance between (37ab), and the small-clause structure for ILCs proposed in this paper makes it tempting to look for a unified analysis for all these phenomena. I leave this matter open for further research.

6 Conclusion

In this paper, I have presented a surface analysis of inverse linking constructions (ILCs). The two readings of ILCs have been shown to derive from two different surface structures. The surface analysis is semantically more complex, but it is empirically more adequate in that it accounts for the contingency of the "inverse" reading on a DP-peripheral position of the PP. The analysis also explains why a language without scope-driven LF (German) allows for "inverse" readings with a subset of syntactic configurations which all involve small clause predication.

Notes

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[1] The bound-variable reading is not available for all speakers. See the end of 4.4 for discussion.

[2] '#' is used to indicate grammatical, but pragmatically strange readings.

[3] At least under Kayne's (1994) definition of c-command, according to which elements left-adjoined to maximal projections always c-command out of these because they are not dominated by them.

[4] I leave open if an inverse reading for (16b) is possible with an intonational break between QPP and PP. If so, the DP-final PP may be right-dislocated.

[5] Incorporation of the head of a small clause predicate into the head of the small clause is also found in den Dikken & Naess (1992). The incorporation in (19b) violates the Projection Principle and is not in line with Baker's requirement that incorporation must preserve the categorial structure (but see Marantz 1984). However. there is no principled reason that would block the prepositional head P in (19b) from leaving behind a trace. preserving categorial structure. The trace could either bc semantically empty, or it could denote the identity function.

[6] The value for *dom(f)* is related to the value of the embedded QP by $dom(f) \in [[QP]]$. This ensures that the restriction of the universal quantifier is large enough. At the same time. presence of *dom(f)* allows for the case that f ranges only over subsets of the restriction of QP. This is necessary in the case of ILCs with *mostQPs* such as *One student in most classesfoiled.* In this case, all elements of a set containing more than half, but not necessarily all of the classes map into a student who failed.

[7] The change to second order predicates over sets is accompanied by a slight revision in the semantics of ILCs: The function f must map into sets of individuals (not singular individuals), and the complex head [Pr+P] requires its second argument to be of type <et,t>.

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