
The Ohio State University

Working Papers in Linguistics No. 51

VARIA

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Summer 1998

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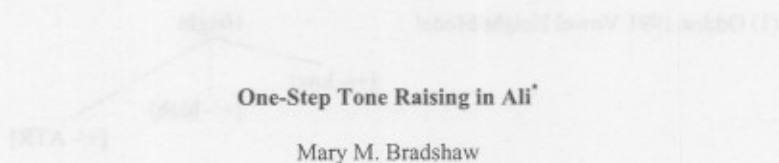
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Varia

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including a diacritic, a feature, or a tone. The model of tone features that can account for the tone phenomenon found in Ali will be structurally analogous to a model of vowel height features, reflecting the similarities between vowel height and tone. For example, both tone and vowel height vary along a single phonetic dimension. Clements 1991 points toward this similarity when he states that of all the other features, only tone might function in a hierarchical manner like vowel height does. Another similarity is that both vowel



1. Introduction

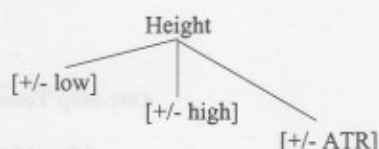
The Niger Congo language, Ali, provides support for a model of tone features in which there is a single feature for tone which may occur in multiple instantiations that differentiate between higher and lower tones. The Incremental Constriction model for vowel height proposed in Parkinson 1996 provides a feature organization in which a single feature is stacked hierarchically in such a way that one feature is the daughter of another. Using data from Monino 1987, I will show that an analogous model accounts very elegantly for a process of one-step tone raising in Ali in which a low (L) tone becomes mid (M) and a M tone becomes high (H). After showing the model's usefulness, I will discuss some problems it poses in providing a unified account of tonal behavior cross-linguistically.

The model of tone features that can account for the tone phenomenon found in Ali will be structurally analogous to a model of vowel height features, reflecting the similarities between vowel height and tone. For example, both tone and vowel height vary along a single phonetic dimension. Clements 1991 points toward this similarity when he states that of all the other features, only tone might function in a hierarchical manner like vowel height does. Another similarity is that both vowel

* I would like to thank David Odden for useful discussion of the ideas presented in this paper.

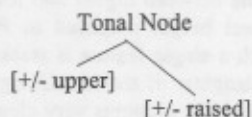
height and tone are subject to incremental raising. In addition, there is a parallel between how vowel height and tone features have traditionally been represented in feature geometry. Traditionally, notwithstanding the fact that there is a single phonetic dimension along which vowel height varies, a variety of different features, each of which is binary, has been used to represent that difference. For example, the model in Odden 1991, shown in (1), uses 3 different features to characterize vowel height: [+/- high], [+/- low] and [+/- ATR].

(1) Odden 1991 Vowel Height Model



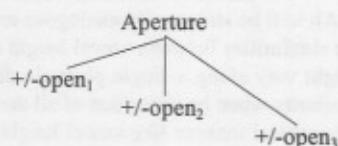
Analogously, traditional models of tone feature geometry rely on two or more different features to characterize tone differences. For example, the model proposed in Clark 1990, and shown in (2), specifies tone with two independent binary features, [upper register] and [raised pitch]. (For earlier models of tone features that Clark builds upon, cf. Clements 1981, Yip 1980, and Pulleyblank 1986.)

(2) Clark 1990 Model



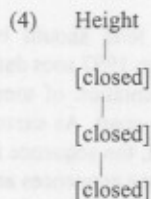
Another type of model for vowel height feature geometry has been proposed in both Clements 1991 and Parkinson 1996. In these models, vowel height is specified by a single feature which is hierarchically organized. The Clements model is given in (3).

(3) Clements 1991 Vowel Height Model



Parkinson 1996 goes further in the direction of representing vowel height as a hierarchical feature. His tone feature, [closed] is privative and stacked, that is,

[closed] features are arrayed in a recursive chain with one instance of [closed] dominating every other. Parkinson's Incremental Constriction model is illustrated in (4) for a high vowel.



As shown in (5), successively higher vowels have successively more specifications of the vowel height feature [closed] in Parkinson's model.

(5)

	a	ɛ	e	i
closed		•	•	•
closed			•	•
closed				•

One of the justifications for the use of a single feature to specify vowel height is that a single feature represents a single phonological parameter, and this corresponds better to the single phonetic dimension across which vowel height varies. The use of multiple features with differing phonetic correlates, as in (1), obscures this property.

Because tone is similar to vowel height in this way, the use of multiple features to represent tones at different levels of pitch similarly obscures the unity of the phonetic dimension (ie. pitch) along which the difference occurs. The case for tone may actually be more striking since there are no definitions of [upper register] and [raised pitch] which even pretend to have different phonetic correlates. Clements 1991 points out that of all the other features, only tone might function in a hierarchical manner like vowel height does. Both Clements and Parkinson also justify their models based on the elegant treatment which the models provide for incremental vowel height assimilations. Although tone models with multiple features can account for such assimilations by extrinsic ordering of seemingly unrelated processes, only tone models with a single tone feature can account for such assimilations in a unified manner. The existence of incremental

tone assimilations, as will be seen in Ali, therefore provides similar justification for an analogous model of tone.

2. An incremental tone model and the case of Ju/'hoasi

These considerations lead to the question of whether tone should be represented in the same way that vowel height is. Miller-Ockhuizen 1997 uses data from a Khoisan language, Ju/'hoasi, to justify a similar representation of tone. Sequences of tones in Ju/'hoasi words are no more than one step apart. As exemplified in (6), if the initial tone is L, the sequence is LH; if it is H, the sequence is HL; and if it is superlow (S^L), the sequence is S^L L. Since these tone sequences are predictable, Miller-Ockhuizen derives the second tone.

- (6) LH gǎ?mǐ 'to hide'
 HL dá?ǎN 'fire'
 S^L L jǎq?ò 'clean'

The significant advantage of the Incremental Constriction model in accounting for one-step vowel assimilations suggests that an analogous representation to deal with one-step tone assimilation would be useful. Miller-Ockhuizen provides the chart in (7) for Ju/'hoasi tone. The chart includes superhigh (S^H) although it is never found in word internal tone sequences.

- (7)
- | | S^L | L | H | S^H |
|---------|-------|---|---|-------|
| [Pitch] | • | • | • | • |
| [Pitch] | | • | • | • |
| [Pitch] | | | • | • |
| [Pitch] | | | | • |

The geometry assumed in Miller-Ockhuizen 1997 is presumably that in (8), where privative [pitch] features are stacked on a tonal node to represent the H tone.

- (8)
- | | |
|--|------------|
| | Tonal Node |
| | |
| | [pitch] |
| | |
| | [pitch] |
| | |
| | [pitch] |

Ju/'hoasi provides an interesting case of one-step tone assimilation, but it is a case that involves no alternations. A stronger argument in support of a new theory of tone feature geometry could be made if it were based on alternating rather than nonalternating tones. When tone patterns are static it is difficult to ascertain their true import since they might simply reflect accidentally unified lexical patterns resulting from disparate historical processes. A pattern involving alternations, on the other hand, provides compelling evidence for a unified synchronic phenomenon. This kind of pattern is found in Ali, a three-toned Gbaya language spoken in the Central African Republic.

3. The incremental tone model and the case of Ali

The associative construction in Ali consists of at least two nouns, or a noun and pronoun, with the head noun to the left. Tone changes occur on the right edge of the left noun. A L on the head noun raises one step to M, a M raises one step to H, and H remains H, since there is no higher tone to raise to. For example, in (9a), the L of head noun *zù* 'head' raises to M in the construction *zū yéré* 'buffalo head'. The tone of the noun or pronoun to the right is irrelevant, as shown by second nouns with initial H, M and L tones. When the left noun is disyllabic, as in (9d) where *gbàlā* → *gbālā yéré* 'buffalo bone', the tone on both syllables is affected. In three word constructions, such as *gbālā zū mi* 'my skull' (9e), tone raising is recursive. First, *gbàlā* + *zù* becomes *gbālā zù*, and then *gbālā zù* + *mi* becomes *gbālā zū mi*.¹

- (9) L → M
- | | | |
|----|---|----------------|
| a. | <i>zù</i> + ASSOC + <i>yéré</i> → <i>zū yéré</i> | 'buffalo head' |
| b. | <i>zù</i> + ASSOC + <i>tānā</i> → <i>zū tānā</i> | 'turtle head' |
| c. | <i>zù</i> + ASSOC + <i>sàdí</i> → <i>zū sàdí</i> | 'animal head' |
| d. | <i>gbàlā</i> + ASSOC + <i>yéré</i> → <i>gbālā yéré</i> | 'buffalo bone' |
| e. | <i>gbālā</i> + ASSOC + <i>zù</i> + ASSOC + <i>mi</i> → <i>gbālā zū mi</i> | 'my skull' |
| f. | <i>gbàlā</i> + ASSOC + <i>yà</i> → <i>gbālā yà</i> | 'his bone' |

Likewise, the M of a head noun raises one step to H, as in *nū* → *nú kpánà* 'jar mouth' (10a). When the left noun has two different lexical tones, as in *mbāā* → *mbāā mi* 'my mother' (10d), only the final tone is affected.

¹ Underlining indicates nasalization.

- (10) M → H
- | | | |
|----|---|---------------------|
| a. | nū + ASSOC + kpánà → nú kpánà | 'jar mouth' |
| | nū + ASSOC + mi → nú mi | 'my mouth' |
| | nū + ASSOC + sàdí → nú sàdí | 'animal's mouth' |
| b. | sām + ASSOC + nū + ASSOC + mi → sám nú mi | 'my mouth's saliva' |
| | sām + ASSOC + mi → sám mi | 'my saliva' |
| | sām + ASSOC + yà → sám yà | 'his saliva' |
| c. | sālā + ASSOC + lī + ASSOC + mi → sálá lí mi | 'my eyelash' |
| | sālā + ASSOC + nǝē → sálá nǝē | 'bird feather' |
| | sālā + ASSOC + tǝ → sálá tǝ | 'body hair' |
| d. | mbàā + ASSOC + mi → mbàá mi | 'my mother' |
| | mbàā + ASSOC + yà → mbàá yà | 'his mother' |

Adopting the incremental model proposed in Miller-Ockhuizen 1997, the tones of Ali can be specified as in (11), where L is unspecified², M has one specification and H has two specifications.

- (11)
- | | | | |
|---------|---|---|---|
| | L | M | H |
| [Pitch] | | • | • |
| [Pitch] | | | • |

The one-step tone raising can be accounted for in terms of an associative morpheme that consists of a floating [pitch] feature. In the associative construction, the associative morpheme is suffixed to the preceding noun. As illustrated in (12), when it docks to the final mora, it adds a specification of [pitch] causing the tone to raise by one step.

² This contrasts with Ju/'hoasi where Miller-Ockhuizen fully specifies all the tones. Although no extensive work has been done on Ali, my work on the closely related Suma language where L is unspecified leads me to suspect that L is unspecified for Ali as well. However, the choice between fully specifying L or leaving it unspecified has no significant consequence for this analysis.

(12) L → M

zù + ASSOC → zū
 [Pitch]_{ASSOC} [Pitch]

M → H

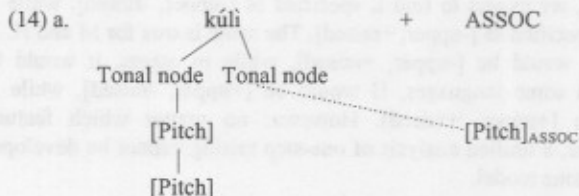
nū + ASSOC → nú
 [Pitch] [Pitch]
 [Pitch]_{ASSOC} [Pitch]

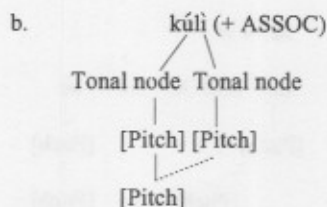
There is an additional process that results in a surface tone which has apparently been raised by more than one step in the associative construction. When a final L is preceded by a H, as in (13), we expect the L to raise to M, but it actually raises to H, due to a process conditioned by the preceding H. For example, when *kúli* 'egg' and *kòrà* 'chicken' are combined in the associative construction, *kúli* becomes *kúli* rather than **kúli*.

(13) HL → HH

- a. kô + ASSOC + yéré → kó yéré 'female buffalo' *kô
 kô + ASSOC + mí → kó mí 'my wife'
 kô + ASSOC + dùà → kó dùà 'female goat'
- b. kúli + ASSOC + nǎē → kúli nǎē 'bird egg' *kúli
 kúli + ASSOC + kòrà → kúli kòrà 'chicken egg'

Although the data in (13) reflect one-step raising at an intermediate stage, the surface tones are the result of a further spreading process that spreads a terminal pitch feature after the floating pitch feature has docked. The derivation would begin with the docking of the associative morpheme (14a), which produces an intermediate form with HM tones. Next, the terminal pitch feature from the preceding tonal node spreads once to the right (14b).



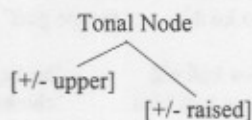


The use of an incremental model makes possible a unified analysis of one-step tone raising in Ali which allows for a straightforward characterization of the associative morpheme as a floating pitch feature.

4. Problems for a traditional tone model in accounting for Ali

An analysis of the same data using a traditional model of feature geometry presents several problems. Clark's 1990 model, given in (2) and repeated in (15), specifies tone with two independent binary features, [upper] and [raised].

(15) Clark 1990 Model



Using this model, we need to know what the specifications of tone in a three-tone language would be. In a four-tone language, and assuming full specification at some point in the grammar, the actual specification falls out of the model. But in a three-tone language, there is some uncertainty over the tone specifications. There are at least four possibilities, as shown in (16), and the choice between them depends on what the actual tone alternations in a language are. Thus, in some three-tone languages, we expect to find L specified as [-upper, -raised], while in others, it would be specified as [-upper, +raised]. The same is true for M and H. In some languages, M would be [-upper, +raised], while in others, it would be [+upper, -raised]. In some languages, H would be [+upper, -raised], while in others, it would be [+upper, +raised]. However, no matter which featural assumptions are made, a unified analysis of one-step raising cannot be developed using the traditional tone model.

The problem with this analysis is that the generalization that tones are raised one step is completely lost. The processes by which [raised] and [upper] features are changed show no evidence of even being related. Nor can we give a representation of the associative morpheme that allows the surface forms to fall out naturally. Instead we must rely on arbitrary tone changes to characterize the associative construction.

There is still another way of approaching this phenomenon in a traditional model, as illustrated by the features in (18). It is possible (though not desirable) to allow two separate specifications for a M tone, either of which would result in the same phonetic output. M might be specified as either [-upper, +raised] or as [+upper, -raised]. Thus, there would be two phonetically identical but featurally distinct M's in a single language.

(18)

	L	M	M	H
Upper	-	-	+	+
Raised	-	+	-	+

Under this assumption, the one-step raising is merely a change of [-raised] to [+raised], as illustrated in (19).

$$(19) \begin{array}{l} \text{L}[-\text{up}, -\text{rai}] \rightarrow [-\text{up}, +\text{rai}]_{\text{M}} \\ \text{M}[\text{+up}, -\text{rai}] \rightarrow [\text{+up}, +\text{rai}]_{\text{H}} \end{array} \quad \begin{array}{l} [-\text{rai}] \rightarrow [+rai] \\ \end{array}$$

In order to justify such an approach, we need to have some other evidence for two independent M tones. That is, there is nothing inherently wrong with the notion that a language might have two phonetically identical but featurally distinct M tones. It is simply that without some kind of independent phonological or phonetic evidence for two M tones, an analysis like that in (18) is excessively abstract.

5. Problems for an incremental model in accounting for Ewe

One-step raising provides support for an incremental model of tone, but there are problems with such a model if we are committed to the notion of a feature geometry which is invariant across languages. Although the incremental model is far superior to the traditional model in Ali, the incremental model simply does not account for tone processes in some other languages. A clear example comes from the Ewe language. There is a process in the Anlo dialect of Ewe

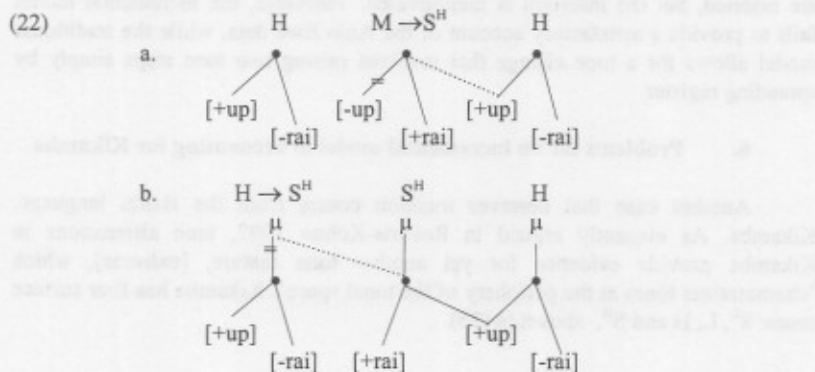
described in Clements 1976 whereby M becomes S^H between two H's. Data is given in (20). Note that there is also a process of S^H spread.

- (20) Anlo Ewe (Clements 1978) $M \rightarrow S^H / H _ _ H$
- | | |
|---|------------------------------|
| wó nǒví → wó nǒví | |
| àtyí + mēgbé → àtyí mēgbé | 'behind a tree' |
| mē + àtyikē dzrā-gé → m' àtyikē dzrā-gé | 'I'm going to sell medicine' |
| mē + kpé + flē-gé → mē kpé flē-gé | 'I'm going to buy a stone' |

In the traditional model of tone feature geometry, the feature specifications will be as in (21), where L is specified as [-upper, -raised], M is [-upper, +raised], H is [+upper, -raised], and S^H is [+upper, +raised]. Since Anlo Ewe has four tones, there is no ambiguity about the specifications.

(21)	Upper Register	Raised Pitch
L	-	-
M	-	+
H	+	-
S^H	+	+

The analysis of the change from M to S^H , shown in (22a), is straightforward using the traditional tone feature model. The H's specification for [+upper] spreads to the M where the [-upper] specification is delinked. Thus, the M changes from [-upper, +raised] to [+upper, +raised], ie. to a S^H . S^H spread, shown in (22b), involves the spread of the entire tonal node.



This data poses serious problems for an incremental model of tone features. The tones would be specified as in (23), where L has no [pitch] specification, M has one specification, H has two specifications and S^H has three. A change from M to S^H would entail a change from a single [pitch] specification to three [pitch] specifications.

(23)	L	M	H	S ^H
[Pitch]		•	•	•
[Pitch]			•	•
[Pitch]				•

Using the incremental model, there is only one pitch feature that can spread, and that would change the M to H rather than S^H.

(24)	H	*M → H	H
	•	•	•
	[pitch]	[pitch]	[pitch]
	[pitch]		[pitch]

Thus, one step up in tone raising is possible, as seen previously. It is also possible to spread the entire tonal node, but that too would result in a H. What seems to be impossible is to use spreading to raise a tone to a pitch higher than the surrounding tones. Clearly, one could always posit a rule by which two specifications of [pitch] are inserted, but the insertion is unmotivated. Therefore, the incremental model fails to provide a satisfactory account of the Anlo Ewe data, while the traditional model allows for a tone change that involves raising two tone steps simply by spreading register.

6. Problems for an incremental model in accounting for Kikamba

Another case that deserves mention comes from the Bantu language, Kikamba. As elegantly argued in Roberts-Kohn 1997, tone alternations in Kikamba provide evidence for yet another tone feature, [extreme], which 'characterizes tones at the periphery of the tonal space'. Kikamba has four surface tones: S^L, L, H and S^H, shown in (25).

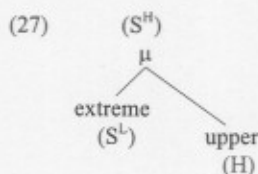
(25)	S^L (˘)	kokonà	'to hit'
	L (unmarked)	nóotókone	'that we may hit'
	H (˘)	toĩkaakoná	'we will not hit'
	S^H (˘)	koyā	'to eat'

The highest (S^H) and lowest (S^L) tones pattern together in various tonal alternations. As it happens, S^H is derived from a combination of S^L and H. Roberts-Kohno 1997 demonstrates this by illustrating the behavior of S^L phrasally. S^L is the phrase-final tone in a phrase with an assertive verb, as in *nétónáa-koní.è* 'we hit (recent past)'. But if a verb stem has a final H, the phrase-final tone surfaces as S^H , as in *néwáá-táá* 'he just counted (immediate past)'. Evidence that this S^H is a combination of S^L and H comes when the phrase is extended by adding a modifier after the verb. In *néwáá-táá maiò* 'he just counted bananas', the phrasal S^L now surfaces on the phrase-final mora, and there is a H (but no S^H) remaining on the verb stem.

Roberts-Kohno postulates a tone feature system as in (26), where the tone feature [extreme] is added to the traditional feature [upper]. (The feature [raised] is irrelevant in Kikamba.) Tones are postulated to be underspecified in Kikamba such that S^L is specified simply as [extreme]; H is specified as [upper]; L is unspecified; and S^H is specified as [extreme] and [upper].

(26)		extreme	upper register
	S^L	•	
	L		
	H		•
	S^H	•	•

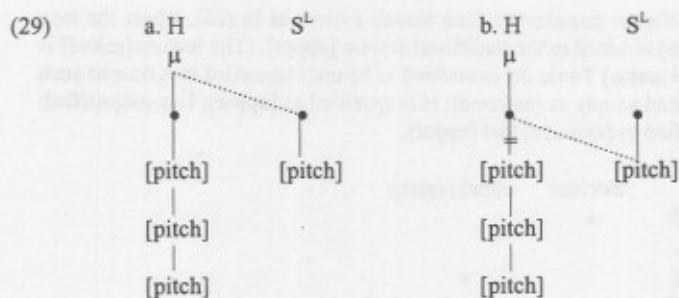
The derivation of S^H is shown in (27) as the combination of a S^L and a H on the same tonal node.



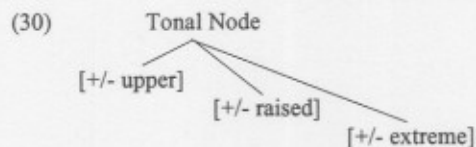
If we try to get a comparable result using the incremental model, once again we run into problems. We can specify the tone features as in (28) where S^L has one [Pitch] feature and S^H has four.

(28)	S^L	L	H	S^H
[Pitch]	•	•	•	•
[Pitch]		•	•	•
[Pitch]			•	•
[Pitch]				•

If S^L and H are combined as in (29a), the result is a contour tone, a fall from H to S^L . If the tone features combine as in (29b), the original specification for H must be deleted and the result is S^L . As in Ewe, it is impossible to get a tone with a higher pitch than the surrounding tones in a process of tone assimilation, and pitch insertion is unmotivated.

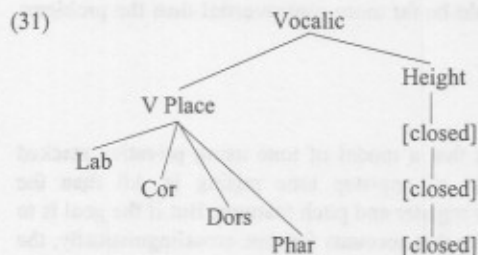


The Kikamba data suggests that the traditional feature model should be modified, as in (30), to reflect the existence of the tone feature [extreme].

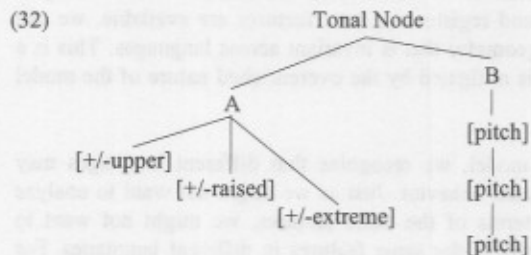


7. An invariant tone feature model

The problem then is that if some languages are accounted for with the incremental model and other languages require the traditional model or the modified traditional model, do we have to give up the notion of a model that is valid for every tone language? One way we could retain a more universal model is suggested by vowel feature geometry. As shown in Parkinson's adaptation (1996) of the Clements & Hume 1995 vowel feature model in (31), in addition to the stacked height features for vowels, we have a separate branch with place features.



A similar structure could be postulated for tone, as in (32). In this model, both the modified traditional model and the incremental model are combined.



This is a possible resolution of the problem, despite the fact that the new model overgenerates possible representations of tone. That is, it looks as if a single language could have a H tone specified in terms of stacked pitch features, as well as a H tone specified in terms of [upper, raised, extreme], as well as a H tone specified in terms of both. There is also a sense in which both parts of the tone feature model in (32) represent the same phonetic dimension, ie. the tonal space,

and differ only in the manner in which they divide up that space. However, the idea that the same surface event may have different underlying representations is not in itself a particularly controversial one. This can be illustrated with respect to M tone, a phonological entity that has been specified differently in different languages. A M tone is specified as [+upper, -raised] in Bradshaw 1995 for Suma, and as [-upper, +raised] in Pulleyblank 1986 for Yoruba and Yala. Likewise, the contrast between the vowels ε and e is described in terms of vowel height in a language like Gbanu (Bradshaw 1996) but it is described in terms of the feature [ATR] in a language like Igbo. The alternative to using a model as in (32) is to propose that the feature geometry of tone is not invariant, but changes from language to language, and this would be far more controversial than the problems posed by the model presented here.

8. Conclusions

In this paper, I have shown that a model of tone using privative stacked features provides a better account of one-step tone raising in Ali than the traditional model which uses binary register and pitch features. But if the goal is to have a unified theory of tone features that accounts for tone crosslinguistically, the incremental model by itself does not fare very well. Some tone phenomena are not well suited to such a theory—and the same can be said about the traditional model. Even with modifications, the traditional model does not provide a satisfactory account of some tone phenomena. If we combine the theories into a new theory in which both stacked features and register and tone features are available, we can maintain a model of feature geometry that is invariant across languages. This is a desirable result, but one that is mitigated by the overenriched nature of the model presented here.

In using a combined model, we recognize that different languages may exhibit different patterns of tonal behavior. Just as we might not want to analyze the same vowel contrast in terms of the same features, we might not want to analyze tonal contrasts in terms of the same features in different languages. For example, the difference between [e] and [ɛ] might be captured in terms of vowel height features in one language and in terms of a place distinction or an ATR distinction in another, as argued by Parkinson 1997 and Clements 1991 respectively. Similarly tone contrasts in Ali might be best captured in terms of stacked [pitch] features, while tone contrasts in Ewe might be best captured in terms of independent [upper] and [raised] features.

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Tonal Polarity in Kɔnni Nouns: An Optimal Theoretical Account*

Michael Cahill

1. Introduction

Tonal polarity is a phenomenon in which a tone-bearing unit, often in an affix, shows a tonal value opposite to that immediately adjacent to it. When the term "opposite" is used, of course, this assumes a binary contrast in tonal qualities, i.e. a contrast between only High and Low tones. Indeed, to my knowledge, the only cases in which tonal polarity has been discussed in the literature are two-tone systems. These include Margi (Hoffman 1963, Pulleyblank 1983, 1986), Bambara (Dwyer 1976, Creissels & Grégoire 1993), Moore and Lama (Kenstowicz, Nikiema, & Ourso 1988), Dagbani (Hyman 1993), Dagaare (Antilla & Bodomo 1996, forthcoming), and Hausa (Newman 1995). Schuh (1978) also mentions Ngizim, Igbo, and Hausa examples of tonal polarity. Though Chumbow (1982) speaks of "polarization" in the three-tone system of Ogori, it is not clear that this is in fact tonal polarity rather than some other process.¹

* This paper has benefited from comments made by Mary Beckman, David Odden, and Robert Poletto on a related paper, as well as by various members of the phonetics/phonology group at Ohio State University. Beth Hume and Mary Bradshaw have given numerous comments which have greatly improved its coherence and substance. They are not responsible for any faults which remain.

¹ For discussion of historical processes leading to synchronic tonal polarity, see Hyman & Schuh (1974).

In the SPE framework, polarity rules were handled with alpha notation. In a tonal context, this would imply a rule something like the following.

$$(1) T \rightarrow -\alpha T / \alpha T _$$

This is interpreted as "a tone becomes the opposite of the value of the preceding tone" and is the way Schuh (1978) accounts for polarity. However, in an autosegmental framework, this type of rule is an anomaly, as Kenstowicz, Nikiema & Ourso (1988) point out; the usual autosegmental operations are spreading, delinking, or deleting tones. There is no way to change a tone into the opposite of an adjacent tone in one step while utilizing the usual range of autosegmental operations. Thus Kenstowicz *et al* (1988) analyzed surface polarity in Moore and Lama not as true polarity, but as a surface dissimilation of High tones (HH \rightarrow HL). However, a dissimilation of this sort still is anomalous in terms of the above autosegmental operations, unless it is a shorthand notation for deleting a High and inserting Low by default, as indeed Pulleyblank 1983, 1986 does for Margi. With the deletion/default option in place, the notion of "polarity" is reduced to an epiphenomenon rather than a true process in most of the literature cited above (with the exception of Hoffman, who notes the phenomenon but does not attempt a formal analysis, and Newman, who strongly argues that the notion of polarity is a natural one cross-linguistically and should not be ruled out on the basis of a particular phonological model).

The framework of Optimality Theory is more amenable to the phenomenon of tonal polarity. Possible outputs are scanned for violations of surface-true constraints, and if, as we shall see, there is a generalization that a suffix is opposite in tone to the preceding syllable, then a constraint may be formulated to express this fact of the language. Since Optimality Theory is a non-derivational model, it is not concerned with any mechanics of possible intermediates between underlying and surface forms.

In this paper, I present an Optimality Theory analysis of a polar-toned suffix in Könni nouns, for which previous analyses of polarity in terms of a general OCP-driven dissimilation is not tenable. Könni is a Gur language, Central Oti-Volta branch, spoken in the Northern Region of Ghana by about 2500 people. Due not only to the number of speakers, but also the isolation of its villages, the language is still largely unknown even to most Ghanaians. Data is taken from my field notes in the village of Yikpabongo from 1986-1992. Some of the material is also found in Cahill (1992).

The basic phenomenon is that the Noun Class 1 plural suffix *-a/-e* in Könni has a tone opposite to what the previous stem tone is. Thus below, while all the singular forms of the nouns end in a High tone due to the suffix *-ŋ*, the plurals end either with High or Low, whichever is opposite to the preceding stem tone.

(2) singular	plural	stem tone	pl.suffix tone	gloss
táŋ	tána	L	H	stone(es)
síŋ	síà	H	L	fish(es) (sp.)
bìsìŋ	bìsá	L	H	breast(s)
tígíŋ	tigè	H	L	house(s)
šìkpááŋ	šìkpára	LH	L	heart(s)

This phenomenon is limited to Noun Class 1 plural suffixes. All other suffixes are unambiguously High-toned, and a general OCP-driven solution of the Moore/Lama type will not work for Kɔ̀nni. However, an Optimality Theory analysis using a constraint POLAR will be seen to work very naturally. In order to lay the foundation for analysis of the polar-toned phenomenon, the broader tonal system of Kɔ̀nni must first be examined. This is especially necessary since most of the previous work published on tone in Optimality Theory has been on Bantu languages, which have quite different tonal characteristics than Kɔ̀nni.

This study is organized as follows. The remainder of this section will lay out basic theoretical assumptions and observations about tones in Kɔ̀nni. Section 2 will go into some detail as to reasons for choosing the underlying representations used in the remainder of the paper, including High tones on suffixes, the floating High associative morpheme, justification of a floating Low tone in downstep, and the existence of toneless noun stems. Section 3 is the analysis in terms of Optimality Theory, first reviewing the necessary constraints, and then analyzing in some detail the polar-toned plural suffix of Noun Class 1. Finally, in Section 4, I summarize the constraints and conclude. Two Appendices of data are also included.

An autosegmental representation of tones is assumed in this work, as in Goldsmith (1976) and the extensive literature arising from it. A detailed representation of tonal features such as [\pm raised, \pm upper] (e.g. Pulleyblank 1986), or the representation of pitch register and pitch height on separate tiers (e.g. Snider 1990) is not necessary for our purposes here. While the Kɔ̀nni analysis is translatable into such systems, these extra enrichments of representation would not be illuminating, and the tones will be abbreviated simply as H for High tone and L for Low tone.

The version of OT that will be assumed is that of Correspondence Theory (McCarthy & Prince 1995), in which various MAX and DEP constraints compare input and output and penalize differences between the two.

Transcriptions of segmental material will be phonemic. Such a transcription is very close to phonetic, with the exception of backing of front vowels before the velar nasal (e.g. /i/ \rightarrow [i̠], /e/ \rightarrow [ɛ̠]), reduction of vowels before liquids, and weakening of /g/ to [ɣ] intervocally. Long vowels are transcribed as sequences of two identical vowels.

Kŏnni has three phonological surface tones: High (\acute{a}), Low (\grave{a}), and downstepped High ($\acute{á}$). These can combine to form one rising tone (low to high) and two falling tones (high to low and high to downstepped high). In transcriptions, downstep will be indicated by $\acute{}$ before the next High tone. These are illustrated below.

- | | | | |
|-----|-----------------------|----------------|------------------|
| (3) | [kpááŋ] | 'oil' | H |
| | [kpááŋ] | 'back of head' | LH |
| | [kpá ^á áŋ] | 'guinea fowl' | H ^á H |

The following generalizations may be made about the Kŏnni tone system:

- (4) Generalizations about Kŏnni tone:
- The syllable is the tone-bearing unit.
 - There is no HLH sequence phonetically within a word, and only rarely across words.
 - Contour tones are found only on the last syllable of a word.
 - A contour in Kŏnni has a maximum of two pitch levels, H-L, L-H, or H-^áH, i.e. a maximum of two tones associated to a TBU.
 - Underlying High tones do not remain floating, but Low tones can float between Highs, causing downstep.
 - High tones always remain associated to the TBU that sponsors them.

Crucial to the approach employed here is the view that a downstepped high tone after a normal high is the phonetic result of a floating low tone between the two high tones (see Sec. 2.3). So a sequence transcribed as H^áH is taken to reflect an underlying tone pattern of HLH.

2. Underlying Representations

Standard Optimality Theory deals with inputs and outputs, with various constraints mediating between the two. In this, OT differs from derivational rule-based approaches, which may have several relevant levels at which different rules may apply. In this section, before proceeding to the interaction of constraints in an OT analysis of Kŏnni nouns, I will justify the inputs assumed in following sections.

The notion of "sponsor" will be important in the sections below. We will define the sponsor of a tone as the segmental part of the morpheme that co-occurs with that tone in the lexicon. At this point I am taking no position on whether tones are pre-linked to TBU's in the lexicon; for simplicity in displays they are not indicated as pre-linked.

2.1 High-toned nominal suffixes

The table below contains examples of all attested tone patterns and syllable weights by noun class that I have to date. The classes are defined by what forms of the articles and plurals they take. The most striking generalization to be noted is that an overwhelming majority of nouns, whether singulars or plurals, definite or indefinite, end with a High tone, (the exceptions are some plurals in Classes 1 and 3, and a very few singulars in Class 3).²

(5) Nouns	Singular	Sg.+ Art	Plural	Pl.+ Art	Stem tone
Noun Class 1					
	/-ŋ/	/-rĩ/	/-a/	/-a-há/	
stone	tãŋ	tãnnĩ ³	tána	tánáhá	L
face mark	wĩŋ	winnĩ	wiè	wié ¹ hé	H
chest	nyúúŋ	nyúúrí	nyúra	nyú ¹ ráhá ⁴	H
nail	yí ¹ ĩŋ	yí ¹ rĩ	yíimà	yí ¹ máhá	HL
bee	siébiŋ	siébírĩ	siébiè	siébié ¹ hé	HH
breast	bĩsĩŋ	bĩsĩrĩ	bĩsá	bĩsáhá	L
bag	búllógĩŋ	búllógĩrĩ	búllógà	búlló ¹ gáhá	HH
stump	dààgbúgĩŋ	dààgbúgĩrĩ	dààgbúgê	dààgbúgê ¹ hé	LHH
Noun Class 2					
	/-ŋ/	/-kú/	/-tĩ/	/-tĩ-tĩ/	
courtyard	gbàáŋ	gbàákú	gbàátĩ	gbàátĩtĩ	L
path	siéŋ	siékú	siétĩ	siétĩ	H
squirrel	chí ¹ ĩŋ	chí ¹ kú	chí ¹ tĩ	chí ¹ tĩtĩ	HL
hawk	kpí ¹ ĩŋ	kpí ¹ íkú	kpí ¹ ítĩ	kpí ¹ ítĩtĩ	HL

² No attempt has been made to integrate the Konni noun classes into the larger picture of Niger-Congo; thus the numbering of these classes is arbitrary. Variations in vowel quality of the suffixes (i/ɨ, u/u, a/e) are the result of root-controlled vowel harmony (see Cahill 1996 for details).

³ The /-rĩ/ suffix assimilates to a nasal-final noun stem as /-ni/.

⁴ The shortening of a root-final vowel in the plural occurs with non-front vowels and is accompanied by the insertion of -r- before the normal suffix. A complete discussion of this is beyond the scope of this paper.

Noun Class 3					
	/-ŋ/	/-ká/	/-sí/	/-sí-sí/	
person	vúóŋ	vúóké	vúósí	vúósísí	H
dawadawa	dùóŋ	dùóká	dùòsí	dùòsísí	L
axe	lí ¹ áŋ	líá ¹ ká	líásí	líá ¹ sísí	HL
man	dèmbíŋ	dèmbíké	dèmbísí	dèmbísísí	L
fly	nánjùŋ	nánjùká	nánjùsí	nánjùsísí	HH
headpan	tá ¹ síŋ	tásí ¹ ká	tásísí	tásí ¹ sísí	HL
lizard	gùrá ¹ áŋ	gùráá ¹ ká	gùráá ¹ sí	gùráá ¹ sísí	LHL
hat	síbúbúŋ	síbúbúké	síbúbúsí	síbúbúsísí	HHH
mussel	kálánŋgbí ¹ áŋ	kálánŋgbíá ¹ ká	--	--	HHHL
bowl	kùrúbá	kùrúbá ¹ ká	kùrúbá ¹ sí	kùrúbá ¹ sísí	HHHL
Noun Class 4					
	/-ŋ/	/-bù/	/-tí/	/-tí-tí/	
water	nyááŋ	nyáábù	nyáátí	nyáátítí	H
meat	nòŋ	nòmbù	nòntí	nòntítí	L
sleep	gbí ¹ íŋ	gbíí ¹ bù	gbíí ¹ tí	gbíí ¹ títí	HL
peanut	sìŋkpááŋ	sìŋkpáábù	sìŋkpáátí	sìŋkpáátítí	LH
ash	tányéé ¹ íŋ	tányéé ¹ libù			HHL
Noun Class 5					
	/-Ō/	/-wá/	irreg.	irreg.	
child	bùá	bùàwá	bàllí	bàllíí	L
woman	hògù	hòwwá	hùáŋ	hùábá	L
thief	gááró	gáárówá			H
older sibling	mîŋ	míí ¹ wá	míí ¹ íŋ	mííí ¹ bá	HL

A credible hypothesis, then, is that all the suffixes (*except* for the plurals [-a/-e] in Noun Class 1) are lexically High-toned. These will include the singular indefinite suffix /-ŋ/, the singular definite suffixes /-rí/, /-ká/, /-ku/, /-bu/, /-wa/, the plural suffixes /-há/, /-tí/, /-sí/, /-ba/, and the plural markers /-tí/, /-sí/, /-ba/. The only singular indefinite nouns which end in a Low tone lack the -ŋ suffix; apart from the unusual *kùrúbá* in noun class 3, these are all from noun class 5 (see forms in Appendices 1-2). The plural suffixes of class 1, which manifest a tone opposite to the previous stem tone, will be examined below in Sec. 3.4, but all the other noun suffixes have a High tone lexically.⁵

⁵ There are a few plural forms in noun class 3 ending in -sí which are not High; at this point the reasons are not understood.

2.2 Floating High tone associative morpheme

Though the main point of the paper is not floating High associative tones, I discuss them here in order to later demonstrate constraints on floating tones vs. associated ones, and the reality and source of floating Lows in downstep.

The morpheme which marks the associative construction in third person, as in 'his stone' or 'child's stick' is posited to be a segmentless High tone. The evidence for this is that the head noun of every such construction for third person as possessor has a High tone on its initial syllable. It is only the third person, singular or plural, that has the floating High tone as associative marker:

(6)	1st	2nd	3rd	3rd non-human	
	singular	ñ dàáŋ	fí dàáŋ	ù dá'áŋ	kà dá'áŋ 'my, etc. stick'
	plural	tí dàáŋ	nì dàáŋ	bà dá'áŋ	à dá'áŋ

If the head noun already has a High tone on its first syllable in citation form, then there is no change when it is placed in an associative construction. Examples in which the tone of the noun does change are given below with both pronouns and nouns as possessors. The examples in (7a) are repeated in Appendix 1.

(7) a.	tǎŋ	ù tá'ŋ	'stone, his stone'
	kàgbà	ù kágba	'hat, his hat'
	dàmpàlá	ù dàm'pàlá	'bench, his bench'
b.	bòàwá dá'áŋ	'child's stick'	(cf. bòàwá 'the child', dàáŋ 'stick')
	bùá kárénfà	'child's cutlass'	(cf. bùá 'child', kàréntà 'cutlass')
	chòró dàm'pàlá	'husband's bench'	(cf. chòró 'husband', dàm'pàlá 'bench')

The alternation between the initial Low for head nouns in citation form and the initial High in the associative construction is explained by the existence of a High tone between the two nouns (comparable to the 's in English 'child's stick'). The High will dock to the head noun, giving the observed pattern of a High tone on the first syllable (sometimes as part of a H' contour on that syllable, as in tá'ŋ and dá'áŋ above).

2.3 Downstep as floating Low tone

In some languages, e.g. KiShambaa (Odden 1982) and Supyire (Carlson 1983), downstep can be shown to be the result of conjoining two High tones. In these languages, two morphemes which are independently known to have High tones, when abutted, are

(11)	H L	H L H
		/
	nyu ra	nyu ra ha

With this background, we can see that a word like *kpá'áŋ* 'guinea fowl' is represented as having an underlying HLH tone pattern, with the Low floating and causing downstep. Further examples will be seen as we progress through the paper.

2.4 Toneless noun stems

Since some of the nouns with polar suffixes to be discussed later have toneless stems, I justify their tonelessness at this point.

Two-syllable nouns in Kɔnni illustrate a variety of tonal patterns when placed in various contexts. Especially notable is that nouns which have the same LH surface tones in citation form behave quite differently in different tonal environments. If underlying High and Low tones were mapped one-to-one onto syllables, there would be of course only four possible tone patterns: HH, HL, LH, LL. However, the real situation is more complex; there are at least eight actual tonal behaviors of disyllabic nouns. Much of the complexity comes from the fact that some of these nouns have toneless stems and/or no suffix in singular form.

Consider data with four disyllabic nouns below, repeated in Appendix 1, which all have the same LH tonal pattern in citation form but show different behavior in different tonal contexts. The postulated underlying tones of the root plus suffix are displayed in the left column.

(12)	UR	citation	'one X'	'his X'
a. 'fish'	LH	zàsɪŋ	zàsɪŋ ¹ káání	ù zá ¹ sɪŋ
b. 'louse'	ØH	kpibíŋ	kpibíŋ ¹ káání	ù kpibíŋ
c. 'hat'	LØ	kágbá	kágbá kàání	ù kágbá
d. 'woman'	ØØ	hògù	hògù ¹ káání	ù hògù

Though all nouns have the same tone pattern in citation form, (12c) 'hat' is differentiated in the forms 'one X' from the others. The last column, 'his X,' distinguishes the other three from each other.

Note that the nouns of (12a-b) end in *-ŋ*, as do approximately 90% of Kɔnni nouns. This *-ŋ* contributes the High tone of the second syllable. In contrast, the nouns in (12c-d) end in a vowel, and I therefore posit that these have no tone lexically on the second syllable. The other dichotomy comes between (12a,c), which I analyze as having a

lexical Low tone contributed by the root, and (12b,d) which I propose have a toneless root.⁶

The pattern for *zasɪŋ* 'fish' is exactly as we would expect for a noun with LH present lexically. The downstep in the 'his X' column is placed as expected, between the High of the suffix and the High of the first syllable that come from the associative morpheme. But for *kpibɪŋ* 'louse,' there is no downstep in the 'his X' column as would be expected if there were a lexical Low tone. The conclusion is that the Low which shows up in citation form is not present in UR.

The nouns 'hat' and 'woman' have no *-ŋ* suffix and so any High in forms of these words cannot be the contribution of the suffix. If there were a lexical High as part of the root, it would show up consistently in the same position in the word, similar to the Highs in *máásà* 'a cake' or *tá'síŋ* 'headpan.' Instead, a High tone shows up in different positions in these words, and not at all in 'one hat.' As I will discuss below, the High tone in the nouns for which there is no lexical High is the result of a phrasal constraint inserting a High. The lack of a lexical High in 'hat' and 'woman' explains why there is only one High, on the initial syllable of the noun, in 'his hat, his woman.' The High comes from the floating High associative marker, and that is the only High in these phrases.

The basic tone patterns of singular disyllabic nouns, then, fall into a pattern based on whether their stem is High, Low, or toneless, and whether or not they have the common High-toned *-ŋ* singular suffix:

(13)	with <i>-ŋ</i> (H)	without <i>-ŋ</i> (Ø)
stem H	HH <i>jóróŋ</i> 'ladder'	HØ <i>máásà</i> 'a cake'
stem L	LH <i>zàsɪŋ</i> 'fish'	LØ <i>kàgbá</i> 'hat'
stem Ø	ØH <i>kpibɪŋ</i> 'louse'	ØØ <i>hðgú</i> 'woman'

Other disyllabic tone patterns, such as for *tá'síŋ* 'headpan' and *nɪmbúá* 'sibling' involve more than one lexical tone in the noun stem.

2.5 The OCP and Kŏnni

In words such as *jóróŋ* 'ladder' in (13) above, I have indicated tones as HH without comment. However, in the absence of a process by which HH is pronounced with

⁶ The related Gur languages Moore and Dagaare have also been analyzed as having the cognate of the noun stem of 'woman' as underlyingly toneless. For Moore, the cognate word is *páǵá* (Kenstowicz, Nikiema & Ourso 1988), and for Dagaare it is *páǵá* (Antilla & Bodomo ms.) With the limited data in both these articles and my Kŏnni data, it has not been possible to identify any toneless cognates corresponding to the Kŏnni 'louse' class of words.

a downstep between the Highs, there would be no phonetic difference between two distinct High tones and one High multiply associated to the two syllables. In some languages, sequences of two identical tones are not allowed, and they either merge, as in $HH \rightarrow H$, or one dissimilates, as in the Meeusen's Rule $HH \rightarrow HL$, or a downstep (possibly a floating Low) is realized between them. However, in Kɔnni, the OCP is not active with respect to tones. We can see cases in which sequences of both LL and HH must be allowed.

For High tones, consider the case of *jágá* 'shades' and *mógá* 'rivers.' Both are representative of several words, i.e. neither is a unique case, and both have the tonally "polar" plural suffix *-a*, to be further discussed in Sec. 3.4, which in both of these words inserts a Low tone, since the previous tone is High. The question, of course, is how to explain the difference between the final Low tone in *mógá* and the final falling tone in *jágá*. The fall cannot be the result of a spreading process, since it does not occur in *mógá*. The solution is that *jágá* has two adjacent High tones in underlying representation, and *mógá* has one:

- | | | |
|------|-------|-------|
| (14) | H H L | H L |
| | / | |
| | ja ga | mú ga |

The word *dàmpàlá* 'bench' (lit. 'logs'), contrasted with *bùr̀míŋ* 'bush donkey' shows the difference between words with a single multiply-linked Low and two adjacent Lows. When *dàmpàlá* and *bùr̀míŋ* have a High-toned word preceding, the tonal behavior differs:

- | | | | |
|------|----------------|---------------------|-------------------------|
| (15) | <i>dàmpàlá</i> | ŋ wó <i>dàmpàlá</i> | 'bench, I lack bench' |
| | <i>bùr̀míŋ</i> | ŋ wó 'bùr̀míŋ | 'donkey, I lack donkey' |

As illustrated in (10a) and (11), a HLH underlying tone on a trisyllabic word is realized as H^1HH on the surface. A single Low between Highs is always floating, resulting in downstep. However, if more than one Low is present between Highs, then they are associated and pronounced as Low. My claim is that the difference in tonal behavior between *dàmpàlá* and *bùr̀míŋ* is the result of the presence of two lexical Low tones versus one:

- | | | | | | |
|--------|----------------|-------------------|----|----------------|-------------------|
| (16)a. | L L H | H L L H | b. | L H | H L H |
| | | | | / | / \ |
| | <i>dàmpàlá</i> | <i>wó dàmpàlá</i> | | <i>bùr̀míŋ</i> | <i>wó bùr̀míŋ</i> |

Since identical adjacent tones may exist for both High and Low tones, it is evident that the OCP cannot be a highly ranked constraint in Kɔnni. As far as known, the OCP is

never active in Kŏnni, and it is never necessary to invoke it to explain tonal phenomena in Kŏnni.

3. Optimality Theory and Tone in Kŏnni

Investigation of the nature of tonal constraints is still in its infancy, especially since, as previously mentioned, most of the OT investigations of tone are on Bantu languages, which have quite different tonal characteristics than Kwa or Gur languages, for example. For this reason, I will adopt a somewhat conservative approach in proposing constraints in this work. For the most part, the constraints proposed here will either be parallel to well-established input-output constraints, such as those of the MAX and DEP family, or closely tied to surface-true generalizations about Kŏnni and other tone languages. In this section I will discuss how different constraints interact to give the surface forms of Kŏnni nouns.

3.1 Basic constraints

From the beginning of autosegmental theory (Goldsmith 1976), it was seen that the optimal configuration, or at least the starting configuration in a derivational framework, was that there was one tonal autosegment associated to one TBU. It was when there were more tones than TBUs, more TBUs than tones, or some language-specific spreading rule, that this pattern was violated. But the one-to-one mapping of tones to TBUs is a general constraint on languages, one which is often violated, to be sure, but which is the general default case. The following constraints, taken from Antilla & Bodomo (1997), give the results of this mapping; let us consider them as a starting point.

- (17) a. 1 TONE/TBU - every TBU is linked to exactly one tone (= *CONTOUR,⁷
*TONELESS)
b. 1 TBU/TONE - every tone is linked to exactly one TBU (= *FLOAT, *SPREAD)

In the case where both constraints are completely satisfied, there is one tone for every TBU, and one TBU for every tone, i.e. a one-to-one mapping of tones and TBUs.

Each of these general constraints may be violated in two ways, a consequence of the term "exactly" having two parts to its interpretation, that is, "exactly" has the parts "at least" and "not more than." Thus if two tones are linked to a single TBU, then 1TONE/TBU is violated by this *contour* tone. In complementary fashion, if there is a TBU which is not linked to any tone, then 1TONE/TBU is violated by this *toneless* TBU. Similarly, if a tone is not linked to a TBU, 1TBU/TONE is violated by this *floating* tone, symbolized as (T). Finally, if a tone is linked to more than one TBU, 1TBU/TONE is violated by the *multiply-linked* tone.

⁷ A constraint prohibiting contour tones was also proposed in Bradshaw 1995.

For a given language, it is an empirical question if the functions need to be separated into their components, or whether the more general constraints of (17) are sufficient. Antilla & Bodomo do not separate the functions of (17a,b) for Dagaare, but leave open the possibility that it may be necessary in some situations. In several languages it can be demonstrated that these functions act separately, where a language exhibits one of the pairs of behavior but not the other. For example, Shona disallows floating tones but has extensive tone spreading (Odden 1981, Myers 1987), Kikerewe has toneless syllables but no contours, and Kenyang has contours but no toneless syllables (Odden, *pc*). As we will see below, it is also necessary to separate these functions in Kɔnni, and *CONTOUR, *TONELESS, *SPREAD, and *FLOAT (= *(T)), are the actual constraints.

There is, however, an additional distinction to be made with respect to *(T) and *SPREAD. Since their referent are tones, there is a potential distinction between High and Low tones in these constraints, and this distinction will turn out to be relevant. So (17b) is actually a family of constraints:

- (18) *(T) ⇒ *(H), *(L)
 *SPREAD ⇒ *HSPREAD, *LSPREAD

The distinction is crucial, as we shall see. In Kɔnni, high tones spread, but Low tones do not. Low tones can remain floating, but High tones can not. From our start in (17), then, we have the following constraints:

- (19) a. *CONTOUR - every TBU is linked to not more than one tone
 b. *TONELESS - every TBU is linked to at least one tone
 c. *(H) - every High tone is linked to at least one TBU
 d. *(L) - every Low tone is linked to at least one TBU
 e. *HSPREAD - every High tone is linked to not more than one TBU
 f. *LSPREAD - every Low tone is linked to not more than one TBU

In this paper, *CONTOUR, *TONELESS, *(H), and *HSPREAD will play a role in the discussion to follow, though I will not discuss details of their rankings here (for justification of the undominated ranking of *(H) as well as further details on these constraints, see Cahill (1997)).

Before our first tableau, we must consider another constraint that keeps tones from wandering in unrestrained fashion. It depends on the notion of sponsorship. A morpheme "sponsors" a tone if that morpheme includes that tone in its lexical entry. The constraint is ALIGN-TO-SPONSOR:

- (20) ALIGN-TO-SPONSOR - the leftmost of the tones sponsored by a morpheme is associated to the leftmost TBU which includes that morpheme.⁸

This constraint keeps lexical tones associated to the morphemes sponsoring them.⁹ For example, ALIGN-TO-SPONSOR is necessary to keep a High tone on the word-final syllable of nouns ending in *-ŋ*, even if the preceding syllable is toneless, as in *kpibiŋ* 'louse' above. Usually a morpheme will have an entire syllable at its left edge, and so the leftmost tone will associate to the leftmost syllable of that morpheme. However, if the morpheme is not an entire syllable itself, as with word-final *-ŋ*, the tone of the morpheme associates to the syllable containing the morpheme *-ŋ*, as we see both in *kpibiŋ* and our first tableau below. In this and all following tableaux, morpheme boundaries are marked with a hyphen, not only for the segmental material, but between tones as well.

Tableau 1: *tãŋ* 'stone' -- shows ALIGN-TO-SPONSOR >> *CONTOUR

UR	L -H tan-ŋ	ALIGN-TO- SPONSOR	*CONTOUR
a.	L H \ / taŋ		*
b.	L H taŋ	*!	
c.	L H taŋ	*!	

Above, the Low tone is sponsored by the noun stem *tan*¹⁰ and so must associate to its sponsoring morpheme by ALIGN-TO-SPONSOR. Likewise, the High tone is sponsored by the suffix *-ŋ* and must associate to the syllable containing its sponsoring morpheme. The ALIGN-TO-SPONSOR constraint is unviolated when both High and Low tones associate to the single TBU of the word. Since the winning candidate has a contour tone, it is evident

⁸ Bickmore (1996) includes a similar constraint, citing Ham (1996): ALIGN (H,L,So,L) - The left edge of a High Tone Span must align with the left edge of its lexical source. Predating both of these is the Basic Alignment Left family of Optimal Domains Theory, aligning the left edge of some F-domain to the left edge of its sponsor (Cole & Kisseberth 1994, 1995, and other ODT literature).

⁹ ALIGN-TO-SPONSOR has some properties in common with the traditional left-to-right mapping in autosegmental phonology. It maps the leftmost tone to the leftmost TBU. However, it says nothing about where the second tone in a sequence should be mapped. Furthermore, it specifically targets morphemes, whereas the usual autosegmental mapping targeted words. In this way, it somewhat resembles the tone to TBU mapping scheme in Lexical Phonology, in which tones were associated to morphemes before bracket erasure between morphemes occurred.

¹⁰ The actual stem is *tan*, as seen in the plural *tan-a*. But when the suffix *-ŋ* is added to *tan*, the result is *taŋ*.

that ALIGN-TO-SPONSOR outranks *CONTOUR. In candidate (b), the High tone is not associated to the syllable *taŋ* containing its sponsoring morpheme *ta-*, and in candidate (c), the Low tone is not associated to the syllable *taŋ* containing its sponsoring morpheme *-ŋ*.

The constraints *(H) and *(L) are both violated above in the losing candidates, and could in themselves force the acceptance of the winning candidate, but there is no way to tell from *taŋ* what ranking they should have with respect to each other or with respect to *CONTOUR. Other data discussed in Cahill (1997) shows that *(H) is undominated; an underlying floating High tone is always associated. However, ALIGN-TO-SPONSOR can be violated.

3.2 More complex cases - prohibition against HLH

In Kɔnni words, there is never a phonetic HLH ($\bar{_} \bar{_}$) sequence within words. Rather, when morphemes that would have produced such a sequence concatenate, the result is H¹HH ($\bar{_} - -$).

One plausible reason for this can be traced to the nature of communication. A language must have "texture" to it, a variation in whatever parameters are relevant, in order to communicate any information at all. However, these parameters must not vary so rapidly that it presents excessive difficulty either in parsing the information present, or producing the necessary articulations. In a tonal language, this implies avoidance of two extremes, both a totally "flat" pitch extending over some domain, and too rapid an alternation between High and Low tones. Either situation depicted graphically below is not desirable.

- (21) a. _____
 b. - - - - -
 - - - - -

This situation translates into two types of constraints in OT. A constant Low-tone such as in (21a) is prohibited in Kɔnni by a constraint requiring at least one High tone per word, to be discussed below.¹¹ (21b), a constant alternation between High and Low tones, is shown to be prohibited in Kɔnni by the fact that there is rarely a HLH sequence on TBU's (e.g. see (10-11)).

¹¹ Interestingly, Kɔnni freely allows words and utterances with all High tones, but not with all Low tones. This asymmetry with respect to High and Low is possibly related to the salience of High vs. Low, but a full discussion of this is beyond the scope of this paper.

- (22) *HLH = no Low can be associated when between two High tones: * H L H
 |
 X

The citation form of the constraint, *HLH, is shorthand for the fuller representation of the forbidden configuration at the right of (22) above. The precise form of this constraint is proposed tentatively; there may be another configuration that would be as adequate.

The absence of a constraint symmetric to *HLH is notable, i.e. there seems to be no *LHL cross-linguistically; on the contrary, there are many instances in which one syllable is prominent (i.e. accented or high-toned) and is surrounded by non-prominent ones. Speculatively, this could be due to the greater salience of peaks relative to valleys.

As mentioned, the result of concatenating morphemes with HLH tones is H¹HH, not HH¹H. In the output, it is the rightmost High which has spread left.¹² Most spreading in Konni is from right to left.¹³ A constraint against rightward spreading is evidently active.

- (23) *R-SPREAD - a tone cannot be associated both to its sponsoring TBU and to a TBU to its right.

This constraint depends, of course, on being able to correctly identify the sponsoring TBU of a particular tone. As we shall see below, this presents no problem. A language may have a predominant direction of tone spreading, and in such a language, either *R-SPREAD or the complementary *L-SPREAD would be highly ranked.

The constraint mentioned in the introductory section 3.1 against spreading must be mentioned at this point as well, that is, *H-SPREAD, which prohibits any spreading of a High tone. Since the High here is multiply linked, then *H-SPREAD must be ranked below *HLH.

¹² In Cahill (1992) I proposed another High-Spreading rule applying across word boundaries, but it now appears that the data actually may all be covered by spreading High in the HLH environment.

¹³ There are two known cases where a tone does spread rightward. One is from a noun onto the toneless locative particle *ma/me* 'on/in/at', which assumes the tone of the noun to the left, e.g.:

tígírí mé	'in the house'	gbɪŋkphám má	'on shoulder'
lóríkè mé	'on the lorry'	kóŋkòm má	'in tin can'

Note that the High here spreads onto a toneless TBU and is thus distinguished from the spreading of High onto a TBU which sponsors a Low tone, which is leftward in Konni. The second case is an apparent rightward spreading in some noun-adjective complexes, which I have not investigated fully. These show that *R-SPREAD may be violated in at least some cases, and so I do not show it in tableaux as undominated.

Tableau 2: ná¹póriŋ 'calf (leg)' shows *HLH, *R-SPREAD >> *H-SPREAD, *(L)

UR	H L- H	*HLH	*R-SPREAD	*H-SPREAD	*(L)
	napóri-ŋ				
	H L H			*	*
	☞ /				
a.	napóriŋ				
	H L H		*!	*	*
	\				
b.	napóriŋ				
	H L H	*!			
c.	napóriŋ				

I follow here the convention of putting a dotted line between constraints whose ranking with respect to each other cannot be determined.

Candidate (c), though perfectly satisfying a one-to-one matching between tones and TBU's, is nevertheless rejected because it violates *HLH. Candidate (b) is rejected because the spreading of High is rightward, leaving candidate (a) as optimal. Note that the High tones and their respective sponsors are readily identifiable.

3.3 The disyllabic nouns - MAX and DEP constraints

Now we are in a position to evaluate the disyllabic nouns and see in particular how four different underlying representations can give rise to one surface citation form of LH. In Cahill (1997), I examine all four disyllabic noun patterns which are LH in citation form, both in the associative construction and in citation form. Below I will limit myself to forms which illustrate the interaction of constraints relevant to the analysis of the polar suffix of noun class I. The MAX and DEP family of constraints, not discussed up to this point, will be essential as we consider toneless nouns, though some patterns are analyzable within the constraints already established.

The MAX and DEP family of constraints is well-established in Correspondence Theory (e.g. McCarthy & Prince 1995 and others in the same volume). In the foundational paper on Correspondence Theory (McCarthy & Prince 1995), MAX and DEP were defined with respect to segments, i.e. speech sounds such as vowels and consonants:

(24) MAX family - every segment of S_1 has a correspondent in S_2 (prohibits deletion)

DEP family - every segment of S_2 has a correspondent in S_1 (prohibits insertion)

The MAX and DEP family have also been used with entities other than segments, e.g. moras (Itô, Kitagawa, & Mester 1995). Also, with the recognition of tones as autosegments, that is, entities which may be deleted or inserted independently of any segmental or other featural material, we can apply these constraints to tones, as indeed Myers & Carleton 1996 have already done. The constraints used here will be specifically:

- (25) MAX-IO (T) - every tone of the input has a correspondent in the output
 (prohibits deletion)
 DEP-IO (T) - every tone of the output has a correspondent in the input
 (prohibits insertion)

These will hereafter be referred to by the abbreviated forms MAX (T) and DEP (T). Note that a tone may be floating in either input or output and be counted as present, i.e. if a tone which is associated in the input is floating in the output, it has not been deleted and does not violate Max (T). Even floating tones may have phonetic effects: a floating Low will cause downstep, and a floating High can associate in some contexts even if not in all.

Since a tone may be either High or Low in Kōnni, the constraints above are actually families and can be split into MAX (H) and MAX (L), DEP (H) and DEP (L) below, since the High and Low tone constraints may have separate rankings.¹⁴ For the DEP family, they must have separate rankings. Likewise, there is likely a difference in the deletion of High and Low tone, but for the data in this paper no specific reference to MAX (L) is made, and in this paper I will refer only to MAX (T).

These MAX and DEP constraints are essential to understanding how a LH citation tone on a disyllabic noun can actually arise one of four different ways, and we now examine these.

The noun *hɔ̀gú* 'woman' is posited to be toneless underlyingly (the LH in citation form will be discussed below). In *ú hɔ̀gú* 'his woman,' a High tone is from the associative morpheme (see Sec. 2.2). The tableau below refers to the constraint *TONELESS for the first time; this constraint rules against any form which has no tone associated to a TBU. Since there are not any surface toneless TBU's in Kōnni, *TONELESS is undominated.

¹⁴ Note that the parentheses around the constraints *(H) and *(L) indicate floating tones, but the parentheses in the MAX and DEP constraints are used merely as separators.

Tableau 3: ò hǎgù 'his woman' shows *TONELESS, H-SPREAD, DEP (H) >> DEP (L)

UR	L	H	*TONELESS	*(H)	*H-SPREAD	DEP (H)	DEP (L)
	ù	ASSOC	hǎgù				
	L	H L					*
a.	ù	hǎgù					
	L	HH				*!	
b.	ù	hǎgù					
	L	H			*!		
c.	ù	hǎgù					
	L H L			*!			*
d.	ù	hǎgù					
	L	H		*!			
e.	ù	hǎgù					

With no underlying tones in *hǎgù*, all surface tones are inserted. Here and in cases below, a toneless TBU receives a Low tone as default. This involves a violation of DEP (L). But this case shows that the Konni speaker would rather insert a Low than spread a non-lexically sponsored High or insert another High. Also, note that spreading the High to a toneless adjacent syllable is not an option, and is ruled out by *H-SPREAD.

Neither of the nouns *kǎgbá* 'hat' nor *hǎgù* 'woman' has an underlying High tone present in the forms I have posited, yet they both in citation form have a High tone on the second syllable. As previously mentioned, no noun in citation form is all Low toned, whatever the number of syllables. There is always at least one High present. In some contexts *kagba* is pronounced with all Low tones, as in *kǎgbá kǎàmí* 'one hat' or *ǎ wó kǎgbá* 'I lack hat.' In these cases, related to the discussion about the tonal texture of an utterance in Sec. 3.2, we see that in Konni, the utterance has a High tone elsewhere. In the citation forms, if there is no High in underlying representation, one is inserted. This is the only situation where High-insertion takes place in Konni.

This relates to similar phenomena in other languages. In several genetically and geographically diverse languages, there is a prohibition against a word having only Low tones. In Mixtec of San Miguel El Grande, in Mexico (Goldsmith 1990, from data in Pike 1948), no words are all Low-toned. The Moore and Dagaare languages of West Africa have a similar pattern: in disyllabic nouns, HH, HL, and LH are attested, but not LL (Kenstowicz, Nikiema, & Oruso 1988, Antilla & Bodomo 1996). Finally, a similar

constraint STEMH (all stems must contain a H-tone) is proposed for North Kyungsang Korean (Kim 1997). In all these languages a "flat" texture of Lows is not tolerated.

The relevant constraint in Kŏnni needs more investigation as to its precise formulation; in particular, what exactly is the domain that requires a High tone? For the present, and knowing that its domain may need revision, I propose the following undominated constraint:

(26) H-PRESENT - there must be at least one High tone present in an utterance.

The tableau below shows the activity of H-PRESENT with other constraints, as well as the first appearance of the DEP(H) constraint.

Tableau 4: *kagbá* 'hat' H-PRESENT >> DEP(H)

UR	L	H- PRESENT	ALIGN-TO- SPONSOR	DEP(H)	DEP(L)
	kagba				
a.	L H kagba			*	
b.	H L kagba		*!	*	
c.	L L kagba	*!			*
d.	L \ kagba	*!			

Since a High tone is inserted, here DEP(H) is violated and must therefore be outranked by other constraints which rule out the alternative candidates below. The word *kagbá* is posited to have a Low tone since there is always a Low present in some position in the word in all contexts (see Appendix 1), unlike the roots I have posited as toneless.

3.4 The polar plural suffix of Noun Class 1

In this section I show that the tonal behavior of the class 1 plural suffix in Kŏnni can best be accounted for by a constraint POLAR, specific to that morpheme. After reviewing the Kŏnni data, I will specifically show how POLAR accounts for all the forms, then examine two other researchers' approaches to "polar" suffixes, and other possible solutions within the system proposed thus far in this paper.

In previous studies of nouns in Gur languages, it has been noted that in many nouns, the nominal suffix has a tone opposite to that of the noun stem. In Moore, for example, disyllabic nouns have one of the patterns LH, HL, or HH (but never LL). Kenstowicz, Nikiema, and Ourso (1988) analyze this and a similar pattern in Lama as all suffixes having a High lexical tone, with the stems being either High, Low, or toneless. A /L-H/ sequence is unchanged, a /H-H/ sequence changes to HL by a version of Meeusen's dissimilation rule, and /Ø-H/ changes to [H-H] as a result of spreading the only High tone present. So in Kenstowicz *et al's* analysis of Moore, the apparent tonal polarity is the result of other processes. Hyman (1993) proposes a similar analysis for Dagbani as well.

In Kɔnni, most suffixes on nouns in Kɔnni are High-toned. In contrast to Moore, this is shown by the fact that these suffixes do *not* alternate or show any polarity, but consistently show up as High-toned. However, the plurals of Noun Class 1 (NC1) in Kɔnni behave in a way inconsistent with the other unambiguously High-toned suffixes. These are exemplified by the forms below, repeated in Appendix 2. The suffix on the plural form is either *-a* or *-e*, depending on vowel harmony, and this suffix is *not* consistently High-toned, but surfaces with a tone opposite to the previous stem tone.

(27)	singular	plural	stem tone	pl.suffix tone	gloss
	tāŋ	táná	L	H	'stone/s'
	síŋ	síá	H	L	'fish/es (sp.)'
	b̀̀́síŋ	b̀̀́sá	L	H	'breast/s'
	tígíŋ	tígè	H	L	'house/s'
	síkpaáŋ	síkpara	LH	L	'heart/s'

There are also noun stems with HL tone. Since these add an additional complication, discussion will be deferred until later.

A satisfactory approach in terms of the Optimality Theory worldview comes when we note that the tone of the plural suffix is opposite to the one before. This is true in a wide variety of cases, whether there is an inserted tone on the suffix, the NC1 plural suffix tone is spread, whether the last tone of the word is an underlying tone of the root, or whether the polar tone is floating, all of which will be exemplified below. We propose a constraint POLAR to describe this generalization.

- (28) POLAR: when a noun class 1 plural suffix is present, there is a tone immediately following the final stem tone which is opposite in polarity to that stem tone.

This constraint refers to the tonal tier, and describes the presence of a tone adjacent and to the right of a stem tone. If such a tone is not present in the input, it will be inserted, from the interaction of POLAR and other constraints. However, if the input

already satisfies POLAR, no insertion occurs. I first illustrate POLAR with the NC1 plural *sã* 'fishes'. In the tableaux below, \emptyset is not meant as a formal entity, but merely to indicate the lack of a sponsored tone for the indicated segmental morpheme.

Tableau 5: *sã* 'fishes' POLAR >> *CONTOUR

UR	H- \emptyset si-a	POLAR	*CONTOUR	DEP (H)	DEP (L)
a.	H L / sia		*		*
b.	H sia	*!			
c.	H H / sia	*!	*	*	
d.	L H / sia	*!	*		*

Recall that the syllable, here the diphthong *ã*, is the TBU in Könni, and in word-final position, it can bear a contour tone. Candidate (a) wins, though it violates DEP(L) by inserting a Low tone, and violates *CONTOUR by having a contour tone. Since *sã* is a NC1 plural, POLAR applies, and candidates (b) and (c) fatally violate it, since there is no polar tone present. Here, POLAR is satisfied by the insertion of a Low tone. Candidate (d) fatally violates POLAR because the polar tone does not follow the stem tone, but precedes it.

Similarly, with *jòá* 'tails', POLAR is satisfied by inserting a High tone.

Tableau 6: *jòá* 'tails'

UR	L-Ø	POLAR	*CONTOUR	DEP (H)	DEP (L)
	jù-a				
☞	L H /		*		*
a.	jùá				
	L L 	*!		*	
b.	jùá				
	L 	*!			
c.	jùá				
	H L /	*!	*		*
d.	jùá				

In both *tàn-á* 'stones' and *tàn-á-há* 'the stones', POLAR forces the *-a* suffix to have a High tone. Interestingly, while in *tàn-á* the High tone is clearly an inserted one, in *tàn-á-há*, the High on *-á* may have its source in either insertion or from spreading from the High on *-há*. We first present the tableau for *tàn-á* 'stones.'

Tableau 7: *tàná* 'stones' shows POLAR >> DEP(H)

UR	L-Ø	*TONELESS	POLAR	DEP(H)	DEP(L)
	tàn-a				
☞	L H 			*	
a.	tàná				
	L L 		*!		*
b.	tàná				
	L \		*!		
c.	tàná				
	L 	*!	*		
d.	tàná				

The winning candidate (a) avoids a violation of POLAR by inserting a High tone, showing POLAR outranks DEP(H). Candidates (b, c, d) all violate POLAR and are ruled

out. Candidate (d) is ruled out not by its violation of POLAR, but by a violation of *TONELESS. As we shall see later, it is possible for POLAR to be violated, but *TONELESS never is. POLAR is thus highly-ranked, but not top-ranked.

In *tàn-á-há* 'the stones', the High tone on *-á* could conceivably have a source either in an inserted tone or in spreading from the definite suffix *-há*, as illustrated below.

Tableau 8: *tàn-á-há* 'the stones'

UR	L-Ø-H	POLAR	*H-SPREAD	DEP (H)	DEP (L)
	tan-a-ha				
☞	L H H 			*	
a.	tanaha				
☞	L H /		*		
b.	tanaha				
	L L H 	*!			*
c.	tanaha				
	L H \	*!			
d.	tanaha				

Above, I mark both candidates (a) and (b) as winning, since at this time there is no way to distinguish which is actually the winner.¹⁵ Candidates (c, d) are clearly losers in that they both fatally violate POLAR. However, we have not established a ranking between *H-SPREAD and DEP (H) in this work. Empirically, this is difficult to establish, since a multiply-linked single High and two Highs are phonetically indistinguishable. This is unfortunate, since they are the very constraints that would decide between candidates (a) and (b). The issue amounts to whether it is better to spread a High onto an empty TBU or insert a new High. The only cases of High insertion we have seen in Könni involve words which have no underlying High, and it is quite possible that High insertion is indeed limited to those. However, at this point, I have no clear empirical evidence to decide the ranking, and at this point, we must live with the indeterminacy.

The tableau for *jágá* 'shades', however, is unambiguous:

¹⁵ In approaches which do not concern themselves with association lines, such as Bickmore 1996, or as in Optimal Domains Theory, which explicitly denies association lines, this distinction is a non-issue.

Tableau 9: *jágá* 'shades' shows POLAR >> DEP (L)

UR	HH-Ø	POLAR	MAX (T)	*CONTOUR	DEP (L)
	jag-a				
☞	H HL /			*	*
a.	jaga				
	H L 		*!		*
b.	jaga				
	H H 	*!			
c.	jaga				

In *jágá*, the winning candidate (a) satisfies POLAR without violating MAX (T). Candidate (b) also satisfies POLAR, but incurs a fatal violation of MAX (T) by deleting the second underlying High tone. Candidate (c) does not satisfy POLAR and is therefore ruled out. The word *bitié* 'chins' as well as others are also accounted for by this approach.

An inserted polar tone is not always associated, as shown by the analysis of *bállí'gáhá* 'the bags.' The floating Low that is indicated by downstep is associated in the indefinite form *bállí'gá* 'bags.' In the indefinite form, there are simply two High tones in the stem, and the Low on the suffix *-á* is inserted to conform to POLAR. In the definite plural form, a Low is also inserted, but it remains floating:

Tableau 10: *bállí'gáhá* 'the bags'

UR	HH-Ø-H	*HLH	POLAR	*RT-SPREAD	DEP (L)
	bullóg-a-ha				
☞	H H L H /				*
a.	bullógaha				
	H H L H 	*!			*
b.	bullógaha				
	H H L H \			*!	*
c.	bullógaha				
	H H H /		*!		
d.	bullógaha				

Candidates (a-c) all have the inserted Low tone after the stem High and thus do not violate POLAR, as does candidate (d). Candidate (b) is ruled out by a fatal violation of

*HLH, since the Low is associated between two High tones. Candidate (c) is ruled out by a violation of *RT-SPREAD (recall from the discussion in Sec. 3.2 that a /HLH/ sequence in Konni is pronounced [H¹HH], as in Tableau 2).

In some words, the polar tone inserted for the indefinite plural form does not surface at all in the definite plural form. In forms like *sisié* 'grasscutter' (a groundhog-like animal), the plural suffix *-é* has the expected polar High tone. However, in *sisièhé* 'the grasscutters,' the plural suffix does not manifest a High. This falls out from the constraints posited thus far.

Tableau 11: *sisièhé* 'the grasscutters'

UR	LL-Ø-H	POLAR	*CONTOUR	MAX(T)	DEP (H)
	sisi-e-he				
a.	L L H sisiéhe				
b.	L L H H / / sisiéhe		*!		*
c.	L H / sisiéhe			*!	

Thus far, either an inserted polar tone or one which is spread from another suffix account for all forms. However, the set of words like *yífmà* 'arrows' illustrates a case in which neither insertion nor spreading is operative. The citation and definite singular forms *yíííí* 'arrow', *yííííí* 'the arrow' show by the downstep that the root *yíí* must have a HL underlying tone. But this is exactly the tone that appears on the plural form *yíífmà*. The Low tone on the suffix is also present in the input. If there were an *inserted* polar tone, it would be High in this case to contrast with the final Low in the root, and we would expect that final Low to float, giving the unattested result **yíííífmà*, which is what we expect given the formulation of the constraints above.

At this point I do not have a clear-cut account of *yíífmà*. However, two possible solutions come with a closer consideration of the POLAR constraint. The function of POLAR is to give a contrast between the last root tone and the tone of the NC1 plural suffix. If the two final tones in the word are High and downstepped High, this provides less of a contrast than a High and a Low, subverting the purpose of the POLAR constraint. One possibility is that the POLAR constraint could be reformulated in such a way as to embody this notion that the contrast of tone in the suffix should be maximal. In this formulation, then **yíííífmà* would not satisfy POLAR, but *yíífmà* would. The second possibility is that POLAR could be reformulated in such a way that both *yíííífmà* and *yíífmà* do satisfy the constraint. The surface tone of the suffix contrasts with that of the tone

borne by the noun stem in both cases. In this schema, the crucial difference between the two is that **yiffmá* has an additional High tone, which fatally violates DEP(H). Tableaus illustrating both of these possible reformulations of POLAR are given below.

Tableau 12: *yiffmá* 'arrows', assuming POLAR → "suffix has maximal contrast from stem"

UR	HL-Ø	*HLH	POLAR	*CONTOUR	DEP (H)
	yiffm-a				
☞	H L a. yiffma				
	H L H / b. yiffma		*!		*

Tableau 13: *yiffmá* 'arrows', assuming POLAR → "suffix has different pitch than stem"

UR	HL-Ø	*HLH	POLAR	*CONTOUR	DEP (H)
	yiffm-a				
☞	H L a. yiffma				
	H L H / b. yiffma				*!

3.4.2 Alternatives

Here I will briefly review a number of alternative analyses which do not use the constraint POLAR (though assuming the other constraints in this paper), and show that they do not account for the data as well as the analysis proposed above.

The general Moore analysis using lexical High tones and an OCP-driven dissimilation for all suffixes cannot be applied to *Konni*; there would have to be a rule or constraint *specific* to the class 1 plural. As shown, the *-ŋ* singular suffix is High-toned. If the plural suffix *-a/-e* is also High, we would expect the same tonal patterns in the singular as in the plural, but instead we find two distinct patterns in singular and plural forms, e.g. *wifŋ* 'face mark' and *wifé* 'face marks.' The singular always ends in a High tone, but the plural ends in a tone opposite to the last tone of the noun stem. Furthermore, the plurals of noun class 1 are the only ones which act in this manner. Positing a lexical

High tone with no other stipulations to account for these is unworkable, since this would lead to the same behavior as the other suffixes, which are definitely High-toned.

While the Kŏnni class 1 plural suffix cannot be lexically High-toned, perhaps it could be underlyingly Low, since the suffix often surfaces as Low. However, this will not work within the system of constraints discussed thus far. If the suffix is Low, it would change to High after a Low-stemmed noun, because a High tone is necessary in a word (expressed by the constraint H-PRESENT). So *tàná* 'stones' would have lexical tones /tàn-à/ and the lexical Low on the second syllable would be High in the output to avoid violating H-PRESENT. (This ignores the question of why the High is manifested on the second rather than the first syllable.) However, this scenario runs into problems in the case of words like *tánáhá* 'the stones.' This word is divided into morphemes as *tàn-á-há*. If the suffix *-a* is underlyingly Low-toned, there is no motivation for it to change to High in this word, since a High is already present in *-há*. A Low tone for the "polar" suffix in the general system proposed thus far is therefore unsupported.

In the present system of constraints, then, neither High nor Low is possible. The last representation-based solution available is that the suffixes of noun class 1 in Kŏnni are toneless. Antilla and Bodomo (1996), hereafter A&B, discuss a polarity phenomenon in Dagaare very similar to that of Moore. In contrast to the Moore analysis by Kenstowicz *et al*, in A&B's account, all nominal suffixes in Dagaare are analyzed as underlyingly toneless. For disyllabic nouns, Dagaare has the same tone patterns as Moore did: LH, HL, and HH. If the root is toneless, A&B's analysis inserts a default H, which spreads to both syllables, giving surface HH. If the root has a lexical tone, the OCP, acting as a specific constraint, ensures that the inserted tone is not identical to the root tone but is opposite, giving surface LH and HL. It may be possible to re-analyze Moore in the same way, with toneless suffixes. Kenstowicz *et al* (1988) rejected the insertion of High tones for Moore on the grounds that the default in a Low-High tonal system is typically Low, not High. However, it is not unknown to have High tone as default; Clark (1990) and Creissels & Grégoire (1993) have analyzed Igbo and Manding, respectively, as having a High tone as the default, though High default does still seem to be the less common case.

Unlike A&B's account of Dagaare, the Low tone has been shown to be the default in Kŏnni (Cahill 1997). But a variation of the A&B tone insertion solution for Dagaare's toneless suffixes could account for most forms in Kŏnni. In this variation, a High is inserted only when the noun otherwise lacks any High. The same set of constraints in both tableaux below will yield either a High or Low inserted, depending on the context.

Tableau 14: *tána* 'stones'

UR	L-Ø	*TONELESS	H-PRESENT	*RSPREAD	DEP (H)	DEP (L)
☞	L H				*	
a.	 tana					
b.	L L tana		*!			*
c.	L \ tana		*!	*		
d.	L tana	*!	*!			

Tableau 15: *tigè* 'houses'

UR	H-Ø	*TONELESS	H-PRESENT	*RSPREAD	DEP (H)	DEP (L)
☞	H L					*
a.	 tigè					
b.	H H tigè				*!	
c.	H \ tigè			*!		
d.	H tigè	*!				

Above, when two equally-ranked (or at least indeterminately-ranked) constraints would each by itself rule out a particular candidate, I mark both with the (!) that marks a fatal violation.

If the noun stem is Low, as in *tána* 'stones' in Tableau 13, the normal default Low is ruled out, and a High must be inserted, since a noun must have a High tone present somewhere. If the noun stem is High, as in *tigè* 'houses' in Tableau 14, then the default Low supplies the tone for the second syllable, with other possible candidates ruled out by the constraints as shown. So we see that in the cases above, the polar suffix is analyzable

as a result of constraints already noted as active in other tonal phenomena, if the suffix is posited as toneless.

The same analysis works for longer words as well. Relevant cases would include *bǎlǎgǎ* 'bags' and *dǎmpǎlǎ* 'bench (lit. logs)'. In *bǎlǎgǎ*, a Low is inserted on the toneless suffix as the normal default, and in *dǎmpǎlǎ*, a High is inserted in order to satisfy the requirements of H-PRESENT.

There are at least two sets of data, however, which are problematic for this analysis and will be examined below. The first set is forms like the previously-mentioned *tǎn-ǎ-hǎ* 'the stones,' in which there seems to be no motivation from H-PRESENT to insert a High tone on a plural suffix *-ǎ*, since the word already has a High tone in it from *-hǎ*. the constraint *H-SPREAD has been established as ranked above DEP(L), so from these *tǎnhǎ* would be predicted rather than the correct *tǎnhǎ*.

The second set is words like *jǎgǎ* 'shades.' The word *jǎgǎ* was shown in Sec. 2.5 to have two lexical High tones, with the second High combined with a Low to make a falling tone on the second syllable. This is tonally similar to *sǎ* 'fishes (sp.)' from (27), in that these both have falling tones on the last TBU of the word.' Here, there is no motivation to insert a tone on a toneless suffix from *TONELESS, since the final TBU would already have a tone available. Also, the constraint *CONTOUR would be violated. Here the constraints in place would predict the incorrect *jǎgǎ*.

Other possibilities can be imagined to account for the facts, such as positing the class 1 suffix to be either High- or Low-toned, and then a version of the OCP which is restricted to the class 1 suffix, ensuring the correct output. However, we have seen the OCP is in general not active in Könni, and without further evidence there is no reason to invoke a specific instantiation of it here. Also, this approach would miss the clear surface generalization on polarity expressed by POLAR above.

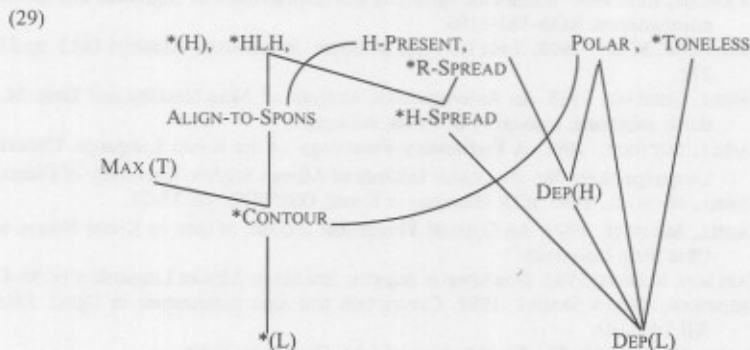
Whatever the crucial constraint that accounts for the noun class 1 plural tone, it is clear that it will have to refer to this one specific morpheme, the noun class 1 plural in Könni. This is consistent with the claim in Anderson (1974) that all polarity rules (termed "exchange rules" there) are either morphologically or lexically restricted, and with Schuh's (1978) observation that all tone polarity rules known to him are marked for specific morphemes, rather than being a part of the general phonology. Thus this is a clear case of a constraint being language-specific, with no possibility of being universal.

Interestingly, the Dagaare, the Moore and the Dagbani analyses all rely on the OCP as the crucial factor in accounting for apparent tonal polarity. In Dagaare, Antilla & Bodomo are explicit that the OCP is a constraint *preventing* two like tones from occurring on the surface. In Moore and Dagbani, the driving force for the Meeusen's Rule *changing* a HH to a HL is implicitly the OCP. However, in Könni, as we have seen, the

OCP is unnecessary to account for tonal polarity or any other tonal phenomena, and it is possible that these other Gur languages could profitably be re-analyzed without recourse to the OCP. It certainly seems that the Meeusen's Rule/OCP analysis may be a carryover from analyzing Bantu languages in which it definitely does play a major role.

4. Summary

The constraints mentioned in this paper and their relative rankings are shown below. Though not all constraints can be specifically ranked with respect to each other, there are no ranking paradoxes present. It will be noted that quite a few of the constraints are undominated. This could be an artifact of the data analyzed, of course, and with more data, some of these might be demoted to lower rankings. But as far as I know, all these express generalizations in Konni tone which are exceptionless.



An Optimality Theory account is most clearly a natural one when the phenomenon under consideration is a "conspiracy," in which a surface generalization may be generated from an underlying form in a number of different ways. One example would be a constraint that expresses CV as the preferred syllable structure. If an underlying representation is not CV, it may be manifested as a surface CV by any of several means, such as deletion, epenthesis, glide formation, etc. In a similar fashion, the Konni constraint POLAR is an expression of a singular surface generalization. However, this generalization may be generalized from an underlying representation in at least two, and likely three independent paths. In *yŷm à* 'arrows', the polar tone is also an underlying tone and there is no change. In *jágá* 'shades' as well as many other nouns, a polar tone must be inserted. In *tánáhá* 'the stones', it is quite likely that the polar tone comes from spreading. Thus the surface polar tone can be generated from underlying representations in several distinct ways, and this is in keeping with the spirit of Optimality Theory.

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APPENDIX 1 - Perturbation of target nouns

Only one example is given of each tone class, but if there are fewer than five examples in my data, the number is marked. Nouns are given in citation forms as well as in frames, and the postulated underlying tone of each noun is listed as well as the surface tone.

The frames	'this is X' 'I lack X'	'one X' 'his/her X'
One-Syllable Nouns		
1. sún 'broom'	sún wún ¹ ná ɛ́ wó sún	sún ¹ káání ù sún
2. táŋ 'stone'	táŋ wún ¹ ná ɛ́ wó ¹ táŋ	táŋ ¹ káání ù tá ¹ ŋ (H- ¹ H on single syllable)
3. bùá 'child' (4)	bùá wún ¹ ná ɛ́ wó ¹ bùá	bùá ¹ káání ù bùá
Two-Syllable Nouns		
1. jórón 'ladder'	jórón wún ¹ ná ɛ́ wó jórón	jórón ¹ káání ù jórón
2. hògú 'woman'	hògú wún ¹ ná ɛ́ wó ¹ hògú	hògú ¹ káání ù hògú
3. kpibín 'louse'	kpibín wún ¹ ná ɛ́ wó ¹ kpibín	kpibín ¹ káání ù kpibín
4. zàsín 'fish'	zàsín wún ¹ ná ɛ́ wó ¹ zàsín	zàsín ¹ káání ù zá ¹ sín
5. kàgbá 'hat' (3 examples)	kàgbá wún ¹ ná ɛ́ wó kàgbá	kàgbá kàání ù kàgbá
6. náá ¹ gín 'cow'	náá ¹ gín wún ¹ ná ɛ́ wó náá ¹ gín	náá ¹ gín kàání ù náá ¹ gín
7. tá ¹ sín 'headpan' (3 examples)	tá ¹ sín wún ¹ ná ɛ́ wó tá ¹ sín	tá ¹ sín ¹ káání ù tá ¹ sín
8. máásá 'a cake' (2 examples)	máásá wún ¹ ná ɛ́ wó máásá	máásá kàání ù máásá
9. nìmbúá 'sibling' (1 example)	nìmbúá wún ¹ ná ɛ́ wó ¹ nìmbúá	nìmbúá kàání ù nìmbúá

APPENDIX 2 - Nouns, plurals, and definite articles

There are occasional gaps in the data. I have left these as is, though in most cases the pattern is clear enough so the missing data could easily be predicted.

Nouns	Singular	Sg.+ Art	Plural	Pl.+ Art
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NOUN CLASS 1

bag	bóllógíŋ	bóllógírí	bóllógà	bólló ¹ gáhá
bee	siébiŋ	siébirí	siébiè	siébié ¹ hé
breast	bìsìŋ	bìsìrí	bìsà	bìsáhá
chest	nyúúŋ	nyúúrí	nyúrà	nyú ¹ ráhá
chin	bitiéŋ	bitiérí	bitié	bitié ¹ hé
day	dàáŋ	dààrí	dàrà	dàráhá
face mark	wíŋ	wínní	wiè	wié ¹ hé
fish (sp.)	síŋ	sínní	sà	sá ¹ há
forehead	diiŋ	díirí	diè	dié ¹ hé
gecko	chóó'síŋ	chóó'sírí	chóósà	chóó ¹ sáhá
gr.stone	níŋ	nírí	nà	niá ¹ há
heart	sìkpááŋ	sìkpáárí	sìkpàrà	sìkpá ¹ ráhá
hoe	kòúŋ	kòùrí	kòrà	kòráhá
house	tígíŋ	tígírí	tígè	tí ¹ géhé
knee	dùŋ	dùnní	dùnè	dùnèhé
log	dàmpàlí	dàmpàlírí	dàmpàlá	dàmpàláhá
nail, arrow	yí ¹ íŋ	yí ¹ írí	yíimà	yí ¹ máhá
name	sàáŋ	sààrí	sàrà	sàráhá
occiput	kpááŋ	kpáárí	kpàrà	kpàráhá
problem	wíŋ	wíírí	wià	wiá ¹ há
river	móúŋ	móúrí	mógà	mó ¹ gáhá
seed	bíŋ	bínní	biè	bié ¹ hé
shade	jágíŋ	jágírí	jágà	jágá ¹ há
sheep	yisíŋ		yisè	yí ¹ séhé
stone	tàŋ	tànní	tànà	tànáhá

stump	dààgbúgíŋ	dààgbúgírí	dààgbúgê	dààgbúgê ¹ hé
toad	bòntòúŋ	bòntòùrí	bùntórá	bùntóráhá
year	bíŋ	bínní	bíná	bínáhá

NOUN CLASS 2

baboon	fááŋ	fáákú	fáátí	fáátítí
calf	ná ¹ póríŋ	ná ¹ póríkú		
courtyard	gbááŋ	gbàákú	gbàátí	gbàátítí
door	gbíá ¹ bíŋ	gbíábí ¹ kú	gbíábítí	gbíábítítí
farm	kóáŋ	kúákú	kúátí	kúátítí
hawk	kpíí ¹ líŋ	kpíí ¹ líkú	kpíí ¹ lítí	kpíí ¹ lítítí
inside	sòŋ	sòkú	sòtí	sòtítí
leaf	vááŋ	váákú	váátí	váátítí
moon	chííŋ	chííkú	chítí	chítítí
path	siéŋ	siékú	siétí	
squirrel	chí ¹ íŋ	chíí ¹ kú		
vulture	zùúŋ	zùúkú	zùtí	zùtítí
wood	dááŋ	dàákú	dàátí	dàátítí
worm	gbáríáŋ	gbáríákú	gbáríátí	gbáríátítí

NOUN CLASS 3

axe	lí ¹ áŋ	líá ¹ ká	líásí	líá ¹ sisí
back	kòáŋ	kòáká	kòásí	kòásísí
chicken	kpìáŋ	kpìáká		
cobra	ǰííŋ	ǰìká	ǰìsí	ǰìsisí
comb	zúúchásíŋ	zúúchásíká	zúúchásá	zúúchásísí
cookpot	kúróbá	kúróbá ¹ ká		
dawadawa	dòúŋ	dòúká	dòúsí	dòúsisí
dog	gbàáŋ	gbàáká	gbàásí	
fly	nánjúŋ	nánjúká	nánjúsí	nánjúsisí
fruit (sp.)	ǰí ¹ íŋ	ǰíí ¹ ká	ǰíísí	ǰíí ¹ sisí
hat	síbúbúŋ	síbúbúké	síbúbúsí	síbúbúsísí
headpan	tá ¹ síŋ	tásí ¹ ká	tásísí	tásí ¹ sisí
knife	ǰíbíŋ	ǰíbíká	ǰíbísí	ǰíbísísí
lamp	pópólí	pópólíké	pópólsí	pópólsísí
lizard	gòrá ¹ áŋ	gòráá ¹ ká		

man	dèmbíŋ	dèmbiké	dèmbisi	dèmbisísi
mussel	káláŋgbí ¹ áŋ	káláŋgbíá ¹ ká		
person	vúóŋ	vúóké	vúósi	vúósisí
pot	gbiéŋ	gbiéké	gbiési	gbièsisí
sack	bòòrá	bòòriká	bòòrisí	bòòrisísí
sleeping mat	ítáŋ	ítáká	ítási	ításísí
thigh	kpòlìŋ	kpòlìtkó	kpòlìsi	kpòlìsisí
tree (sp.)	sěŋ	séké	sénsi	sénsísí
waist	chìáŋ	chìáká	chìási	chìásísí
window	tókóró	tókóróké	tókórosí	tókórosísí

NOUN CLASS 4

alcohol	dááŋ	dáábú	dáátí	dáátítí
ash	tányéé ¹ lìŋ	tányéé ¹ libú		
broom	súŋ	súmbú	sóntí	sóntítí
flour	zúŋ	zúmbú	zóntí	zóntítí
funeral	kũŋ	kúmbú	kúntí	kúntítí
hunger	kúŋ	kúmbú	kóntí	kóntítí
meat	nǎŋ	nǎmbú	nǎntí	nǎntítí
medicine	ítíŋ	ítibú	ítítí	ítítítí
net	nìŋ	nìbú	nìtí	nìtítí
oil	kpááŋ	kpáábú	kpáátí	kpáátítí
peanut	sìŋkpááŋ	sìŋkpáábú	sìŋkpáátí	sìŋkpáátítí
porridge	sááŋ	sáábú	sáátí	sáátítí
sleep	gbí ¹ ìŋ	gbí ¹ bú	gbí ¹ tí	gbí ¹ títí
thing	jàáŋ	jàábú	nyintí	nyintítí
water	nyááŋ	nyáábú	nyáátí	nyáátítí
wind	bòlògsíŋ	bòlògsíbú		

NOUN CLASS 5

child	bùá	bùàwá	bàllí	bàllíí
father	chùá	chùàwá	chùàlìŋ	chùàlìbá
friend	zùá	zùàwá	zùá ¹ lìŋ	zùàlì ¹ bá
husband	chòró	chòrùwá	chòró ¹ lìŋ	chòllì ¹ bá
woman	hògú	hòwwá	hòáŋ	hòàbá
thief	gááró	gáárówá		

daughter	lɪ̀á	lɪ̀á¹wá	lɪ̀¹áŋ	
older sibling	mɪ̀	mɪ̀¹wá	mɪ̀¹lɪ̀ŋ	mɪ̀lɪ̀¹ba

MIXED CLASSES

goat	biɪŋ	biikú	bié	bièhé
guineafowl	kpá¹áŋ	kpáá¹kú	kpííné	kpí¹néhé
rain	nɪ̀ŋ	nɪ̀kú	ná	nàhá
room	jùóŋ	jùòkú	jùnέ	jùnέhé
cow	náá¹gíŋ	náágí¹bú	niigé	ní¹géhé
horse	ðùúŋ	ðùùmbú	ðùùné	ðùùnéhé
rope	gú¹úŋ	gúùm¹bú	gúúnέ	gúúnέ¹hé
blindness	yɪ̀	yí¹kú	yíísí	yíísíísí
chair	chíáŋ	chíá¹kú	chíásí	chíá¹sísí
antelope	yisíŋ	yisiké	yisé	yiséhé

Relative Obliqueness and Subcategorization Inheritance in Old English Preposition-Verb Compound Verbs

Gwang-Yoon Goh

This paper addresses two main questions about Old English (OE) preposition-verb compound verbs (P-V CVs): first, how can we explain the contribution of the nonhead P to the subcategorization of the whole CV while maintaining the traditional priority of the head V, and second, what determines the case government of OE P-V CVs when more than one case is logically possible? On the basis of an 'obliqueness hierarchy' which results in an enriched notion of case feature, I show that not only the contribution of the nonhead P but also the case government of OE CVs can be explained under the traditional notion of the head without weakening the true priority of the head by resorting to an ad hoc redefinition of the head or to a formal mechanism which has not been fully justified.

1. The Subcategorization Inheritance in Old English Compound Verbs

1.1. The Head of Old English P-V Compound Verbs¹

One general assumption in morphology is that words have, as phrases do in syntax, a head or a central element, intended to explain the relation between a word and its parts. In general, the head of a word is defined as one of the constituent elements of the word which determines the properties of the whole word. In OE P-V CVs, the right-hand

* An earlier draft of this paper was presented at the thirty-second annual Mid-America Linguistics Conference in October 1997. I am grateful to Brian Joseph, Bob Kasper, and Alan Brown for their invaluable comments on various points. Of course, none of them are responsible for any errors.

¹ P represents a preverb (e.g. *wip* of *wip-cweðan*) which is assumed to be originally a preposition in its underlying representation. On the other hand, V indicates a simplex verb, and Vi and Vt mean an intransitive verb and a transitive verb, respectively. See section 3.3 for a more elaborate definition of P-V CVs.

member determines most important properties of the whole compound (mother), including categorial features, as in the following:²

(1) Category of OE P-V CVs

[[æfter]p-[hyrigean]v]v	'to follow an example'
[[from]p-[swican]v]v	'to desert from'
[[geond]p-[drencan]v]v	'to drink excessively'
[[purh]p-[drifan]v]v	'to drive through'
[[under]p-[þegnian]v]v	'to serve under'
[[wiþ]p-[standan]v]v	'to hinder, withstand'
[[ymb]p-[sælan]v]v	'to tie around'

(2) Morphological Class of OE Verbs and P-V CVs³

	Infinitive	1st (sg.) Pret.	2nd (pl.) Pret.	Past Ptc.	Class
a.(i)	hieran 'to hear'	hierde	hierdon	hiered	W1
	(ii) ofer-hieran 'to overhear'	ofer-hierde	ofer-hieron	ofer-hiered	W1
b. (i)	bregdan 'to pull'	brægd	brugdon	brogden	S3
	(ii) ofer-bregdan 'to cover'	ofer-brægd	ofer-brugdon	ofer-brogden	S3
c.(i)	faran 'to go'	for	foron	faren	S6
	(ii) ofer-faran 'to go over'	ofer-for	ofer-foron	ofer-faren	S6

As we can see in (1), the categorial feature percolates to the mother (CV) from V. In the same way, examples in (2) show us that the CVs are different in their morphological classes from one another even though they share the same preposition and show the same verb class as their corresponding simplex verb, which means again that V determines the morphological class of the whole CV. Furthermore, as is well known, the right-hand member of the CV determines many other inherent features such as tense, aspect, person, and number; the left-hand member P does not influence the determination of those features. Therefore, we can reasonably say that the right-hand member V is the head of the OE P-V CV and expect that this head will also determine other important features like the subcategorization of the whole compound.⁴

1.2. The Contribution of Nonheads to the Subcategorization Inheritance

One conspicuous difference between OE and Modern English (MnE) is that in OE CVs could be made very freely by combining a preposition and a verb. Furthermore, unlike MnE in which the meanings of P-V CVs are not usually obtained from their components in a compositional way, most OE P-V CVs are more transparent so their meanings can be derived from the meanings of their parts. One may observe in this regard that many OE CVs behave compositionally in their argument subcategorization as well, that is, the prefix (i.e. P) as well as the head (i.e. V) contributes to the subcategorization or argument structure of the CV. Thus, unlike our general expectation about the behavior of the head and a nonhead, many OE P-V CVs show that although the

² Kim (1997) identified the head of OE P-V CVs in a similar way.

³ I follow the classification of Mitchell (1992: 36).

⁴ By identifying V as the head of P-V CVs, I don't intend to mean that all words have a head or that there is a unique way to identify its position within (complex) words.

head V determines most of the morphosyntactic features of the whole CV, the valence of the CV is jointly determined by the head V and the nonhead P. This point is well demonstrated by the comparison of the respective case government of P-V CVs and their component V and P (Kim 1997).⁵ Consider the following examples:

(3) *gan* vs. *ymb-gan*

- a. *se þe fylgeþ me ne gæþ he on þeostro*
 he who followsme not goes he into darkness
 'he who follows me shall not go into darkness' (BIHom 103.31)
- b. *Ymb-eode þa ides Helminga duguþeond geogoþe dæl æghwylcne.*
 around-went then lady of-Helmings veterans and youths part each [acc]
 'then the lady of the Helmings went around every group
 of the veterans and the youths' (Beo 620-1)

(4) *ymb*

- a. *Aras þa se rica, ymb hine rinc manig.*
 rose then the noblearound him [acc] man many
 'the noble and many a man around him rose up' (Beo 399)
- b. *he ferde eft siððan embe sumere neode*
 he went again afterwards about some need [dat]
 'afterwards he went again about some need' (ÆCHom ii. 508.15)

Gan in (3a) is an intransitive verb which does not take any object, whereas *ymb-gan* in (3b) is a transitive verb which takes an accusative object. Note that the preposition *ymb* takes an accusative or dative object in (4). The observation about the case government in OE P-V CVs in (3) and (4) shows us that the subcategorization of the P is percolated to that of the whole CV. Furthermore, in these examples, we can see that the meaning of the CV is so transparent that it can be compositionally obtained from its constituent parts. Thus, the meaning of *ymb* 'around' combines with the meaning of *gan* 'to go' to produce the compositional meaning of the whole CV *ymb-gan* 'to go around'. This observation, which shows that nonheads, along with the head, can participate in determining the argument structures of (OE) P-V CVs, is common also in MnE and many other languages and goes against our expectation about the behavior of the head and a nonhead.

The following examples are more interesting because they show that a preposition combines with a transitive verb which can take its own NP object and that both the head and the nonhead contribute to the argument structure of the whole CV.

(5) *cweðan* and *wiþ-cweðan*

- a. *in leohtehim þa word cweþað*
 in light him [dat]those words [acc] speak
 'they will speak those words to him in glory' (Christ 401)

⁵ Campbell (1959: §72 fn.1) seems to be the first to observe the contribution of the prepositional prefix to the subcategorization of the whole compound verb in OE. This observation was also made by De la Cruz (1973: 161, 164), Mitchell (1985: §§1065-6), Kim (1997), and others.

- b. gif inc hwa ðæs wip-cweþe
 if you-two [dat] anyone that [gen] contradicts
 'if anyone contradicts you about that' (BIHom 71. 1 [BT])

Wip-cweðan 'to refuse, contradict' in (5b) is a ditransitive and takes dative and genitive at the same time, whereas *cweðan* 'to speak' can take either dative and accusative at the same time or accusative alone but never takes genitive. Therefore, we can infer that the genitive case would come from P and this is ascertained by the following examples showing the case government of *wip*, which takes genitive, dative, or accusative:

- (6) *wip*
- a. micelliget fleah of ðære dune swilce flan
 great lightning flew from the mountainlike arrows
wið þæs hæðenan folces
 against the heathen folk [gen]
 'great lightning flew from the mountain like arrows against the heathen folk'
 (ÆCHom i. 504.29)
- b. se dæg cume þe he sceole wið þæm lichomon hine gedælon
 the day come that he must against the body [dat] him separate
 'the day shall come that he must separate himself from the body'
 (BIHom 97.20)
- c. he forgifep eall swa hwæt swa þes middangeard ær
 he forgives all whatsoever this world previously
wip hine æbyligðageworhte
 against him [acc] offenses made
 'he shall forgive all offenses whatsoever this world has previously
 committed against him' (BIHom 9.12)

Our observation so far is well verified by the case government patterns of verbs and prepositions which are based on Bosworth & Toller (1898) (henceforth, BT) and Mitchell (1985: §§1092, 1178). The general subcategorization pattern of the above CV, the simplex verb, and the preposition can be described as follows:

- (7) Subcategorization of *wip-cweþan*, *cweþan*, and *wip*
- a. *wip-cweþan* [dat, (gen)] 'to contradict (sb) [dat] with regard to (sth) [gen]'⁶
 b. *cweþan* [acc, (dat)] 'to say, speak (sth) [acc] to (sb) [dat]'
 c. *wip* [acc/dat/gen]

The above subcategorization pattern as well as the examples considered shows that the CV *wip-cweþan*, as a ditransitive, takes dative and genitive at the same time and that the genitive case does not come from the simplex *cweþan* but from the preverb *wip*. Therefore, we can conclude that the nonhead (P) as well as the head (V) participates in the determination of the argument structures of the P-V CVs in OE, and this is quite

⁶ V[dat, gen] (= V[COMPS<NP[dat], NP[gen]>]) means that the given verb takes dative and genitive NPs at the same time, while V[acc/dat] indicates that the V takes accusative or dative but not both at the same time. In particular, the first case in the subcategorization of a ditransitive P-V CV indicates the case which comes from the verb part, regardless of the surface word order in OE. We can easily distinguish it by the related meaning and function in most cases. (sb) and (sth) indicate a person and a thing, respectively.

different from our expectation based on the traditional notion of the head. Thus, the consideration so far raises two interesting questions to be answered by any reasonable morphological theory which assumes the notion of the head.

First, how can we explain the contribution of the nonhead to the subcategorization of the whole compound in OE P-V CVs? Is there any notion of the head available in current morphological studies which can help us out of the apparent dilemma between the contribution of the nonhead P and the priority of the head V? Second, how is it that a particular case is used in a CV in the situation in which more than one case is logically possible? In particular, OE has some well-attested, ditransitive P-Vt CVs, whose simplexes are monotransitive or different in their subcategorization from the corresponding P-V CVs, and they show some peculiar behavior in their case inheritance. That is, when they are ditransitive, some OE P-V CVs such as *wip-bregdan*, *wip-cweðan*, and *wip-standan* take only [dat, gen] and they do not take other logically possible combinations of cases: [dat, acc], [dat, dat], [acc, gen], etc.⁷

In this paper, I will show that by better understanding the case assigning properties of the head, the interesting case government patterns of OE P-Vt CVs as well as the contribution of nonheads can be explained under the traditional notion of the head without weakening the priority of the head by resorting to an ad hoc redefinition of the head or to a formal mechanism which has not been fully justified.

2. Previous Studies

2.1. Observation about the Subcategorization Inheritance

There have been several studies which note the prepositional function of the prefix P in OE P-V CVs, that is, the contribution of nonheads (P) to the subcategorization of the whole CVs, in which P brings about and is responsible for the difference in valence or subcategorization between a simplex V and the corresponding P-V CV. Thus, Campbell (1959: §72 fn. 1) says that "prepositional adverbs" (i.e. prefixes of P-V CVs) can "have a function approximating to that of prepositions, the object being under their government". De la Cruz (1973: 161, 164) also observes that both P-V CVs and prepositional verbs in OE and Middle English (ME) can permit a difference of object with respect to the simplex. Mitchell (1985: §§1065-6) makes a similar observation about the behavior of prepositional prefixes of P-V CVs and explains what sort of verb results from the combining of the two elements (P and V).

Although their observation seems to be quite reasonable and correctly points out the contribution of the prefix to the argument structure of P-V CVs, none of them provide any generalization or explanation beyond the observation. Furthermore, their observation

⁷ Such ditransitive P-Vt CVs as *wip-cweðan*, in which P (*wip*) as well as V (*cweðan*) contributes to the subcategorization of the whole CV, do not seem to be very common in OE. However, OE has many instances of such P-Vt CVs and other languages including Greek and Latin show similar examples (e.g. *σπ-πεμπω* 'to send sb₁ with sb₂' from *συν* 'with' and *πεμπω* 'to send sb/sth', and *επι-βουλευω* 'to plot against sb < to plan (sth) against sb' from *επι* 'against' and *βουλευω* 'to plan sth'). See Visser (1963-73: §677), Mitchell (1985: §§1092, 1178) for the subcategorizations of the above three P-V CVs with the P *wip*. Kim (1997) discusses the three OE P-Vt CVs and several Greek and Latin examples.

misses the prepositional function of a prefix when it combines with a (mono)transitive verb to form a ditransitive verb, as in *wip-bregdan*, *wip-cweðan*, and *wip-standan*.⁸

2.2. Redefining the Notion of the Head

Many studies have attempted to account for a complex word and its head and their relationship, which can be applied to the explanation of the argument structures of (P-V) compounds and their subcategorization inheritance. They can be divided into two main groups, depending on how the priority of the head is maintained. The first group, including Williams (1981), Lieber (1983), Selkirk (1982), Di Sciullo & Williams (1987), and others, attempts to keep the priority of the head mainly by redefining the notion of the head. Their basic idea in 'headness' is that the head of a word determines the properties of the whole word by percolating its properties to the word but that a nonhead does not have an influence. In contrast, the second group, including Toman (1987), Lieber (1992), and Kim (1997), tries to accommodate the contribution of nonheads by employing a formal device which can make the head have the control of the subcategorization inheritance.

Williams (1981: 248) proposes the Right-hand Head Rule (RHR) to define the notion of the head. According to his RHR, the head is always the rightmost constituent of the morphologically complex word. Thus, the category of each compound (e.g. [sweet_A talk_N]_N) is determined by the right-hand member (e.g. [talk_N]). However, we can easily find many counterexamples to this RHR. For example, in [be-{witch}_N]_V, [be-{guile}_N]_V, [en-{large}_A]_V, and [en-{able}_A]_V, the left-hand member determines the category, or more precisely, the right-hand member does not determine the category.⁹

In order to resolve this problem, Selkirk (1982: 20) provides a revised RHR, in which the notion of head is defined in terms of types and feature complexes rather than the position of a constituent, so that category-changing prefixes can be treated as heads. The point is that the head should have a complex of all relevant features shared by the mother.

(8) Right-hand Head Rule (revised)

In a word-internal configuration,



where X stands for a syntactic feature complex and where Q contains no category with the feature complex X, X^m is the head of Xⁿ.

On the other hand, Di Sciullo & Williams (1987) replace the original notion of the head of a word by a so-called "relativized head" in order to avoid the problem in Williams (1981). Now, the head is defined as the rightmost constituent of a word which is specified for the property in question. This new notion is basically the same as

⁸ However, Mitchell (1985: §§1902, 1178) provides the subcategorization patterns of all the three CVs and their components P and V, from which the prepositional function of P can easily be shown in each CV.

⁹ Williams (1981: 250), however, notes the presence of *en-X* compounds (e.g. *en-rich* and *en-slave*) and treat them as systematic exceptions to the RHR.

Selkirk's (1982) revised RHR in that it allows any element (notably, the left-hand member) relevant to the given property to percolate its property to the mother.¹⁰

In the case of P-Vi CVs (e.g. *be-gangan*, *ymb-gan*, etc.), either of the two revised approaches seems to work, since the feature (i.e. argument) of the left-hand member can percolate to the mother (CV) and determine the argument structure of the whole CV. However, in the case of P-Vt CVs such as *wip-cweðan*, in which the argument structure is determined by both of the members, no approaches based on the above three versions of the head seem to be able to explain the subcategorization of CVs. That is, no matter how we define the notion of the head, both P and V in P-V CVs cannot be the head at the same time, unless more than one head is allowed or the whole P-V CV is treated as the head.¹¹

Lieber (1983: 253) provides a similar but more specified proposal for the head and its role in the argument structure of compounds, in which she says that the features of the right-hand member percolate up to the mother node. Furthermore, she claims that the right-hand stem determines not only the category but also the argument structure of the compound, while the left-hand member does not pass any of its features up to the mother (compound), only satisfying its own argument structure within the compound. Again, it is clear that this claim is not valid: in many OE P-V CVs and even in many similar MnE P-V CVs (e.g. *over-come*, *over-lay*, *over-lap*), not only the right-hand member (V) but also the left-hand member (P) participates in determining the argument structure of the whole compound.

In short, the problem with all the above approaches is that no matter how we define the head and its position, it is difficult to provide a solid basis for an effective and reasonable account of the contribution of nonheads in the subcategorization inheritance.

2.3. Accommodating the Contribution of Nonheads Through a Formal Mechanism

Instead of proposing a new definition of the head, Lieber (1992), following Toman (1987), distinguishes "percolation", the passing of morpho-syntactic features between two different nodes, from "inheritance", an operation within the argument structures of a nonhead and the head, thereby trying to provide a way of accommodating the contribution of nonheads. That is, in this mechanism, the head (V) can inherit the argument of the nonhead (P) and then percolate it to the mother (CV).

Kim (1997) discusses some OE P-V CVs, in which the value of the subcategorization feature is not determined solely by the head. Her observation about the case government of OE P-V CVs is quite right, especially in that the CVs must assign the case from the simplex V with the case assigned by the P as optional (pp. 44-56). Furthermore, she

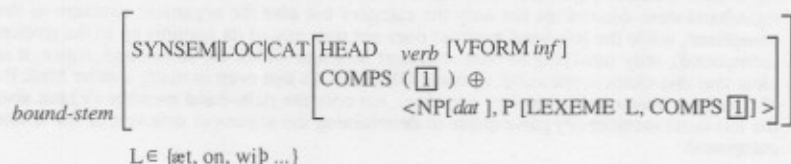
¹⁰ See Anderson (1992: 310-19) for several other problems which the relativized head has.

¹¹ Multiple heads have been proposed for some problematic cases such as so-called 'dvandva' compounds and coordinating compounds (e.g. *hydrogen-oxygen* in *hydrogen-oxygen mixture*), in which more than one participant in a compound is assigned head status. However, OE P-V CVs in question don't seem to need to be treated as such a case at all, since the two components in OE P-V CVs are very different in their status: V is dominant in almost every respect. Furthermore, note that such a proposal, even for 'dvandva' cases, brings about complications in other parts of the description or the theory, as pointed out in Zwicky (1993: 292).

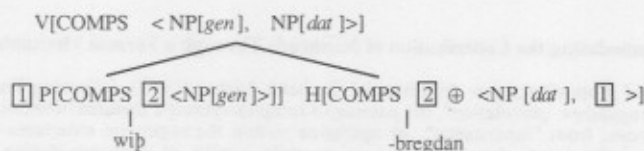
provides a way of making the head control the subcategorization inheritance by adopting the mechanism of argument attraction, which is proposed by Hinrichs and Nakazawa (1989, 1994) within the framework of Head-Driven Phrase Structure Grammar.

Although the approaches in this line allow us to nicely accommodate the contribution of the nonhead by means of a formal device such as argument attraction, they are not without problems. Above all, they still have to explain what makes the inheritance (or argument attraction) possible and what controls it, and in particular, what the role of the head is in the relevant process including the subcategorization inheritance. This problem becomes clear when they are applied to the case government of OE P-V CVs: they cannot explain why the CVs such as *wip-cweðan* and *wip-bregdan* take a particular (set of) case(s) when more than one case is logically possible. Consider the following inheritance mechanism for *wip-bregdan* which is proposed by Kim (1997: 61-61):

(9) a. Revised Partial Feature Structure Description of *bregdan*



b. COMPS Inheritance in P-Vt Compounds



Even though the actual element inherited is the COMPS list of the nonhead, the inheritance mechanism above enables the head to be in control of the inheritance, making the CV *wip-bregdan* have the COMPS list of <NP[gen], NP[dat]> (or <NP[dat]>). Note, however, that although the nonhead *wip* as a preposition governs an NP[dat] or an NP[acc] as well as an NP[gen], the head *bregdan* always inherits an NP[gen] from the nonhead. This selective case government in the subcategorization inheritance cannot be explained by the given formal mechanism itself. This means that although Kim (1997) may maintain the head-to-mother percolation of the subcategorization list by rather artificially making the inheritance of the subcategorization list of the nonhead always be by way of the head, she still has to explain what really controls the subcategorization inheritance, resulting in the peculiar case government pattern of the P-V CV.

Note that Lieber's (1992) proposal of inheritance and percolation can be formalized in a similar way and has the same problem because her proposal cannot explain why the

head inherits an NP argument of a particular case, either. Thus, their account should be determined to be an approximation of a complete account because although their formal mechanism enables the head to appear to be in control of the subcategorization inheritance, it gives us little explanation of why it is that the theory of subcategorization inheritance is constituted in the way it is. This makes us doubt whether they really can maintain the true priority of the head.

So far, we have considered various approaches which are relevant to the subcategorization inheritance of OE P-V CVs, and found that there is no previous study which can reasonably account for or be applied to the questions at issue. In the following section, I will present an alternative account of the subcategorization inheritance in OE P-V CVs, in which, without any ad hoc definition, the head in the traditional sense is still in control and determines the contribution of nonheads. Thus, I will motivate and propose an 'obliqueness hierarchy' (OH) among the NP arguments of OE verbs and prepositions. Then, in order to represent the information about the OH in the subcategorization of the head, I will enrich, but not try to redefine, the notion of the head with respect to the case feature. This enriched interpretation of the case feature based on relative obliqueness of NP arguments will enable us to explain the contribution of nonheads to the subcategorization inheritance of OE P-V CVs without weakening the priority of the head.

3. Obliqueness Hypothesis

3.1. Two Strict Distinctions among Old English NP arguments

There have been many studies which attempt to explain the syntactic and semantic contribution of OE morphological cases and most of those studies have tried to explain what the OE cases encode on the basis of traditional notions of case government. Thus, OE cases might be explained in terms of the grammatical relations they encode, that is, the nominative encodes subjects, the accusative direct objects and the dative indirect objects. However, few of the explanations based on this traditional view have been very successful in accounting for what OE cases really encode, because even though such accounts may be appropriate in many cases, they are inappropriate in many other instances, making it very difficult to formulate a generalization which can be applied to various uses of OE non-subject cases. In particular, the object marking of a lot of OE verbs is so variable that we can find such alternative case markings even in one and the same sentence, as follows:

- (10) a. se fæder wipsoc *his bearne*, and þæt bearn wipsoc
 the father renounced his child [dat] and that child rejected
þone fæder, and æt nextan ælc freond wipsoc *oðres*,
 the father [acc] and at last each friend refused another [gen]
 'the father renounced his child, and the child rejected
 the father, and then all friends refused each other'
 (ÆIS, i. 23: 110 [BT: 1255; Plank (1983)])
- b. gefylgdon *hine* vel *him*
 followed him [acc] or him [dat]
 'they followed him or him' (Lindisf. Gosp. [Plank (1983)])

The above examples clearly show that a verb varies in assigning a case to its direct object without involving any important difference in grammatical relationship and

meaning in kind. How can we explain these alternative case markings for the same verb? Should we say that it was just a free variation which doesn't make any significant difference? One might argue that such alternations in OE object case marking come from uncertainties in the use of OE object cases and that they especially reflect the loss of case distinction in relatively late texts. However, this does not seem to be the case, since such variation in object cases is extremely pervasive in the early OE period and characteristic even of other early Germanic languages (Plank 1983: 246).

Although grammatical roles and functions are variably encoded in OE cases, there are two rigid distinctions among OE NPs with respect to their cases and governors. Above all, there is a strict distinction among the NP arguments of a verb, especially between accusative NPs and NPs in other cases, which can be clearly seen in their behavior in passivization.¹² OE has a syntactic passive like MnE.¹³ The norm for this OE passive is that the accusative object of the active verb becomes the subject of the passive, which is called 'personal passive', as in (11a). Otherwise, the impersonal passive is the rule. That is, when an active verb takes a dative or genitive NP object, the NP has to remain in the oblique case without becoming the subject of the passive sentence, as in (11b) and (11c).

- (11) a. *he* mid eotenum wearð on feonda geweald forð forlacen
 he [nom] among giants became into enemy's power further betrayed
 'among the giants, he was well betrayed into the power of the enemy'
 (Beo 902-3)
- b. *Him* weorpeð blæd gifen!
 him [dat] became blood given
 'he was given blood' (Christ 877)
- c. Forðæm se ðe *his* ær tide ne tiolað,
 because his [gen] before time not provide (for)
 þonne bið *his* on tid untilad,
 then (it) is his [gen] on time unprovided
 'because they will not provide for him before time
 then it will be unprovided in respect of him when the time comes'
 (Bo 67. 11 [Mitchell 1985: §849])¹⁴

¹² This strict distinction between accusative and other cases can also be applied to NP arguments of prepositions since OE P-V CVs such as *ymb-sprecan*, *ymb-locian*, *wiþ-springan*, *wiþ-fleogan*, etc. whose sole arguments come from the prefix will show the same difference in passivization. That is, even though a prepositional argument could not be passivized at all in OE, an inherited argument (from P) in P-V CVs did not have any problem with passivization even in OE.

¹³ OE has two ways to represent the passive. That is, besides the syntactic passive, there is one OE verb which has a synthetic passive, that is, *hate* 'is (was) called'. On the other hand, Impersonal *man* for indefinite agency is often used in the nominative singular with an active verb form as an equivalent of the passive voice.

¹⁴ Although the OE verb *tifolian* 'to strive after, provide (for)' takes genitive, example (11c), which Mitchell provides as an example of the impersonal passive for the genitive object, may be problematic because the word *untilad* 'unprovided' can be regarded as an adjective rather than a past participle form. Unlike the impersonal passive for the dative object, clear examples of the impersonal passive for the genitive object seem to be rare (McLaughlin 1983: 62). This rareness is compatible with the distinction between the dative case and the genitive case, which is reflected in the obliqueness hierarchy proposed in (14).

This distinction between accusative NPs and dative or genitive NPs must have been extremely strong since no reasonable evidence has been found that this rule had exceptions. Thus, OE does not even have the indirect passive, which means only an accusative NP can become a passive subject.¹⁵ This distinction is also maintained even when one and the same verb has two different sets of NPs as its arguments, as in the examples below. Note that the different argument structures are associated with different meanings of the verb, which are illustrated in (12b) and (12c), respectively.

(12) *ofteon*¹⁶a. Informal Argument Structures of *ofteon*

- (i) 'to take, deny (sth) [acc] from/to (sb) [dat]'
 (ii) 'to deprive (sb) [dat] of (sth) [gen]'

- b. (i) ... þæt ðam godum þe hit gehealdan willað,
 ... that to the pagan gods [dat] which it to hold wish,
 ne sy *oftogen* *seo gastlice deopnyss*
 not may-be denied the spiritual profoundness [nom]
 '... that to the pagan gods which wish to hold it,
 the spiritual profundity may not be denied' (ÆCHom ii. 96.4)

- (ii) ðe bið *seo bodung* *oftogen*
 to whom is the message [nom] denied
 'to whom the message is denied' (ÆCHom ii. 530.30)

- c. (i) ... ac him wæs ða *oftogen* *ælces fodan* six dagas
 ... but him [dat] was then deprived everyfood [gen] six days
 '... but he was deprived of all food for six days' (ÆCHom i. 570.30)

- (ii) Blindsceal his eagna þolian,
 blind must his eyes dispense with,
 oftigen biþ him torhtre *gesihþe*
 deprived is him [dat] clear vision [gen]
 'a blind man must dispense with his eyes,
 (and) he is deprived of clear vision' (Max i. 39)

On the other hand, OE has another conspicuous distinction between verbal arguments and prepositional arguments, which is also clearly revealed in passivization. That is, passivization in OE is allowed only for a verbal argument. In other words, there is no prepositional passive (PreP) in OE, at least, not in the same form as the MnE PreP. Thus, OE does not have the passive type *He was laughed at*. This type of passive begins to appear about 1300, but remains rare until the end of the 14th century (Mustanoja 1960: 440-1).¹⁷

¹⁵ The indirect passive is the passive type *I was told a story*, which becomes a feature of English usage in the 15th century (Mustanoja 1960: 440-1).

¹⁶ The examples are from Mitchell (1985: §858) but the MnE translation is mine.

¹⁷ The PreP is not found in what Denison calls "Standard Average European", which still has different morphological cases for NPs just as in OE, though there is something similar in mainland Scandinavian languages (Denison 1993: 125).

- (13) a. Bot nu þan am i *after send*
 'but now when I am after sent (= sent for)
 (a1400 (a1325) Cursor 14216 [Denison 1993: 126])
- b. Litel is he loid or *lete by þat suche a lessoun techip*
 'he is little loved or thought of who teaches such a lesson'
 (c1400 (a1376) PPI. A (1) 11. 29 [Denison 1993: 126])

In sum, there are two strict distinctions among OE NPs: one is among the NP arguments of the same head or governor with respect to their cases and the other is between verbal arguments and prepositional arguments. Whatever makes this distinction possible among OE NPs, we can call it Ω and say that the easier for an NP to be passivized, the less Ω that NP is. Then by using this property of OE NPs, Ω , we can describe the above two distinctions among OE NPs with respect to their morphological cases and governors as follows: first, accusative NPs are less Ω than dative or genitive NPs, and second, regardless of their cases, NPs are less Ω when they are verbal arguments than when they are prepositional arguments.

3.2. Obliqueness Hierarchy among Old English NPs

The property Ω and the distinction among OE NPs in terms of Ω seem to be very closely related to the notion of 'obliqueness'. The notion of 'obliqueness' here is similar to the traditional grammatical notion of obliqueness, which can be roughly defined as follows: the less oblique an NP argument is, the more central it is for the meaning or relationship expressed by the head (i.e. verb) of the relevant VP and the more likely for it to be selected by the head. Note, however, that the obliqueness of NPs is defined here with regard to their morphological cases, not their grammatical roles or relationships.¹⁸

Above all, accusative case in OE usually encodes the direct object of a verb, the least oblique non-subject argument, which is generally encoded by accusative case. Furthermore, OE accusative NPs are more likely to be selected by a verb than dative or genitive NPs. According to Mitchell (1985: §1092),¹⁹ OE has a very small number of verbs (about 180 verbs in his list) which take genitive or dative, whereas there are a great number of transitive verbs, which can take accusative alone or along with other cases. That is, accusative case is much more likely to be selected by V than any of the other object cases and thus we can say that accusative NPs are less oblique than dative or genitive NPs.²⁰

¹⁸ The representation of the grammatical relation by means of relative obliqueness can be found in many studies including Keenan & Comrie (1977, 1979), Comrie (1981: 148-55), and Pollard & Sag (1987: 67-72, 117-121, 1994). Note, however, that their hierarchies mainly based on grammatical functions are difficult to be properly applied to the NP arguments which have the same grammatical function (i.e. the direct object) but alternative case markings, as is shown in (10). Thus, unlike most others, the relative obliqueness here is defined with regard to the morphological cases of NP arguments rather than their grammatical roles or functions.

¹⁹ Visser (1963-73: §§ 323, 378-392) shows a similar list of OE verbs which take dative or genitive but not accusative.

²⁰ Furthermore, the common object case (= [ACC]) in MnE, which was mostly accusative in OE (if the relevant NPs have their counterparts in OE), can be considered less oblique than prepositional dative (= [DAT]) and genitive (= [GEN]), which are usually represented by *for+* or *to+*NP phrases and *of+*NP phrases, respectively (i.e. periphrastic dative and genitive (Mustanoja 1960: 74, 95)), because the direct

Thus, there is a general hierarchy among the NP arguments with respect to the likelihood of their being selected by a verb or appearing as a verbal argument, which is directly related to their centrality in the relationship expressed by the verb.²¹ This tells us that other things being equal, the less oblique (in its morpho-syntactic case) an NP is, the more general it is in its distribution. For example, a subject NP of the nominative case is mostly likely to appear in any sentence. Even though we can find impersonal constructions which don't have a subject (more precisely, a nominative NP) in languages such as OE, this seems to be still true. In the same way, an object NP of accusative case was much more general in its appearance than other object NPs of more oblique cases like dative and genitive.

Furthermore, this seems to be compatible with our general observation about OE P-V CVs: other things being equal, a less oblique case is favored over a more oblique case.²² Also, in many languages such as English and German, most verbs (and prepositions as well) which used to govern a genitive NP object now either take a less oblique case or have been replaced by more widely used alternative expressions (Hammer 1991: 369, 444). This general tendency to less oblique expressions is closely related to the behavior of OE P-V CVs.

On the other hand, it seems to be generally acknowledged that verbal arguments are less oblique than prepositional arguments in the sense that they are more central for the relationship expressed by the head (i.e. verb) of a sentence and more likely to be selected by the head. In the same way, in MnE, prepositional phrases (PPs) are usually less central and often optional and prepositional arguments are more difficult to passivize than verbal arguments. This seems to be still true even when along with a verbal argument a PP can be selected as a complement by the head verb, as in *John gave a book to Mary*, because for many native speakers, the omission of the PP (*to Mary*) is more tolerable than that of the verbal argument (*a book*), not to mention the difference in passivization.

Moreover, among prepositional NP arguments, NPs indicating 'time' (e.g. *at the time*) are very difficult to passivize or to move out of PP leaving their governor (i.e. preposition) stranded in *wh*-relative clauses, whereas NPs indicating 'place' are relatively easy to passivize or to move with the resultant prepositional stranding in *wh*-relative clauses (e.g. *The room was slept in*).²³ This resistance to being passivized seems to be closely related to the obliqueness of an NP, because prepositional arguments indicating 'place' are less oblique than those indicating 'time' in the sense that the former can be selected by some verbs such as *put*, while few verbs subcategorize for the latter.

object is much more likely to be selected by V and also because when an NP [ACC] (usually as a direct object) and a PP [DAT/GEN] occur together, unlike the NP [ACC], which is obligatory and almost always passivizable, the prepositional dative (or genitive) is often optional and not passivizable.

²¹ One may think about an obliqueness hierarchy including other arguments of a verb such as clauses, infinitive phrases, etc. This is a subject for further research.

²² Note also that even though OE has many prepositions which can take either accusative or dative, in most cases, they tend to take dative rather than accusative, whereas many P-V CVs tend to take accusative rather than dative, even with a P which usually takes dative as a preposition. This difference suggests that the prepositional argument is very oblique and that once it is accommodated into the new argument structure of a P-V CV, what is important is the relative obliqueness among the arguments involved and its maintenance, but not the absolute (or formal) obliqueness, that is, the original case form.

²³ For the difference in prepositional stranding, compare *This is the place which I ate dinner at* with *??This is the time which I ate dinner at*.

In short, it seems clear that the property Ω , which makes possible the strict distinction among OE NPs with respect to their cases and governors, is closely related to the obliqueness of NPs. In particular, this relationship between the property Ω and obliqueness is most vividly revealed in passivization. Thus, in terms of obliqueness, we can describe the distinction among OE NPs with respect to the property Ω : the less Ω an NP is, the less oblique it is.²⁴ Finally, in terms of the notion of obliqueness, the distinction among OE NPs can be generalized as follows: first, accusative NPs are less oblique than dative or genitive NPs, and second, regardless of cases, verbal arguments are less oblique than prepositional arguments. On the basis of this generalization about OE NPs and their obliqueness, I propose the following 'Obliqueness Hierarchy (OH)' among OE NP arguments with respect to their cases and governors:

- (14) Obliqueness Hierarchy of Morphological Cases among OE NP arguments²⁵
- a. Nom (subject) < Acc < Dat < Gen (< Instr.)
 - b. Verbal arguments < Prepositional arguments

3.3. The Maintenance of the Obliqueness Hierarchy in P-V Compounding

Compounding, in this paper, is defined as "the creation of new words through a more syntactic combination of pre-existing (full) words" (Anderson 1992: 399). This typical definition, above all, means that the original fundamental syntactic and semantic relationship which holds between the two relevant component elements (i.e. V and P) of a P-V CV is maintained after compounding. That is, even though compounding can often involve some change in the syntactic or semantic relationship between two components, the change usually means a certain degree of abstractness but not a change in the original core relationship itself. Thus, we define P-V CVs in OE as compounds that result from combining an independent preposition and an independent verb.

As noted in section 1.2, when P and V combine to form a P-V CV, the original NP object of P can become part of the arguments of the CV. In this case, a given complex word can be considered a P-V CV only when the prefix has a pre-existing counterpart preposition which is closely related in form and meaning, while the basic meaning of the simplex verb is maintained. Furthermore, an argument of CV can be said to come from P only when we have enough evidence for the original subcategorization of that NP argument by P in terms of their semantic relationship and in many cases, the case government as well, and when it is clear that the argument does not come from the simplex verb. What this means is that at least in the case of P-V CVs, in order to say anything reasonable about the inheritance of an argument and its case, the basic pattern of the semantic relationship expressed by V and P should be maintained after V and P

²⁴ One might be against my relating or identifying the property Ω with obliqueness. But what is crucial is not the relationship between Ω and obliqueness but the fact that there is a very strict two-way distinction among OE NPs with regard to their cases and governors, which is clearly revealed in passivization, and that, if necessary, 'obliqueness' in this paper can be used for referring to the property Ω , which makes possible such a distinction.

²⁵ Case₁ < Case₂ means that Case₁ is less oblique than Case₂. The distinction in obliqueness between dative and genitive is not as clear as the distinction between accusative and other object cases. The hierarchy (Dat < Gen) mainly reflects the relative frequency of each case and relative passivization possibility. This seems to be also the case between MnE prepositional dative (*to* NP) and genitive (*of* NP).

combine to become a P-V CV even if the CV comes to have a degree of abstract or figurative meaning through compounding. This is because only when there is a sufficient degree of transparency in the semantic and syntactic structure can there be an objective criterion for determining the inheritance of the argument (and its case) in OE P-V CVs.²⁶

Note that in spite of the inconsistent encoding of kinds of meaning or grammatical relationship in OE object cases, the distinction among cases or the relative obliqueness of NPs encoded in cases is very systematic and regular, because, as we already have seen, this difference in obliqueness among NPs is unexceptionally applied in determining the passivization possibilities of NP arguments. Thus, it is very likely that the obliqueness of NPs is more likely to be maintained in P-V compounding than any other semantic information.

There are several other reasons why the compounding of V and P in OE would not change the fundamental semantic relationship, especially the relative obliqueness among NPs. Above all, as we already considered, prepositional arguments are more oblique than verbal arguments regardless of the cases involved. Then, it would be very unlikely for a transitive verb to subcategorize for (as its original complement) an argument which is less central for the meaning involved while through compounding inheriting a more central argument from other less central parts of a given sentence. On the contrary, the original argument of a simplex verb should still be more important or central for that verb and less oblique than the inherited prepositional argument even after V and P combine to form a P-V CV as long as the basic pattern of the original semantic structure is maintained. This conclusion would be more plausible if we consider that there was a higher degree of semantic and/or morpho-syntactic transparency in OE P-V CVs than in MnE P-V CVs.²⁷

In this connection, there is one important thing about maintaining the obliqueness hierarchy (OH) among NPs especially when V inherits its second argument through P-Vt compounding. The obliqueness of an NP is encoded in its morphological case and the OH among NP arguments of the same governor is determined solely by their morphological cases, whereas a verbal argument is less oblique than a prepositional argument, regardless of their morphological cases. Thus, if an argument of P is inherited into the new argument structure of a P-Vt CV, then the OH between the (less oblique) original verbal argument and the (more oblique) original prepositional argument should be maintained in the new argument structure and, therefore, the case of the inherited prepositional argument should be appropriate in order not to change the original relative obliqueness between the two NP arguments. I believe that what is important here is maintaining the OH between the two NP arguments rather than preserving the original (surface) case of the prepositional argument, as we will consider later in this paper.

Most importantly, all the characteristics of OE NPs and their behavior so far considered are determined and controlled by the head (V). This is because it is the head itself that represents the syntactic and semantic relationship in question including the OH among its relevant arguments, and encodes the relationship in its NP arguments.

²⁶ This might seem to be circular, but it is not, because my argument is based on morphology. Above all, what is clear is that only when there is a sufficient degree of transparency, at least, in the meaning of V and P, can we reasonably say anything about the subcategorization inheritance in P-V CVs. Otherwise, any argument about the contribution of nonheads (P) would be meaningless.

²⁷ See Ogura (1995) for a discussion of some evidence about the transparency of OE P-V CVs.

especially through their morphological cases, by subcategorizing for relevant arguments of particular cases. This means that the head of OE P-V CVs has more significance than we have often assumed and suggests that the contribution of nonheads in the subcategorization inheritance and the case government in OE P-V CVs can be explained under the traditional notion of the head by more properly reflecting the properties of the head as they are rather than providing an arbitrary definition of the head.

As for OE morphological cases and their inheritance in P-V CVs, in particular, if a certain case is not marked for a verb in its subcategorization and is less oblique than the case marked for the same verb in the lexicon, then the case in question is very likely to be negative in the sense that it does not occur with the given verb even through P-V compounding, as long as the compounding does not involve any significant change in the original fundamental syntactic and semantic relationship between the NP arguments involved.²⁸ Thus, along with the OH in (14), I propose the following re-interpretation of the notion of the head with respect to the case feature:

(15) Re-Interpretation of the Case Feature (> Enriched Notion of the Head)

- a. Any morpho-syntactic case (of an argument of a verb) which is unmarked in the subcategorization of a verb is *negative* if it is *less oblique*, and *potential* if it is *more oblique* than the morpho-syntactic case of an argument which is specified as a marked value in the subcategorization of the given verb.
- b. Informal Redefinition of the Argument Structure of OE Verbs²⁹
 - (i) Auxiliary Verb [SUBCAT < NP [+nom], +VP >]
 - (ii) $V_i = V$ [SUBCAT < NP [+nom] >]
 $= V$ [SUBCAT < NP [+nom], ((NP [ζ_{acc} / ζ_{dat} / ζ_{gen}])) >]
 - (iii) $V[acc] = V$ [SUBCAT < NP [+nom], NP [+acc] >]
 $= V$ [SUBCAT < NP [+nom], NP [+acc], ((NP [ζ_{dat} / ζ_{gen}])) >]
 - (iv) $V[dat] = V$ [SUBCAT < NP [+nom], NP [+dat] >]
 $= V$ [SUBCAT < NP [+nom], NP [+dat], ((NP [-acc, ζ_{gen}])) >]
 - (v) $V[gen] = V$ [SUBCAT < NP [+nom], NP [+gen] >]
 $= V$ [SUBCAT < NP [+nom], NP [+gen], ((NP [-acc, ζ_{dat}])) >]

²⁸ This is mainly because P-V compounding can help a relevant verb to inherit a more oblique prepositional argument at most, as long as some other more important factor is not involved. In this connection, note that although a prepositional dative (e.g. *to NP* [DAT]) can be added to the MnE structure 'V + accusative NP' (e.g. *told the story* [ACC]), as in *John told the story to Mary*, the accusative *the story* cannot be added to the MnE structure V + prepositional dative (e.g. *spoke to Mary* [DAT]), as in **I spoke to Mary the movie*, in which the prepositional genitive *about the movie* [GEN] is acceptable, as in *I spoke to Mary about the movie*.

²⁹ The double parentheses indicate that relevant case features are specified but unmarked, inverted question mark (ζ) means that relevant cases are not realized yet but are potential, and finally, the plus (+) and minus (-) indicate marked and negative cases, respectively.

For the representation of the subcategorization list of OE verbs, I generally follow the framework of Head-Driven Phrase Structure Grammar (HPSG) in the version of Pollard & Sag (1987, 1994). Note that although HPSG has no treatment of 'potential (case) features', there is nothing incompatible with such a proposal in that framework.

- (vi) Impersonal Verb [SUBCAT < (NP [-nom, + α]) >]
 = V [SUBCAT < (NP [-nom, + α]), ((NP [- β , $i\delta$])) >]
 where [- β] < [+ α] < [$i\delta$].

In addition, in order to make the above two proposals (i.e. the OH and the enriched notion of the head) effective in the compounding of OE verbs and prepositions and, more than anything else, to secure the priority of the head, I propose the following 'feature conservation hypothesis' (FCH) in P-V compounding.³⁰

(16) Feature Conservation Hypothesis in P-V Compounding

- a. No feature can be added to or subtracted from the original features of the head.
- b. 'Feature changing' should be the realization of an unrealized potential feature which is already specified as an unmarked value in the head.

The FCH, along with the OH and the enriched notion of the head, produces the following results in connection with the subcategorization inheritance in OE P-V CVs. First, the above three concepts will provide a reasonable justification for the subcategorization inheritance and so-called argument composition as well, which often seems to have been employed as a convenient mechanism for the formalization of some problematic linguistic phenomena without providing any principled explanation. Thus, the OH and an enriched notion of 'head' give us an explanation of why and how the head can inherit the arguments of a nonhead.

Second, the FCH can then become one of the principles which constrain the subcategorization inheritance (or argument composition), which otherwise doesn't seem to have any well-motivated constraints. Thus, as far as compounding of OE P-V CVs is concerned, the subcategorization inheritance (or argument composition) should be allowed only when it does not violate the FCH.

Finally and most importantly, our hypothesis can provide a principled account of the subcategorization inheritance and case government in OE P-V CVs: it explains the contribution of a nonhead without weakening the priority of the head. As a matter of fact, it will consolidate the priority of the head. Note also that the approach proposed here is compatible with Lieber's (1992) and Kim's (1997) proposals and their formalization *and* can deal with the problem (i.e. the selective case inheritance in P-Vt CVs) found in their accounts.

In the next section, by examining many relevant OE verbs and sentences, I will demonstrate that my proposal is strongly supported by the extant OE data. In particular, I will show how my alternative approach based on the relative obliqueness (which I call the 'obliqueness hypothesis') can answer several interesting questions about the behavior

³⁰ In fact, the FCH can be considered the implementation of the OH and the enriched interpretation of the case feature and it can be subsumed under a similar but more general assumption which can be found in many syntactic frameworks. For example, the Projection Principle of Government-Binding (GB) theory requires lexical properties to be projected to all levels of syntactic representation (Horrocks 1987: 99), and the Head Feature Principle and the Subcategorization Principle play a role in HPSG theory roughly comparable to that of the Projection Principle of GB.

of OE CVs, including the peculiar case government in *wipbregdan*, *wipcwēpan*, and *wipstandan*, which do not seem to be answered satisfactorily in any previous studies.

4. Verifying the Obliqueness Hypothesis

4.1. Negative Evidence

One clear prediction from the hypothesis proposed so far is that if a simplex verb subcategorizes for only (an NP of) dative or genitive case in the lexicon, then it does not inherit accusative through compounding. Thus, a P-V CV formed by that verb and a preposition will not take accusative either, because accusative is less oblique than either dative or genitive.

In order to verify this prediction, I examine the OE simplex verbs which are specified for genitive on the one hand, and those which governs dative or genitive on the other. My list of dative- or genitive-taking verbs comes from Mitchell (1985: §1092), in which Mitchell says that his list aims at completeness.³¹ I consider every genitive- or dative-governing simplex verb in the list and checked all the relevant verbs in Bosworth & Toller (1898) (BT), Toller (1908-21) (BTs, henceforth), Campbell (1972) (BTe, henceforth), and Hall (1960) in order to see if any of them combines with a preposition to form a CV which takes a less oblique case than the case specified for the original simplex verb.

In the explanation of derived P-V CVs, I include derived monotransitive P-V CVs. This is because although monotransitive P-V CVs can mean that V is used as intransitive or that P is used just adverbially, the relevant derivation or compounding can also mean that the original prepositional object is overt while the original verbal object is implicit just as a transitive verb can be used absolutely.

As for the question of what prefixes should be dealt with as prepositions, I generally follow the criteria suggested in de la Cruz (1975) and Mitchell (1978). Thus, I assume that the prefix (P) of the P-V CV is a preposition (only) when it has the same form as an independent preposition and its meaning is (etymologically) related to that of the corresponding preposition. Note that this implies it should be clear for the relevant NP argument selected by the whole P-V CV to come from the P.³²

³¹ See the appendixes for the list of the verbs and their derivational complex verbs, along with the relevant explanations. Mitchell (1985) has about 180 verbs which take dative or genitive and among them there are 112 simplex verbs, which I examine in this paper.

³² In particular, de la Cruz (1975: 47) treats the prefixes *on-* and *to-* as inseparable prefixes since they have no etymological prepositional counterpart and Mitchell (1978: 246) also treats the prefix *to-* as an inseparable prefix because there is no corresponding phrasal use of the simple verb + preposition and also because the corresponding complex word is different in meaning from combinations of the simplex verb and the preposition.

On the other hand, although de la Cruz (1975) treats *be-* as an inseparable, non-prepositional prefix since it often gives an intensification to a verb or has a privative sense, the prefix shows the same or similar semantic and syntactic contribution as the corresponding preposition *be* in many instances (e.g. *be-bindan* 'to bind about', *be-cidan* 'to complain of', *be-faran* 'to go around', *be-licgan* 'to lie around', *be-sittan* 'to sit around', *be-smeagan* 'to consider about', etc.). Similarly, although the prefix *on-* is often meaningless and mostly corresponds to Old High German *int-* (or German *ent-*), which expresses the idea of escaping, going away, or removing sth (Hall 1960, BT), we can also find many instances of the prepositional prefix *on-* with the meaning of the preposition *on* '(up)on, onto, against, toward, in respect to, or according to'

Some interesting results from the investigation of the target data are the following. Above all, as expected from the proposed hypothesis, it was found that most of the target verbs do not make many compound or complex verbs. In fact, as we can see in the list given in the appendixes, they usually have no more than one or two derivational complex verbs, which in most cases are not P-V CVs but just combinations of an inseparable prefix (e.g. *a-*, *ge-*, *mis-*, etc.) and a given simplex verb. This becomes more interesting if we note that many intransitive or accusative-governing simplex verbs form a lot of complex verbs, many of which are P-V CVs, as in the following:³³

(17) OE Intransitive and Monotransitive Verbs and Their Derivational Complex Verbs

a. Intransitive Verbs

(i) *cuman* 'to come'

a-, *an-*, *be-*, *for-*, *fore-*, *forþ-*, *ge-*, *in-*, *of-*, *ofer-*, *ofer-be-*, *on-be-*, *ongean-*,
þurh-, *to-*, *to-be-*, *under-*, *up-cuman*

(ii) *cweþan* 'to say, speak' (also as a transitive verb)

a-, *æfter-*, *be-*, *bi-*, *for-*, *fore-*, *ge-*, *hearm-*, *on-*, *onbe-*, *onge-*, *to-*, *wiþ-*, *wearg-*,
wiþer-, *yfel-cweþan*

(iii) *faran* 'to travel'

a-, *be-*, *for-*, *forþ-*, *ge-*, *geond-*, *in-*, *of-*, *ofer-*, *on-*, *oþ-*, *þurh-*, *to-*, *ut-*, *wiþ-*,
ymb-faran

(iv) *gangan* 'to go'

a-, *æt-*, *be-*, *bi-*, *for-*, *fore-*, *forþ-*, *ful-*, *ge-*, *in-*, *of-*, *ofer-*, *on-*, *ongean-*, *þurh-*,
to-, *under-*, *up-*, *ut-*, *wiþ-*, *ymb-*, *ymb-gangan*

b. Monotransitive Verbs

(i) *don* 'to do, make'

a-, *be-*, *for-*, *ge-*, *in-ge-*, *of-*, *of-a-*, *ofer-*, *on-*, *on-ge-*, *oþ-*, *to-*, *to-ge-*, *un-*,
under-, *up-a-*, *ut-a-*, *wel-*, *yfel-don*

(ii) *habban* 'to have'

a-, *æt-*, *be-*, *for-*, *ge-*, *of-*, *on-*, *wiþ-*, *wiþer-*, *ymb-habban*

(iii) *healdan* 'to hold'

a-, *æt-*, *an-*, *be-*, *for-*, *ge-*, *mis-*, *of-*, *ofer-*, *on-*, *oþ-*, *to-*, *ymb-healdan*

(iv) *settan* 'to set, place'

a-, *an-*, *be-*, *bi-*, *for-*, *fore-*, *ge-*, *in-*, *of-*, *ofer-*, *on-*, *to-*, *un-*, *wiþ-*, *ymb-settan*

(e.g. *on-a-sendan* 'to send into', *on(be)blawan* 'to blow upon/into', *on-bugan* 'to yield to, bow to', *on-hlinian* 'to lean on', *on-sawan* 'to introduce into', *on-sittan* 'to seat oneself in', *on-wadan* 'penetrate into', etc.). Thus, this paper will treat *be-* and *on-* as prepositional prefixes when it is clear that they are closely related to the corresponding prepositions in their semantics or when the complex words (i.e. *be-V* or *on-V*) have the corresponding phrasal counterparts (i.e. *V+be* or *V+on*).

³³ Note also that the productivity of a *Vi* and *Vt* in compounding can also be predicted by the proposed hypothesis. For example, a *Vi* has as its SUBCAT value 'V [SUBCAT < NP [+nom], ((NP [_iacc / _idat / _igen])) >]' and so it has an accusative, dative or genitive NP as its potential argument, which can be provided by almost any OE preposition and its object NP without destroying the original relative obliqueness among the NP arguments involved.

Second, there are a few derivational complex verbs or P-V CVs which may appear to take a less oblique case (i.e. accusative) as a monotransitive verb (V[acc]) or a ditransitive verb (V[dat/gen, acc]). However, none of them are problematic, because their simplex verbs take genitive or dative only when they have a special (non-default) meaning while, with a default meaning, they are mainly used as a transitive verb [acc], which in fact participates in the compounding in question. For example, the simplex verb *þicgan* [gen] has *op-þicgan* [acc, dat] and this may seem to be a counterexample since the P-V CV takes less oblique cases than the genitive case for the simplex verb. However, the simplex *þicgan* takes genitive when it means 'to partake of sth' but, with the (default) meaning 'to take', it is used as a transitive verb [acc]. Furthermore, the accusative NP argument of the P-V CV comes from the latter use of the simplex verb, which is clear from the meaning of the P-V CV *op-þicgan* 'to take sth [acc] from sb [dat]'.³⁴

Another interesting point in this connection is that the OH is also generally observed in most complex verbs which are not P-V CVs but come from the combination of an inseparable prefix and a genitive- or dative-governing simplex verb. Thus, as long as the basic semantic relationship expressed by the simplex verb is maintained after compounding, those complex verbs (e.g. *mis-limpan* [dat] 'to turn out badly for someone' from *limpan* [dat] 'to happen to someone') at least have a strong tendency to avoid taking or composing a less oblique case by usually taking genitive or dative. This seems to be because the syntactic and semantic relationships expressed by those simplex verbs are not appropriate for subcategorizing for or inheriting any less oblique object than the ones which are originally selected by the simplex verbs.

On the other hand, if we should find a P-V CV[dat, acc] which comes from V[dat] and P[acc] or a P-V CV[gen, acc] which comes from V[gen] and P[acc], this would be a real counterexample. Such P-V CVs could come from the compounding of P[acc]/(dat)/(gen)] and either Vt[(dat)/(gen)] or Vt[acc]/(dat)/(gen)]. However, none of dative- or genitive- only-governing verbs (i.e. Vt[(dat)/(gen)]) form any such P-V CVs. Furthermore, I have examined OE verbs which can take accusative and genitive at same time on the one hand and OE verbs which can take accusative and dative at the same time on the other. The target OE verbs are collected from Visser (1963-73: §§679, 682, 696).³⁵ Visser has about 76 OE verbs [acc, gen] (or [gen, acc]) and about 253 OE verbs [acc, dat] (or [dat, acc]). Among the verbs [acc, gen], no CVs are to be found which come from a preposition and a simplex verb.³⁶ Among the verbs [acc, dat], there are some P-V CVs whose simplex is not ditransitive; however, there are no P-V CVs which come from P[acc] and V[dat].

Thus, the results of the investigation of the relevant OE verbs are compatible with the predictions from the proposed hypothesis. They show that there are no verbs [dat/gen] which combine with a preposition [acc] to make a P-V CV [dat/gen, acc] and this strongly suggests that OE has, at most, a very small number of P-V CVs [dat/gen, acc]

³⁴ For potentially problematic cases and their accounts, see the appendices.

³⁵ Mitchell (1985) does not include verbs [dat, acc] in his list of verbal rections (§1092) but refers to Visser (1963-73).

³⁶ About 20 verbs [acc, gen] have a prefix whose form is similar to an independent preposition. That is, there are about 16 verbs [acc, gen] which consist of *be-* and a verb (e.g. *be-dælan*, *be-hatan*, *be-niman*, etc.) and 5 verbs [acc, gen] which consist of *on-* and a verb (*on-cunnan*, *on-munan*, *on-sacan*, *on-secan*, and *on-wendan*). The prefixes *be-* and *on-* in all those verbs, however, are used as inseparable prefixes, which are usually privative or just meaningless.

which come from a preposition [acc] and a simplex verb [dat/gen]. Most importantly, all the above facts constitute strong evidence for the obliqueness hypothesis, which says that genitive- or dative-governing simplex verbs are not compatible with an NP argument which is less oblique than the NP arguments that they originally subcategorize for.

One might justifiably argue that not only do we not have intuitions about OE, but also that the extant OE data are not complete enough to prove any principle or rule like the obliqueness hypothesis. In fact, Mitchell (1985) and Visser (1963-73), even though they are among the most extensive collection of the relevant data at present, would not exhaust any type of OE verbs which we must examine for verifying the proposed hypothesis. Furthermore, my investigation of those verbs is mainly based on the above two books, as well as BT, BTs, BTe, and Hall (1960). However, the negative evidence provided in this section (i.e. the results from the investigation of OE verbs [dat/gen], verbs [acc, gen], and verbs [acc, dat]) is strong enough for us to conclude that the obliqueness hypothesis based on the OH and the FCH is at least a strong tendency in OE verbs and their subcategorization inheritance, because the hypothesis turns out to be valid for the large set of OE verbs which are available at present. More importantly, there is no reason to give up the priority of the head in our account of the subcategorization inheritance of OE P-V CVs unless we find sufficient evidence from further OE data that the contribution of nonheads cannot be explained on the basis of the properties of the head itself.

4.2. Positive Evidence and Choosing from More Than One Case

4.2.1. Monotransitive P-Vi CVs Whose Simplex Verb is Intransitive

Many OE P-V CVs are formed from a preposition and an intransitive verb. In fact, this kind of P-V CV is not characteristic of OE because even in many other languages including MnE there are many P-V CVs of this type (e.g. *overcome*, *overlay*, *overlap*, *overshine*, *overspread*, *undergo*, *underlie*, *underline*, *underpass*, *underwrite*, etc.). In this case, as already discussed in section 2.2, the contribution of a nonhead to the subcategorization inheritance of the whole CV can be explained very easily without giving up the priority of the head. Thus, Selkirk (1982) and Di Sciullo & Williams (1987) would say that P is the head since they define the head as the rightmost constituent of a word which is specified for the property in question (i.e. the subcategorization of the NP object and its case).

On the other hand, according to the alternative approach, i.e. the obliqueness hypothesis, the head is still the simplex verb and the contribution of a nonhead is explained by the subcategorization of the head verb, which originally has the potential of inheriting an argument which is more oblique than the markedly specified argument. Thus, in the case of P-Vi CVs, the Vi subcategorizes for some potential but unrealized argument as well as the marked subject NP[nom] and when it is required to inherit an additional argument through compounding, it chooses a potential argument of a certain morphological case from the nonhead P, mainly depending on the grammatical function and meaning it encodes.³⁷

³⁷ In her discussion of OE P-Vi CVs, Kim (1997: 46) says that as for *begangan* and *ymbgan*, although the dative case is taken by the corresponding preposition, the extant data do not show any instances of dative case for those compounds but they show only instances of accusative case, another case governed by the preposition. It seems to be generally true that other things being equal, the accusative case is favored over other oblique cases. This general tendency in fact reflects the obliqueness hierarchy proposed in this paper.

The account of the subcategorization inheritance in P-Vi CVs may not seem to be very interesting since at first glance there does not seem to be much difference between the obliqueness hypothesis and other headness-based approaches. That is, Selkirk (1982) and Di Sciullo & Williams (1987) may also seem to explain the contribution of a nonhead (more precisely, the 'head' for them). However, there are some serious problems in their approaches. Above all, their approaches are based on the ad hoc redefinition of the head, which would very conveniently identify the head of one and the same complex word in several different ways depending on the relevant features. The definition of the head in this way may turn out to be a tautology. Thus, it cannot explain our intuition about the headness that no matter which element decides some specific feature(s) in P-V CVs (i.e. in spite of some contribution of nonheads), it is still the simplex verb that is the head and the preposition is still just a nonhead prefix.

As a matter of fact, we don't have to resort to such an arbitrary redefinition of the head, which will bring about other subsequent problems, as in the percolation of the head features from a different head depending on the relevant feature(s), nor do we need to be grudgingly satisfied with a nice-looking but unjustified formalization which mainly serves to give the head (V) nominal priority. In fact, the obliqueness hypothesis can deal with even more difficult cases such as P-Vt CVs, in which both members of the CV contribute to the subcategorization inheritance. This is possible by better understanding the properties of 'headness' and the relevant head.³⁸

4.2.2. Ditransitive P-Vt CVs Whose Simplex Verb is Monotransitive

The explanation of ditransitive P-Vt CVs formed from a preposition and a monotransitive simplex verb is more interesting. Although this type of compounding is not very common in OE, it is found in other languages including Greek and Latin as well as OE has some clear instances of P-Vt CVs formed by such compounding. Such P-V CVs provide us with very interesting positive evidence for the obliqueness hypothesis. Consider the following examples:

(18) *wiþ-metan* vs. *metan*

- a. Hwylcum hiġspelle *wiþmete* we hiġ?
 which parable [dat] compare we it [acc]
 'which parable shall we compare it with?'

(Mk. Skt. 4.30 [BT: 1254])

However, note that all the CVs which, she says, take accusative only in her examples describe motion rather than state, and also note that we find many P-Vi CVs which do not take accusative even though P can take accusative as well: for example, *wiþ-faran* [dat], *wiþ-springan* [dat], *wiþ-licgan* [dat], *ymb-fleagan* [dat], *ymb-springan* [dat], etc. (Visser 1963-73: 648-657).

³⁸ Note that Kim's (1997) approach adopting argument attraction, as is shown in (9), cannot be properly applied to the complex verbs which have a non-prepositional, (sub)category- or valence-changing prefix because there is no argument attraction from a nonhead (i.e. inseparable prefixes such as *a-*, *ge-*, *to-*) involved in such complex words. In this connection, it is important to note that as long as the original semantics of the simplex verb is not altered, the relative obliqueness among NP arguments tends to be maintained even when a simplex verb combines with an inseparable, non-prepositional prefix (e.g. *a-bitan* or *on-bitan* 'to taste of sth [gen]' from *bitan* 'to bite/tear sth [acc]').

- b. (i) To *metenne wip ðæt mod*
 to measure with that mind [acc]
 'to measure/compare with that mind' (Bt. 16.2. Fox. 52.6 [BT: 681])
- (ii) Ne *sinthi no wip eow to metanne*
 nor are they [nom]not with you [acc/dat]to compare
 'they are not to be compared with you'
 (Bt. 13. Fox. 40.10 [BT: 681])
- c. þu *gedydest ðætwe metan ure land mid rapum.*
 you caused thatwe measure our land [acc] with cords [dat]
 'you caused us to measure our land with cords'
 (Ps. Th. 15.6 [BT: 681])

Examples (18b) and (18c) show that *metan* 'to measure, compare' usually takes an accusative NP and often occurs with a preposition *wip* or *mid* 'with' and a prepositional object NP, which is usually accusative or dative. When the simplex verb *metan* combines with the preposition *wip* to make a P-Vt CV, as in (18a), the whole P-Vt CV *wip-metan* 'to compare/measure one thing[acc] with/by another[dat]' becomes ditransitive and always takes accusative and dative. Here, we can clearly see that one of the two (non-subject) NP arguments in (18a) comes from P (nonhead) and that this prepositional argument is the dative NP but not the accusative NP because it is what something is compared with. What is interesting is that although the prefix *wip* as a preposition can take accusative, dative, or genitive, the P-V CV *wip-metan* only takes accusative and dative on its two objects, as in (18a).

None of the approaches we considered in section 2 seems to be able to provide a reasonable account of this subcategorization inheritance in *wip-metan*. For example, Kim (1997) and Lieber (1992) would say that the dative NP comes from P (*wip*) and it is inherited or composed by the head V (*metan*) of the whole CV. However, they would not be able to explain why the P-V CV only takes [acc, dat] even though [acc, acc] should also be logically possible. This means that there is much still to be explained about the mechanism of subcategorization inheritance, especially how the subcategorization inheritance is constrained and what role the head plays in that process.

The obliqueness hypothesis, on the other hand, very easily explains this phenomenon without weakening the priority of the head or resorting to an ad hoc and arbitrary redefinition of the head. That is, the simplex verb *metan*, whose case feature can be described as $V[+nom, +acc, \zeta dat, \zeta gen]$, has the potential for inheriting a more oblique argument than its original accusative argument, and thus it comes to choose dative from among the actually possible options (i.e. [acc] and [dat]).³⁹

Now let's consider another set of examples, in which the simplex verb *metan* combines with the preposition *be* 'by, in reference to' to make the P-Vt CV *be-metan* 'to measure one thing by another':

³⁹ The extant OE data seem to show that when the preposition *wip* occurs with *metan*, it only takes accusative or dative but does not take genitive even though it is possible in other cases. For the case government of the preposition *wip*, refer to BT, BTs, and Mitchell (1985).

(19) *be-metan* vs. *metan*

- a. *þæthy na sibþan nanes anwealdes by ne*
 that they not afterwards not-any power [gen] themselves [acc]neither
bemetan, ne nanes freodomes,
 measure-by nor not-any freedom [gen]
 'that afterwards they did not consider themselves
 (possessed) of any power, nor of any freedom'
 (Mt. Bos. 62.11 [BT: 82])
- b. *þæthy heora miclan anwealdes and longsuman hy sylfe*
 that they their great power [gen] and lasting themselves [acc]
sibþan wip Alexander to nahte [ne] bemetan,
 afterwards against Alexander at nothing measure-by
 'that, in the respect of their great and lasting power,
 afterwards they estimated themselves at nothing against Alexander'
 (Mt. Bos. 65.39 [BT: 82])
- c. *Se sweg wæs be winde metan*
 the sound [nom] was by wind [dat] measured
 'the sound was compared to/measured by the wind'
 (BIHom. 133.31 [BT: 681])

As we considered in (18), the simplex *metan* takes accusative, which is also confirmed in (19c) since in OE only an accusative object NP could be a passive subject, and the preposition *be* 'by, in reference to' almost always takes dative, as in (19c), and occasionally takes accusative but never takes genitive.⁴⁰ Furthermore, the ditransitive P-Vt CV, which comes from the simplex *metan* and the preposition *be*, always takes accusative and genitive at the same time, as in (19a, b). What is interesting here is that although we expect the genitive case to come from P, the extant OE data do not show any example in which the corresponding preposition *be* takes genitive. Consider the following examples, in which some specific case taken by a P-V CV does not come from either the simplex verb (V) or the preverb (P):

(20) *on-cweðan* vs. *cweðan*

- a. (i) *þæthio hære cwene oncweðan meahton*
 thatshe the woman [dat/gen] speak-with-respect-to could
swa tiles, swa trages,
 such good [gen], such bad [gen]
 'that she could answer the woman with respect to
 either such a good thing or such a bad thing'
 (Elene 324 [Visser I: 610])
- (ii) *Drihten spræc ... Abraham Metode oncwæð,*
 the Lord spoke ... Abraham to God [dat] spoke-in-response
 'the Lord spoke ... Abraham said to God in response'
 (Gen. 2303 - 2345 [BT: 667])

⁴⁰ See Mitchell (1985: §§1183-4). Note also that, when it is an inseparable prefix, *be-* is usually privative or meaningless and never means 'by, in the respect of'.

- b. Him þa word hi cweðað,
 him [dat]the words [acc] they speak
 'they say the words to him' (Exon. 13b. Th. 25.15 [BT: 178])
- c. cweð ðæm eorð-crypple: aris.
 spoke to the crippled [dat]
 'I spoke to the crippled man' (Lindisf. Gosp. Mt. IX. 6 [Visser I: 289])
- d. on [acc/dat/?gen] 'upon, with respect to, in accordance with'⁴¹
- (21) *on-leon* vs. *leon*
- a. þa he þæs wæpnes onlah seþran sweord-freca:
 whenhe the weapon [gen] gave-the-loan-of(the) better sword man [dat]
 'when he lent that weapon to the better swordsman' (Beo 1467)
- b. Næs þæt þonne mærost mægen-fultuma,
 not-was thatthen the least mighty aid
þæt him on ðearfelah ðyle Hroðgares;
 that him [dat] in need lent spokesman of Hrothgar
 'then it was not the least of the might aid,
 that Hrothgar's spokesman lent him in need' (Beo 1455-6)
- c. Min lond þe ichæbbe, and me God lah
 my land [acc] that I have, andme [dat] God lent
 'my land that I have, and God lent me'
 (Chart. Th. 469.25 [BT: 633])
- d. Lih me þreo hlafas
 lend me [dat] three breads [acc]
 'lend me three loaves of bread'
 (Lk. Skt. Lind. 11.5 [BT: 633])

In the examples (20), *on-cweðan* 'to respond to somebody [dat] with respect to something [gen]' takes dative and genitive at the same time or dative alone, whereas the simplex verb takes accusative and dative at the same time, as in (20b), or separately but it does not take genitive. Thus, one might expect that the second case genitive for *on-cweðan* comes from the preposition *on*. However, the government of genitive by the preposition *on* is not well attested.⁴² In the same way, *on-leon* 'to give somebody [dat] the loan of something [gen]' in (21a) takes dative and genitive while the simplex *leon* does not take genitive but does take accusative and dative. One might try to explain the case government in question by recourse to the comparative method.⁴³ But in this case, there does not seem to be any clear evidence that *on* and its cognates take a genitive object in the Proto-Germanic stage.⁴⁴

⁴¹ See Mitchell (1985: §1178) for cases which are taken by the preposition *on*.

⁴² According to BT, BTs, and Hall (1966), *on* does not take genitive but it only takes accusative, dative, or instrumental. But see Mitchell (1979: 40, fn. 2) for two examples in which *on* might be considered to take genitive.

⁴³ See Kim (1995). *Ofer-stigan* takes accusative or genitive while neither the simplex verb nor the preposition takes genitive. But the Gothic preposition *ufaro*, the cognate of OE *ofer* can take a genitive object, so that one can posit that *ofer* in Pre-English could govern genitive and *ofer-stigan* retains a trace of that behavior.

⁴⁴ The cognates of OE *on* (i.e. Gothic *ana*, Old Low Franconian *an*, Old High German *an(a)*, etc.) take accusative or dative respectively (Old High German *an(a)* sometimes takes instrumental), but do not take

According to the obliqueness hypothesis, the genitive case is allowed in both CVs since the genitive case is more oblique than the dative case which is specified for each simplex verb. Thus, we have two possible accounts: first, diachronically, the preposition in question used to be able to take genitive but with time this use became restricted until finally it does not take genitive any longer; and second (more synchronically), the P-V CVs in question take genitive as the second case since there is no other choice. No matter which position we take, the obliqueness hypothesis is compatible with each option: it can not only accommodate either possibility but also predict and explain it. In this connection, I believe that in general even a historically possible case could be allowed in compounds only when it is compatible with the more general principle like the OH. Thus, the OH is a principle that has diachronic as well as synchronic applications. Note also that the OH is also relevant to MnE, as already considered.

Finally, on the basis of the proposed hypothesis, I will reconsider the question raised about *wip*-CVs in section 1.2 and see how this approach can answer the question. The question is why a particular case is used in a P-V CV when more than one case is logically possible. Consider the following case government patterns for *wip-cweþan*, *wip-bregdan*, and *wip-standan*:

- (22) Case Government of [*wip*-Vt] CVs, [Vt], and [*wip*] ⁴⁵
- a. *wip-bregdan* [dat, (gen)] 'to restrain (sb/sth) [dat] from (sth) [gen]'
 - wip-cweþan* [dat, (gen)] 'to refuse (sth) [gen] to (sb) [dat]'
 - wip-standan* [dat, (gen)] 'to hinder (sb/sth) [dat] with respect to (sth) [gen]'
 - b. *bregdan* [acc/dat] 'to draw, bend'
 - cweþan* [acc, (dat)] 'to say, speak'
 - standan* [(dat)] 'to stand, become'
 - c. *wip* [acc/dat/gen]

The above OE *wip*-CVs show us some peculiar behavior in their case government. When they are used ditransitively, all the CVs in (22) take only [dat, gen] but they fail to take other combinations of cases, even though these are logically possible: [acc, acc], [acc, dat], [acc, gen], [dat, acc], [dat, dat]. How can we explain the case-government pattern in these P-Vt CVs?

According to the obliqueness hypothesis, no CVs can take an argument whose morpho-syntactic case is negative in the subcategorization of its head (simplex verb) through compounding. Thus, even if the nonhead P originally governs a certain case, if that case is less oblique than the marked case specified for the head, then it is negative and therefore cannot be inherited by the head or be percolated to the mother (CV). Note that in all three CVs, the dative case comes from the verb part (V), which is clear from the relevant meaning and the fact that the remaining case is genitive, which can be taken only by the P *wip*. Remember also that V[+dat] is equal to V[+dat, ((-acc, ¿gen))] in our re-interpretation of the case feature. Therefore, the only possible option for the second

genitive (Karg-Gasterstädt & Frings 1968, Balg 1887-1889, and Kyes 1983).

⁴⁵ This is based on Mitchell (1985: §§1092, 1178), Visser (1963-73: §677), BT, and BTs. For the discussion of the three P-V CVs, see Kim (1997).

argument which comes from the P should be the genitive case, which gives the argument structure V[dat, gen] for each P-Vt CV.

Then, why don't the above CVs take [acc, acc], [acc, dat], [dat, dat] or [acc, gen]? This can also be easily explained. Consider the following example again:

(23) *cweðan* and *wiþ-cweðan* (repeated from (5))

- a. in leohtehim þa word cweþað
 in light him [dat] those words [acc] speak
 'they will speak those words to him in glory' (Christ 401)
- b. gif inc hwa ðges wiþ-cweþe
 if you-two [dat] anyone that [gen] contradicts
 'if anyone contradicts you about that' (BIHom 71.1 [BT: 1250])

The argument structures for *cweðan* and *wiþ-cweðan* are "addressee [dat], what-is-said [acc]", and "addressee [dat], what-is-spoken-about [gen]", respectively, which is apparent from the above examples in (23). Note that an addressee generally takes dative. Thus, once the case of the first NP (i.e. the original verbal argument) is determined as dative, the only remaining choice becomes genitive since genitive alone is more oblique than dative and potential in the case feature of the head verb.⁴⁶ Also note that all three *wiþ-*CVs have almost the same semantic and syntactic structure with a little difference in meaning in the verb part. Thus, even though more than one morphological case is logically possible, we can predict the right choice.

5. Summary and Conclusion

In this paper, we have considered the subcategorization inheritance, especially case feature inheritance, in OE CVs and demonstrated that the head of a word has more significance than generally assumed in many morpho-syntactic studies. Starting from the observation about the contribution of nonheads, which is very common but quite abnormal from the standpoint of the traditional notion of the head, we have examined various approaches available in current morphological theories only to find ourselves still

⁴⁶ One might want to treat the case government of *wiþ-cweðan* by means of a mapping from semantics or thematic roles to case categories as an alternative to the obliqueness hypothesis. The case government here, however, is difficult to explain in terms of semantics alone. Above all, the encoding of grammatical or semantic roles by morphological cases is often inconsistent. Note, in this connection, that in OE the same grammatical role or function is often represented by different morphological cases, as noted in (10) and (18). If we ignore this problem, the cases required for the addressee and the theme will exclude [acc, acc], [acc, dat], [acc, gen], and [dat, dat], since a theme or topic tends to take accusative or genitive and an addressee is generally encoded by dative, which is the case with *cweðan* and *wiþ-cweðan*. Yet, this still leaves [dat, acc] and [dat, gen]. Here the OH again helps us to choose between the remaining two by eliminating [dat, acc] which has a less oblique case than the dative case specified for the head verb.

On the other hand, one may try to resolve the problem of choosing [dat, acc] and [dat, gen] by arguing that the variation between accusative and genitive with the same verb is often due to the fact that accusative expresses the whole thing and the genitive a part (Mitchell 1985: §1340). Note, however, that although such a semantics-based account might be compatible with the semantic structure of the CV *wiþ-cweðan*, it is not clear how it could be applied to the semantic structures of other CVs such as *wiþ-bregdan* and *wiþ-standan*. This also makes it difficult to maintain a systematic application of mapping from thematic roles to case categories. See Kim (1997: fn.21) for another criticism on a semantic approach.

facing a dilemma between the contribution of a nonhead and the 'true' priority of the head. In order to remedy this situation, on the basis of the OH (obliqueness hierarchy), derived from the distinction between NP arguments with respect to their cases and governors, the enriched notion of the head, and the FCH (feature conservation hypothesis), we have proposed an alternative approach, in which we can consolidate the priority of the head as well as explain the contribution of a nonhead.

In short, the following advantages are obtained from the approach proposed in this paper. First, the obliqueness hypothesis can explain the contribution of a nonhead under the traditional notion of the head by showing that, despite the contribution of a nonhead, the head is still in complete control of the subcategorization inheritance in OE CVs. Second, the better understanding of the head suggests a reasonable answer to the question of why argument composition, which has recently been used in many morpho-syntactic studies, is possible and how it should be constrained. Finally, this approach, if it can be applied more generally, should enable us to provide a reasonable explanation and prediction about case government in OE, as we have seen in the previous section, and the prediction could contribute to the understanding of OE by accounting for many evasive grammatical relationships in which OE NPs and CVs are involved.

APPENDIXES⁴⁷

APPENDIX I. OE VERBS WHICH GOVERN A GENITIVE NP ARGUMENT

anþracian 'to lament at sth'
basnian (*ge-*) 'to wait for sth'
blinnan (*a-* [gen], *ge-* [gen]) 'to cease from sth'
blissian (*efen-* [gen]) 'to rejoice at sth'
boeta(n) 'to acquire sth' (Matt (1.i) 18.15 (Mitchell 1985: §455))
bon 'to boast of sth'
dwelian, dwellan (*a-*, *ge-* [gen], *ofa-*) 'to go astray from sth'
efestan 'to strive after, undertake sth'
elcian 'to delay or put off sth'
fæstan (*a-*, *ge-*) 'to abstain from'⁴⁸
 (*ge-ƿelan* 'to feel, perceive, touch sb/sth'
 (*ge-ƿeon* (*efen-* [gen]) 'rejoice at sth [gen/dat/instr]'
frasian (*ge-*) 'to tempt sb'
friclan 'to desire or seek for sth'

⁴⁷ The verbs and their definitions in the appendixes are based on Mitchell (1985: §1092). The following notations and abbreviations are used: (i) V[case₁/case₂] = the given verb takes either an NP [case₁] or an NP [case₂], and V[case₁, case₂] = the given verb takes two NPs whose case is [case₁] and [case₂], respectively; (ii) 'sth' and 'sb' stand for something and somebody, respectively; (iii) the complex verbs or P-V CVs which, in spite of the resemblance in form (and meaning), are not derived from a given genitive- or dative-governing simplex verb are given in the relevant footnote with an explanation; (iv) in case a simplex verb takes genitive or dative only with a specific meaning which is different from its default meaning, while it mainly or often takes accusative and/or dative with the default meaning, I separate the two uses of the verb and deal with the latter case in the relevant footnote.

⁴⁸ There are several OE words such as *æt-fæstan* 'to fix', *be-*, *bi-fæstan* 'to fix, inflict on', *op-fæstan* 'to entrust, inflict', which are similar to *fæstan* [gen] only in form. However, as is clear from the involved meanings and forms, they all come from OE *fæstan* [acc] 'to fasten, entrust'.

giernan 'to ask for, desire sth'
gilpan (*for-*) 'to boast of, glory in sth [gen/instr]' (prep. *for*)
habban 'to consider sth'⁴⁹
hentan (*ge-*) 'to pursue, follow sb/sth'
hlosnian 'to listen to, wait for sb/sth'
latian (*a-, ge-*) 'to delay from sth'
locian (*ge-*) 'to gaze on, examine, have regard to sb/sth'⁵⁰
ge-nugan (*be-nugan* 'to need, enjoy sth [gen]') 'to suffice, have abundance of sth'⁵¹
nyttian (*ge-*) 'to make use of, enjoy sth'
pleon 'to risk or endanger sth'
ge-restan 'to rest from sth'
romian 'to strive after sth'
sætan, sætian (*be-, for-*) 'to lie in wait for sb'⁵²
sætman (*ge-* [dat]) 'to lie in wait for sb'
sciran (*a-* [acc, gen] 'to separate sb [acc] from sth [gen]') 'to get clear of, get rid of sth'
sinnan 'to care for, heed sb/sth'
slæpan (*ge-, on-*) 'to be asleep to, not to be alert to'⁵³
þicgan (*a-, ge-*) 'to partake of sth'⁵⁴
þorfnian (?) 'to suffer lack of sth' (See BTs)
wæðlian 'to lack sth'
wafian 'to wonder at sth'
wandian (*a-, for-* 'to reverence', *un-*) 'to turn aside from sth'⁵⁵
weddian (*ge-*) 'to engage to do sth'⁵⁶

⁴⁹ *Habban* has derivational words *a-habban* 'to restrain', *æt-habban* 'to retain', *be-habban* 'to surround, hold', *for-habban* 'to restrain', *ge-habban* 'to have, retain', *of-habban* 'to hold back', *on-habban*(?) 'to support', *wip-habban* [dat] 'to oppose', *wiper-habban* 'to resist', *ymb-habban* 'to surround'. However, the involved meaning tells that these verbs come from *habban* [acc/gen] 'to have', which was one of the most frequently used OE verbs unlike *habban* [gen] 'to consider'.

⁵⁰ The verb *locian* is mainly used as intransitive and often occurs with a preposition *to* or *on*. BT and BTs show two derivational verbs for this verb *be-locian*, *ymb-locian* 'to look round'.

⁵¹ Any verb shown as *ge-V* in the entries of this list always occurs as a prefixed form like *ge-nugan*.

⁵² BTs shows one example in which *be-sætan* and *for-sætan* take an accusative NP as follows:

He *forætade* *hie* [acc.pl.] *þær* *þær* *hie* *geþoht hæfdon* *þ* *hie* *hiene* [acc.sg.] *besætedon*.
 <insidiantes insidiis capit> (Or. 3. II; S 146. 11 [BTs: 82 & 250])

However, the two derived words *be-sætan* and *for-sætan* (= *for-sætan*) have exactly the same meaning as *sætan* and furthermore, they are not well attested (BTs has only one example for the verbs, which is a Latin translation. Thus, it is very likely that the simplex *sætan* also takes accusative or that the example was influenced by Latin.

⁵³ *Slæpan* is mainly used as intransitive.

⁵⁴ *þicgan* has a complex verb *aþ-þicgan* 'to take sth[acc] from sb[dat]' but this word is not a counterexample since it does not come from the genitive-taking simplex verb *þicgan* 'to partake of sth'. That is, *þicgan*, when it means 'to take', is usually used as a transitive verb which can take accusative or dative, and thus we can say that the sth [acc] comes from this use of the simplex verb, which is clear from the meaning of the P-V CV 'to take sth [acc] from sb [dat]'.

⁵⁵ *Wandian* 'to care for' is used as intransitive with the preposition *for*.

ðā ne wandast *for* nānon menn
 'you do not care for any men' (Mt. Kmb. 22. 16 [BT])

⁵⁶ There is one related P-V CV *be-weddian* 'to betroth sb[acc] to sb[dat]', which does not come from the given genitive-taking verb. *Weddian* with the meaning of 'to wed, betroth' usually takes accusative (BT: 1181), which means that the accusative object comes from the simplex verb.

APPENDIX II. OE VERBS WHICH GOVERN A GENITIVE OR DATIVE NP ARGUMENT

- andwyrðan* (*ge-*) 'to answer (sth [acc] to) sb [dat]'
bicnan, bicanian (*and-, ge-*) 'to make a sign to sb'
bisenian, bysnian, (*ge-, mis-*) 'to give an example to sb [dat] of sth'
brycian, brycsian (*ge-*) 'to do good to sb/sth'
campian (*ge-, wip-*) 'to fight for sb/sth' (prep. *for*)⁵⁷
cidan, *ge-* (*be-* 'to complain of', *ofer-* 'to chide sharply') 'to rebuke sb'⁵⁸
ge-clifian 'to stick to sth' (prep. *to*)⁵⁹
cweman (*ge-, mis-* 'to displease sb [dat?]') 'to please, satisfy sb'
ge-dafenian ((im)personal) 'to be becoming to, behoove sb/sth'
derian (*a-, ge-*) 'to hurt, damage sb/sth'
dryman 'to rejoice in sb'
dugan, dygan 'to befit, be of use to sb'
earmian (*of-*) 'to cause pity in sb' ((im)personal)
efnetan 'to eat as much as sb?, imitate?'
eglan, eglan (*æt-* [dat], *ge-* [dat]) 'to trouble' ((im)personal)
fægnian, fagnian (*ge-, on-*) 'rejoice at sth [gen/dat]'⁶⁰
feligean 'to follow sb/sth'
ge-feolan (*æt-, be-, wip-*) 'to stick to sb/sth'⁶¹
framian, fremian, fromian (*forþ-* 'to grow up, make progress') 'to profit, avail sb/sth'⁶²
frodian 'to make sb wise'
(ge-)fultuman, -ian (*to(-ge)-*) 'to help, support sb/sth'⁶³
(ge-)fylstan (*to-*) 'to help sb'
geocian (*un-*) 'to preserve, save sb/sth [gen/dat]'
gitsian (*ge-*) 'to covet, desire sth [gen/dat]'
godian 'to enrich sb'
gramian 'to be offensive to, vex sb'

⁵⁷ *Wip-campian* 'to fight against' is likely to take accusative as transitive, even though BT, BTs and CA do not have the corresponding entry or any example for this P-V CV (only BT lists this CV and only as a derivation of *campian*). However, *campian* 'to fight against' is often used with a preposition *for, mid, wip* or *ongean* with an NP object [acc/dat], which means the simplex verb is an intransitive verb in this case. Thus, this verb cannot be a counterexample.

⁵⁸ *Cidan* can also take accusative and it is often used absolutely or intransitively with a preposition (*ongean* or *wip*) (BTs: 123). *Be-cidan* (only) occurs with a clause (BTs: 67) and furthermore, the meaning of *ofer-cidan* clearly tells us the prefix (*ofer*) is used not prepositionally but adverbially.

⁵⁹ *Clifian* 'to cleave, adhere' is usually used as intransitive with a preposition as follows:

Ht willaþ clifian on ðæm monnum.

'they will cleave to the men' (Bt. 16.3; Fox 54.19 [BT])

⁶⁰ *Fægnian* is used as intransitive with the preposition *for* or *on* (BTs: 198).

⁶¹ The simplex verb *feolan* 'to stick, adhere, come, pass' is usually used as intransitive. Note that all three CVs *æt-feolan* 'to adhere to sb/sth', *be-feolan* 'to apply oneself to sth', and *wip-feolan* 'to apply oneself to sth' have a similar meaning and take dative. On the other hand, *geond-feolan* 'to permeate, fill completely' comes from the transitive verb *feolan* 'to penetrate, pass into'.

⁶² *Framian* 'to get good, make progress' is used as intransitive and it is clear from the meaning of the *forþ-framian* that the prefix *forþ-* is used adverbially, not prepositionally in that CV.

⁶³ *To-fultuman* 'adiuuare, adiuua' (tofuluma (A.lxxxii, 91, 10 [BTe: 60]) has the same meaning (and probably, the same usage) as the simplex.

hearmian (*of-* (impersonal) 'to cause grief' (Hall 1960)) 'to harm sb/sth'
(ge-)helpan (*a-* [dat/gen], *to-*) 'to help sb [dat/gen]'⁶⁴
hiersumian (*ge-* [dat]) 'to obey, serve sb/sth'
(ge-)hlystan (*under-*) 'to listen to, obey sb [dat/gen]'⁶⁵
hremian 'to exult in sth [dat/gen]' (in *Brun* 39)
hwopan 'to threaten sb [dat] with sth [dat/instr]'
hyrian (*after-*, *of-*, *on-*) 'to imitate sb/sth'⁶⁶
labian (*a-*) 'to be hateful to sb'
(ge-)leogan (*a-* [dat], *for-*, *of-*) 'to deceive, tell a lie to sb'⁶⁷
libban (*mis-*, *ofer-*) 'to live to sb' (*libban* is mostly intransitive.)
(ge-)lician (*mis-*, *of-*, *un-ge-*) 'to please sb' (all verbs take dative.)
(ge-)limpan (*a-*, *be-*, *mis-*) 'to happen to sb' (all verbs take dative.)
linnan (*a-*, *ge-*, *b(e)-* [gen], *of-*) 'to desist from sth [gen]' 'to cease from sth [dat/gen]'
losian (*ge-*) 'to be lost to, escape from sb/sth' (prep. *of*)⁶⁸
lyffettan 'to flatter, pay court to sb'
magan 'to prevail over sb/sth' (prep. *wiþ*)
(ge-)metgian 'to assign due measure to sb'
migan (*ge-*) 'to pass, discharge sth [dat] in one's water'
(ge-)mitsian 'pity, pardon sb/sth [dat/gen]'
missan <1> [gen] 'to miss, fail to hit sth' <2> [dat] 'to escape the notice of sb'
(ge-)neþan 'to risk one's life'
(ge-)nyhtsumian 'to be sufficient for sb' ((im)personal)
ge-ortre(o)wan <1> 'to despair of sth [gen]' <2> 'not to trust to sb [dat] for sth (clause)'
ge-ortruwian 'to despair of sth [gen]'
plihian 'to bring danger upon sb/sth'
racian 'to rule sb/sth'

⁶⁴ The CV *to-helpan* is used in the same way as *helpan* as follows:

Íc geþrifo, help (töhelpfe, R. *adjuva*) ungeleáffulnise mīnne. (Mk. L. 9. 24 [BTs: 531])

⁶⁵ *Hlystan* is usually used as intransitive or absolutely (BT: 546 & BTs: 555) and *under-hlystan* 'to supply an omitted word (<subadire>)' is a Latin translation.

⁶⁶ BT shows only one example, in which *after-hyrian* 'to imitate' is used as intransitive or absolutely but with exactly the same meaning as that of the simplex verb. BTs shows only one example for *of-hyrian* 'to imitate', in which it seems to take accusative (BTs: 662). *On-hyrian* [dat/acc] 'to imitate' might be problematic. De la Cruz, however, treats *on-* as an inseparable prefix, which seems to be relevant here since the prefix makes little semantic contribution to the given whole complex verb.

Anyway, exactly the same meaning in all the simplex and complex verbs argues that the prefix does not have a prepositional function in any CV. Furthermore, BT and BTs record only two examples for *hyrian*, whereas they have many examples for *on-hyrian*, and this insufficiency in data, together with the identical meaning involved, suggests the possibility that the simplex verb could also be used as intransitive. Visser (1963-73) does not include *hyrian* in the list of verbs which takes a dative NP. Considering all this, this word needs further research.

⁶⁷ *Leogan* 'to tell a lie' is mainly used as intransitive or transitive (mainly with a clausal object or an accusative NP). It takes a dative NP only when it means 'to tell a lie to sb'. BT and BTs record many examples for this verb.

⁶⁸ *Losian* is mainly used as intransitive and it is also used as transitive with an accusative NP when it means 'to destroy'. BT and BTs have many examples. There is one complex verb *for-losian* 'to destroy' which comes from the accusative taking transitive *losian*.

(*ge-*)*rædan* (*a-*, *be-* 'to deprive sb [acc] of sth [dat/gen], *for-* 'to give counsel against', *mis-* 'to advise/read wrongly', *wiþ-* 'to act against [dat]')⁶⁹

<1> [dat] 'to give advice to sb'

<2> [dat/instr] 'to rule, govern, direct sb'

<3> [dat] 'to possess sth'

(*ge-*)*sælan* (*to-* 'to happen amiss to sb [dat] in respect of sth [gen]') 'to happen to sb'

sceadan 'to part from sth [dat]' (in *Ruin* 30)⁷⁰

scrifan (*ge-*) 'to care for sth [dat/gen]'⁷¹

spiwian, *spiwian* (*a-*) 'to split up, vomit sth'

(*ge-*)*spowan* (*mis-spowan* (impersonal) 'to turn badly for sb [dat]')

<1> [dat] 'to be successful in sth'

<2> (impersonal) 'to turn out well for sb [dat] in the respect of sth [gen] (*æt/mid/on*)'

stefnian (*ge-*) 'to summon, cite sb'

stelan (*be-* [dat], *ge-*, *for-* 'to steal away, rob') 'to steal from sb'⁷²

sweltan (*a-*, *ge-*, *for-* (Vi) 'to die away, perish')⁷³

<1> [gen] 'to die to, be no longer conscious of sth'

<2> [dat] (prep. *for/mid*) 'to die of sth, die a death'

(*ge-*)*swican*

(*a-* 'to betray sb [dat]', *be-* 'to fail sb [acc/dat]', *from-* 'to desert from sb [dat]')⁷⁴

<1> [dat] (prep. *from*) 'to depart from sb'

<2> [dat/gen] (prep. *from*) 'to cease from sth'

<3> [dat] 'to betray, deceive sb'

tidan (*ge-*, *mis-* (impersonal) 'to turn out badly to sb [dat]') 'to happen to sb'

ge-timian (*miss-timian* [dat]) 'to happen, befall to sb'

trucian (*ge-*) 'to fail sb'

(*ge-*)*þancian* 'to thank sb [dat] for sth [gen]'

⁶⁹ Two verbs originally distinct seem to coalesce under the form *rædan* (BT: 782). Thus, besides the usage above, the verb *rædan* takes accusative or is used as intransitive when it means 'to read'. Furthermore, even with the meaning 'to consult upon a matter [acc] with (*wiþ*) sb' it can take accusative. Note that the prefixes *a-*, *be-*, *for-*, *mis-* are just inseparable prefixes here, regardless of the origins of combined simplexes. The P-V CV *wiþ-rædan* 'to act against sb/sth [dat]', the origin of whose simplex is not clear, only takes dative. On the other hand, there is one P-V CV *ofer-rædan* 'to read over' which comes from the (in)transitive verb *rædan* 'to read (sth [acc])'. Thus, there's no counterexample here.

⁷⁰ The simplex verb *sceadan* 'to separate, divide' is mainly used as transitive (taking accusative) or as intransitive and it has derivational words, *a-*, (*be-*), *for-*, *ge-*, *of-*, (*ofer-*), and *to-sceadan*.

⁷¹ *For-scrifan* 'to condemn, proscribe sb [acc/dat]' comes from the simplex verb *scrifan* 'to decree, appoint, ordain, condemn' which takes accusative or dative. Furthermore, the prefix *for-* is not a preposition but an inseparable prefix, which is intensive or pejorative.

⁷² *Stelan* takes an accusative NP when it means 'to steal sth [acc] (from sb)'.
Wērist þū, ðæt wē ðnes hlāfordes gold [acc.sg.] stælon (Gen. 44. 8 [BT: 915])

⁷³ *Sweltan* 'to die a natural or violent death' is used as intransitive and *for-sweltan*, whose preverb *for-* is an inseparable intensive prefix, is also an intransitive verb:

Manig wif forswilt for hire bearne [dat. sg. neut].

'Many a woman dies because of her child' (Bt. 31. I [BT: 319])

⁷⁴ The only P-V CV *from-swican* takes dative. *Swican* 'to move about, depart, escape' is used as intransitive and furthermore, although it usually takes dative when as transitive it means 'to deceive sb', it seems, unlike Mitchell (1985: §1902), that it can also take accusative follows:

Se swiceþ þa menigo [acc. sg. fem.]

'that man deceived the company'

(Jn. Skt. Rush. 7, 12 [BT: 953])

- þegan* 'to acquire sth'
þegnian (*ge-*, *under-*) 'to serve, attend upon sb'⁷⁵
þeowan, *þeowian* (*be-* 'to serve', *ge-*, *ni(e)d-*) 'to serve sb/sth'
(ge-)þingian (*for(e)-* 'to plead or intercede for', *op-* 'to usurp')⁷⁶
 <1> 'to plead for sb [dat]'
 <2> 'to intercede for sb [dat] (or prep. *for*) with sb (prep. *wiþ*)'
(ge-)þwærian (*a-*, *mid-* 'to consent' (See BTe: 47))
 <1> 'to consent to, conform to, agree to sth'
 <2> 'to agree with sb [dat] (or prep. *mid*)'
(ge-)þyncan (*mis-* [dat], *of-* [dat], *on-* 'to appear') 'to seem, appear to sb' ((im)personal)
(ge-)unan (*of-unan* 'to begrudge, refuse to grant sb [dat] sth [gen]')
 <1> 'to grant sb [dat] sth [gen/acc]'
 <2> 'to wish sb [dat] sth [gen]'
(ge-)wifian 'to marry sb' (absolute, or with reflexive [dat])
wrixlan (*be-* 'to change, exchange sth [dat]' (BTs: 89), *ge-*)
 <1> [dat] 'to change sth' <2> [dat] 'to exchange sth'

OLD ENGLISH TEXTS: SHORT TITLES AND REFERENCES

[*: Quoted by line. **: Quoted by page and line.]

- ÆCHom* i, ii = Thorpe, B. (1844-46, 1971). *The sermones catholici or homilies of Ælfric*. 2 vols. London: The Ælfric society.**
ASPR = Krapp, G. P. and Dobbie, E. V. K. (1931-53). *The Anglo-Saxon poetic records: a collective edition*. 6 vols. New York: Columbia University Press.
Beo = Klaeber, F. (1922, 1928, 1936, 1941 & 1950). *Beowulf and the fight at Finnsburg*.
 Lexington, MA: D. C. Heath & Co.*
BIHom = Morris, R. (1874, 1876, 1880, 1967). *The Blickling homilies*. EETS.**
Bo = Sedgefield, W. J. (1899). *King Alfred's Old English version of Boethius' de consolacione philosophiae*. Oxford: Clarendon.**
Christ = *Christ* in *The Exeter book*. *ASPR* iii.*
EETS = Early English Text Society.
Max i = *Maxims I* in *ASPR* iii.*

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⁷⁵ *Under-þegnian* 'to serve under' glosses Latin *subministrare*. BT and BTs have no further information.

⁷⁶ As we can see from the usage of *þingian*, the P-V CV *fore-þingian* comes from V1 + P (*þingian for*) and the prefix *op-* is not prepositional but means separation or departure as an (inseparable?) prefix (BT: 769; Hall 1960: 270).

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Syntax and Tone in Runyankore

Robert Poletto

1 Introduction

The interaction between phonological phenomena and other "levels" of the grammar is well documented. In fact, it is taken as a given that phonological structure and morphological structure are related. However, in the past several years, the study of the interaction of syntax and phonology has burgeoned to include research in such disparate languages as Italian, Chinese, Japanese, and several Bantu languages. (Napoli & Nespors 1986, Kaisse 1985, Selkirk 1986, Odden 1990, 1997) In this discussion, we examine two different principles in the tonal phonology of Runyankore. Both occur at the phrasal level (i.e., they are only manifest in a phrasal context) and both appear in a limited range of syntactic environments. One principle is responsible for the deletion of a high tone, the other, for the insertion of a high tone. Ultimately, we shall see that their application is related to the syntactic and prosodic structure of the utterance. Before examining the relevant data from Runyankore, let us compare the two major theoretical approaches to the syntax-phonology interface.

2 Theories

Several studies have examined the relationship between various phonological processes in languages and the syntactic conditions under which these processes may occur. In particular these have been Napoli & Nespors (1979) for Italian *Raddoppiamento Sintattico*, Selkirk (1980) for French, Kaisse (1985) for various languages, Nespors & Vogel (1986) for Italian, Selkirk (1986) for Chimwi:ni vowel shortening; Odden (1987, 1996) for Kimatuumbi.

The various approaches to the syntax-phonology interface can be roughly divided into two approaches. One approach (that favored by Selkirk, Napoli & Nespors, and Nespors & Vogel) maps prosodic structures onto phonological structure and then uses those as the domain for the application of phonological rules. The second, the

"direct reference theory" (Kaisse 1985 and Odden 1990, 1997) allows phonological rules to make "direct reference" to the syntax. We examine aspects of these two theories below.

2.1 Direct Reference Theory

According to Kaisse (1985), various phenomena associated with the syntax-phonology interface can be explained by allowing direct reference to syntactic information by phonology. I will briefly review a few of the examples that Kaisse cites in her 1985 discussion. The first of these will be the familiar case of "syntactic doubling" from Italian (discussed at length in Napoli & Nespors 1979 and Nespors & Vogel 1986)

2.1.1 Italian Raddoppiamento Sintattico

Several dialects of Italian possess a phonological process referred to as *Raddoppiamento Sintattico* (RS) ('syntactic doubling'). RS involves the gemination of the initial consonant of a word, *b*, when it stands in a particular configuration to a preceding word, *a*.

- (1)
- | | | |
|----|-------------------------------------|-----------------------------------|
| a. | <i>Maria è più [c:]alda che mai</i> | AP |
| | 'Maria is hotter than ever.' | |
| b. | <i>Ho visto tre [c:]ani.</i> | NP |
| | 'I saw three dogs.' | |
| c. | <i>Mario ha [f:]attu tutto.</i> | VP |
| | 'Mario did everything' | (= Napoli and Nespors 1979: [20]) |

In each of the sentences above, the initial consonant of a particular word is lengthened. Theories developed to account for this phenomenon have been introduced by Napoli & Nespors (1979), Nespors & Vogel (1986), and Kaisse (1985). All of these theories relate the appearance of RS to some aspect of the syntactic structure of the utterance, as opposed to a purely sociolinguistic or phonological account.¹

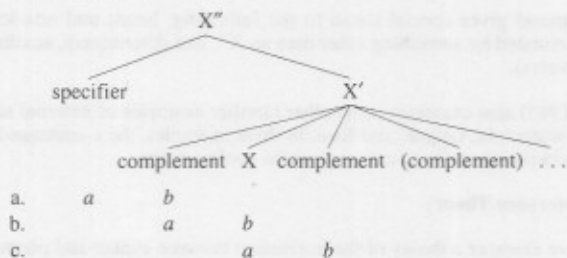
2.1.2 The Left-Branch Condition and c-command

Napoli & Nespors (1979) refer directly to syntactic structure in formalizing the relationship that must hold between two words in order for RS to take place. The Left-Branch condition describes this relationship. In basic terms, a word *a* must be on the

¹ Napoli & Nespors (1979) indicate that RS is common in many varieties of Italian. They limit themselves to the Sicilian and Tuscan varieties, which they claim have the same syntactic environment (p. 813).

left edge of the constituent that contains *b* in order for RS to apply to word *b*. Consider the phrase in (2).²

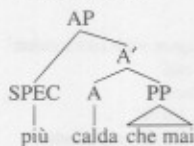
(2) Italian Maximal Projection



In this phrase, RS can only hold between the words in (2a) and (2b), where the word labeled (*a*) is on the left edge of the constituent that contains the word labeled (*b*). If there were no complement preceding the head of the phrase (*X*), then RS could occur in (2c). Specifiers always allow RS with a following word, as illustrated in (1).

The structure of the adjective phrase in (1a) is given in (3). Here, the word *più* 'more' is on the left branch of the constituent that contains the following word *calda* 'hot' and so, RS occurs.

(3) 'hotter than ever'



Kaisse reanalyzes the Left-Branch Condition in terms of the syntactic relationship *c-command*. The goal is to capture in a simpler fashion the relationship that exists between the two words in question.

- (4) **c-command** A *c-commands* B if the first branching node dominating A also dominates B.

More specifically, she interprets this in terms of X-bar syntactic theory.

² Space constraints do not permit a full description of the Left-Branch Condition. Readers are referred to Napoli & Nespor 1979 and Kaisse 1985.

- (5) **Domain c-command:** In the Structure [$X_{Max} \dots \alpha \dots$], X^{Max} is defined as the domain of α . Then α c-commands any β in its domain.

Domain c-command gives special status to the following: heads and non-lexical items (things dominated by something other than an X'' , like determiners, auxiliaries, and complementizers).

Kaisse (1985) also examines some other familiar examples of external sandhi from French, Kimatuumbi, Gilyak, and Ewe. In these examples, the c-command relationship holds between words in an external sandhi configuration.

2.2 Indirect Reference Theory

In this section, we examine a theory of the interaction between syntax and phonology that can be described as "indirect". In this model, the end-based model of Selkirk (1986), the information about syntactic structure is not directly available to phonological rules. Rather, syntactic structures are the basis for the creation of prosodic structure (see Selkirk 1986 for a discussion of the levels of prosodic structure). It is within a particular prosodic domain that a phonological rule will apply.

2.2.1 End-Based (Selkirk)

The Bantu language Chimwi:ni exhibits a vowel length alternation, exemplified in (6), from Kisseberth & Abasheikh (1974).

(6) Chimwi:ni Vowel Shortening

ku-wa:fiq-a	'to agree, to approve'	ku-wafiq-an-a	'to agree with one another'
xa:tima	'the end'	xatima-ye	'its end'
x-so:m-a	'to read'	x-som-esh-añ-a	'to teach'
jo:hari	'jewel'	johari-ye	'her jewel'
ku-re:b-a	'to stop'	ku-eb-eñ-an-a	'to stop for one another'
ku-te:t-ez-a	'to loosen some-thing'	ku-teñ-ez-ek-a	'to be able to be loosened'

The general principle illustrated by the data in (6) shortens a long vowel in pre-antepenultimate position (PAS, pre-antepenultimate shortening in Kisseberth & Abasheikh). As the data in (7) illustrate, PAS also applied in the phrasal context as well: a long vowel in pre-antepenultimate position must surface as short.

(7) Chimwi:ni Phrasal Vowel Shortening

shika:ni	'(pl.) seize!'	shikani munt'u uyu	'(pl.) seize this man!'
soma:ni	'(pl.) read!'	somani chuwo ichi	'(pl.) read this book!'
peteka:ni	'(pl.) send!'	petekani xati izi	'(pl.) send these letters!'
mu:nt'u	'person'	munt'u uyu	'this person'

iko:pa	'glass'	ikopa iyi	'this glass'
ma:yi	'water'	mayi malaḁa	'fresh water'
chi:nt'u	'thing'	chint'u shpiya	'something new'
xfu:nguḁa	'to open'	xfunguḁa xalbi	'to open one's heart'
xsu:la	'to want'	xsula uki	'to want honey'

In her analysis of Chimwi:ni, Selkirk (1986) offers that PAS follows from an analysis of the Chimwi:ni sentences prosodically. A stress rule (similar to a rule found in Latin) applies stress only to the antepenultimate or the penult syllable. Only stressed syllables can be long. The rule of PAS shortens a long vowel found in pre-antepenultimate position.

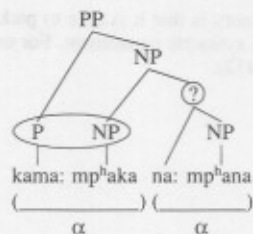
(8) Stressless Shortening (SS)

$$[-\overset{V:}{\text{'(main) stress'}}] \rightarrow V$$

Since only antepenult or penult vowels in the phrase receive stress, they are immune from stressless shortening. Any other long vowel is therefore shortened. The key issue then becomes the question of identifying the phrasal domain to which these rules apply. There is some range of syllables to which the rule assigning stress refers. A successful theory will predict which syllables are assigned stress and therefore made immune to the rule of Stressless Shortening.

According to Selkirk, the relevant fact here is the role played by domain ends. In two of the examples that she analyzes, Selkirk observes that there is no one syntactic constituent that predicts the domain for stress, α .

(9) Selkirk (16): 'like a cat and a rat'



According to Selkirk, there is no consistent theory that describes the domain α in (9).

Selkirk's solution to this problem is to propose that the derived domain is a constituent of the **phonological** representation of prosodic constituents. The relation between syntactic structure and prosodic structure is defined by reference to the ends of syntactic constituents. The type of syntactic constituent, whether XMax or Word, is a language-specific parameter.

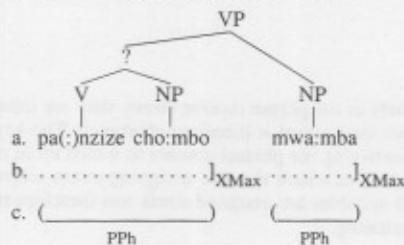
The prosodic constituents that are relevant for the computation of phonological rules are created based on the syntax following the end parameters setting.

(10) End Parameter Settings (Selkirk (23))

- i. $\left. \begin{array}{l} \text{Word} \\ \text{X}_{\text{max}} \end{array} \right\}$ $\left. \begin{array}{l} \text{Word} \\ \text{X}_{\text{max}} \end{array} \right\}$
- ii. $\left. \begin{array}{l} \text{Word} \\ \text{X}_{\text{max}} \end{array} \right\}$ $\left. \begin{array}{l} \text{Word} \\ \text{X}_{\text{max}} \end{array} \right\}$

Thus, the mapping of the Chimwi:ni phrase *panzize cho:mbo mwa:mba* would be as follows.

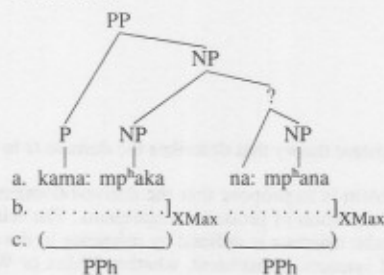
(11) Prosodic Domains Built from XMax



The end setting parameter identifies the right end of the maximal projections, as shown in line (b). Based on these edges, the phonological phrase (PPh) domains are created. The PPh domains are the domains of the application of the stress and stressless shortening rules described above.

Another important claim of the end-based theory is that it is able to pick out phonological domains that are not part of any single syntactic constituent. For example, consider Selkirk's analysis of (9b) given here as (12).

(12) Selkirk (27)



Notice that the first PPh constituent constructed on line c. of (12) encompasses the preposition and the following NP, although these are not a single constituent of syntactic structure. Thus, the end-based account is, according to Selkirk, better able to handle these facts.

The direct and indirect reference theories both refer specifically to certain elements to syntactic structure. However, the major difference between them is whether syntactic structure information is accessible to phonological rules. The direct-reference model, by allowing rule to "know" things about syntactic structure, allows for a tighter relationship between syntactic structure and phonology. Syntactic relationships may also hold between elements of a phrase that are not directly adjacent as long as the correct relationship holds between them. We shall see below that there is just such a case in Runyankore. On the other hand, the indirect-reference theory allows for the possibility that syntactic relationships may not be as crucial as the edges of syntactic units. Because of syntactic structure, this model predicts that such prosodic constituents as the phonological phrase may cut across syntactic constituents or break up strings that are related in the syntax. With respect to tone insertion, we shall see that this is true in Runyankore.

3 General Facts in Runyankore

There are two basic tone-syntax interactions: high tone insertion (HINS) and high tone deletion (HDEL). Both are conditioned by factors external to the word, i.e., syntactic or prosodic (depending upon the rule). While these two processes are very basic, they have complicated domains of application. The following sections will describe the occurrence of both HINS and HDEL. First, in sections Tone Deletion-2, we provide a very basic overview of HDEL and HINS. In section Exceptions to HDEL and Extensions of HINS, we will consider larger phrases and the apparent exceptions to HDEL. These sections will also allow us to demonstrate that HINS occurs in a wider range of environments and to a wider range of lexical categories.

3.1 Tone Deletion

Let us begin with the more restricted of the two processes under consideration, high tone deletion, HDEL. HDEL causes the deletion of a high tone from the head noun just in case the following word is high toned and stands in a particular relationship with the head. Specifically, a high toned noun followed by a high toned adjective or possessive pronoun (a plural), then the high tone of the noun stem disappears on the surface (high tone sponsors, i.e., underlyingly high toned, vowels are underlined).

As the phrases in (13)–(14) show, the high tone of the noun stem does not surface when a following high-toned adjective or possessive follows; it is deleted.³

- | | | | | | |
|------|---------|-------------------------|--------------------|------------------------------|-------------|
| (13) | a. | omw-áana | | 'child' | |
| | | CL.I.child ⁴ | | | |
| | | omw <u>aa</u> na waítu | | 'our child' | |
| | | CL.I.child CL.I.our | | | |
| | | omw <u>aa</u> na waáñu | | 'your _{pl} child' | |
| | | omw <u>aa</u> na waábo | | 'their child' | |
| | | b. | enkóko | | 'chicken' |
| | | enkóko yaítu | | 'our chicken' | |
| | | enkóko yaáñu | | 'your _{pl} chicken' | |
| | | enkóko yaábo | | 'their chicken' | |
| | | c. | omukamá ... | omukamá waítu | 'our chief' |
| | | embúzi | embyzi yaítu | 'our goat' | |
| | | embwá ... | embwá yaítu | 'our dog' | |
| | obwóoci | obwóoci bwaítu | 'our honey' | | |
| (14) | | eriinó ... | eriing ruháango | 'large tooth' | |
| | | ebitóosha | ebitqosha biháango | 'large mushrooms' | |
| | | emótoka | emgtokaa mpáango | 'large automobile' | |
| | | embwá ... | embwaa nkúru | 'old dog' | |
| | | | | | |

The following phrases illustrate an important point about HDEL. Observe first that the high tone of the head noun 'child' is not deleted before a toneless adjective, *muruunji* 'good'. But, when there is a high-toned element in the constituent that follows the head noun, the high tone of the head does delete.

- | | | | | |
|------|--|------------------------------------|--|----------------------|
| (15) | | omwáána muruunji | | 'a good child' |
| | | omw <u>aa</u> na muruunji munóonga | | 'a very good child' |
| | | omuhijnji muruunji munóonga | | 'a very good farmer' |
| | | embw <u>aa</u> nuunji munóonga | | 'a very good dog' |

The phrases in (15) show that HDEL actually must look at the following phrase. The range of phrasal elements that can appear with an adjective or a possessive preposition as the head is extremely limited. Only the word *munóonga* 'very' can

³ I will underscore a tone-bearing unit that has lost a high tone and will boldface (**á**) a tone bearing unit that has received a high tone by insertion. A vowel marked like [**á**] indicates an underlying high tone still present on the surface.

⁴ Note the following abbreviations: CL.I: class I prefix (etc.); 1S: first person singular (etc.); NEG: negative; REM: remote; PST: past tense; FV: final vowel morpheme. The symbols √ and [represent the left edge of the verb root and the verb stem, respectively.

follow an adjective within an AdjP. This structure is shown within the noun phrase in (16).

- (16) [[omwaana]_N [muruunji munóonga]_{AdjP}]_{NP}
 child good very
 'a very good child'

With the examples in (15), we see the effect of the high tone within the adjective phrase. Later, we shall see that only the immediately following constituent is relevant for HDEL. This significant point to be garnered here is that the following *constituent* and not just the immediately following word is relevant for HDEL.

Of particular interest in these phrases is the fact that the high tone of the noun heading the NP is lost even if the immediately following word is toneless. The high tone on the word 'very' *munóonga* is sufficient to condition the deletion of the high tone on the preceding noun.

HDEL does not apply to the adjective heading the Adjective phrase modifying the noun. Consider the phrases in (17). HDEL does not delete a high tone on an adjective that is followed by a high toned modifier (viz. *munóonga* 'very').

- (17) enkaitoo nkúru munóonga 'very old shoes'
 enkókoo nkúru munóonga 'very old chickens'
 enkókoo ntó munóonga 'very young chickens'
 omuhijji mukúru munóonga 'very old/important farmer'
 omwaana mukúru munóonga 'very old/important child'
 omwaana muháango munóonga 'very big child'

To summarize the basics, HDEL targets only a head noun before either an adjective or a possessive pronoun. Below, we will examine the syntactic structures where HDEL does not take place and contrast them to the ones where it does. In doing so, we will gain a clearer picture of the exact formulation of the process of HDEL. First, we discuss the principle that inserts a high tone onto a toneless head noun. This will allow us, in the end, to see that the two different principles, high deletion and high insertion, operate within different domains.

3.2 Tone Insertion

Compared to HDEL, the process that inserts a high tone is more widespread: it applies to more lexical categories and appears to have fewer restrictions on its application. High tone insertion (HINS) occurs when a toneless noun (stem) is followed by a toneless word in the same phrase. As we shall see below, HINS is subject to certain limitations that are particularly relevant for a theory of syntax-phonology interaction. However, for now, just consider some toneless nouns followed by a modifying toneless adjective, given in (18).

- (18) a. omuuntú muruunji 'good person'
 omuguhá miruunji 'good rope'
 eihurí riruunji 'good egg'
 enkaitó nuunji 'good shoe'
- b. omuguhá muraingwa 'long rope'
 omuhoró muraingwa 'long panga'
 omuguzí muraingwa 'tall buyer'

However, if the following adjective is high toned, HINS does not take place, as shown in (19).

- (19) omuuntu mugúfu 'short person'
 omuguha mugúfu 'short rope'
 amahwa magúfu 'short thorns'
 omurimi mukúru 'old/important farmer'
 omuuntu mukúru 'old/important person'
 omuguzi mukúru 'old/important buyer'

HINS also occurs before singular possessive pronouns, which are toneless. These are the singular forms: 'my', 'your_s', and 'his/her'. Some examples are given in (20):

- (20) a. omuguzí waanje 'my buyer'
 omuguhá gwaanje 'my rope'
 eihurí ryaanje 'my egg'
- b. omuguhá gwaawe 'your_s rope'
 enkaitó yaawe 'your_s shoe'
 eihurí ryaawe 'your_s egg'
- c. enkaitó ye 'his/her shoe'
 eihurí rye 'his/her egg'
 omurimí we 'his/her farmer'

As with high-toned adjectives, HINS fails if the following possessive is high toned, shown in (21).

- (21) a. omuguzi yaítu 'our buyer'
 omuguha gwaítu 'our rope'
 eihuri ryaítu 'our egg'
- b. omuguha gwaáñu 'your_{pl} rope'
 enkaito yaáñu 'your_{pl} shoe'
 eihuri ryaáñu 'your_{pl} egg'

- | | | |
|------|------------------------|-------------------|
| | c. omuguha gwaábo | 'their rope' |
| | enkaito yaábo | 'their shoe' |
| | eihuri ryaábo | 'their egg' |
| (22) | e-báruha nuunji | 'good letter' |
| | CL9.letter CL9.good | |
| | e-mótoka nuunji | 'good automobile' |
| | eci-káaraanjiro caanji | 'my roasting pan' |

These examples illustrate the long-distance blocking of HINS by a high tone on the noun stem. The lexical high tone of the noun need not be on the final or penultimate syllable to block HINS. If this were the case, we might appeal to the Meeussen's rule (i.e., the OCP) to account for the blocking. But, in a form like *eci/káaraanjiro* 'roasting pan' the high tone is at least two tone-bearing units away from the target of HINS. Nevertheless, HINS still does not occur.

So far, HINS has appeared almost as a complement to HDEL. While the latter deletes a high tone before another high tone, the former inserts a high tone onto the head noun just in case there is not a following high-toned word. As we see below, HDEL and HINS turn out to have somewhat different domains of application.

Unlike tone deletion, tonal insertion *does* occur on verbs. The verb stem must be toneless and followed by a toneless word.

- | | | |
|------|----------------------------|---------------------------------------|
| (23) | a. n-aa[reeb-á buremu | 'I have just seen Buremu' |
| | IS.PST[√see-FV Buremu | |
| | naa[teecerá buremu | 'I have just cooked for Buremu' |
| | b. ti-n-áa[reeb-á buremu | 'I have not seen Buremu' |
| | NEG-IS-PST[√see-FV | |
| | tináa[teecerá buremu | 'I have not cooked for Buremu' |
| | c. ba[bará buremu | 'they count Buremu' |
| | 3P[count | |
| | ba[reebá buremu | 'they see Buremu' |
| | d. a-ka[reebá kagoma | 's/he saw the bataleur eagle' |
| | 3S-REM[see | |
| | aka[barirá buremu | 's/he will count for Buremu' |
| | aka[gurá magaro na makáasi | 's/he will count pliers and scissors' |
| | e. yááka[ramutsyá buremu | 's/he has just greeted Buremu' |
| | yááka[ramutsya kakúru | 's/he has just greeted Kakuru' |

f. yááka[téécera buremu	's/he has just cooked for Buremu'
yááka[téécera kakúru	's/he has just cooked for Kakuru'
yááka[shééndecereza buremu	's/he has just escorted Buremu'
yááka[shééndecereza kakúru	's/he has just escorted Kakuru'

In particular, the examples in (23e–f) show that the target and the trigger must both be toneless. A high tone anywhere on the verb stem or on the trigger will block HINS.

In the following section, we will examine some syntactic domains where HDEL does not occur. At the same time, we will highlight the areas where HINS takes place that are broader than the targets already presented. The picture that emerges is one where HDEL and HINS target very similar locations (i.e., words) but where HINS has a relatively wider range of application than HDEL, which we shall see is restricted to nominal phrases.

3.3 Exceptions to HDEL and Extensions of HINS

Several different categories of following word do not fall within the domain of application of HDEL. From what we have seen, only nouns are targeted for high-tone deletion. In the following section, we consider cases where a noun is immune to HDEL. This will help define the range of the application of HDEL. At the same time, we consider the range of HINS to illustrate its wider and more general range of application. Number are particularly interesting because they fail to condition HDEL but *do* condition HINS. Furthermore, HINS will apply to any eligible lexical category: nouns, verbs, and prepositions.⁵ Below follow data for several of these categories. The first of these to be considered will be numbers.

3.3.1 Numbers and Phrasal Tone

Numbers in Runyankore (and in Bantu generally) have some interesting properties. First, there is a morphological difference between the numbers 1–5 and 6–9: their prefixes and tone are different.

⁵ Unfortunately, adjectives never appear in the correct location to allow HINS to target them.

(24)	emwe	'one'
	ibiri	'two'
	ishatu	'three'
	ina	'four'
	itaano	'five'
	mukáaga	'six'
	mushaanzhu	'seven'
	munáana	'eight'
	mweenda	'nine'
	ikúmi	'ten'

The numbers from six to nine do not have a high toned prefix. Because of this fact, they behave differently from the numbers one to five whose prefix is high toned (underlyingly). Consider the following.

(25)	a.	abaantu bá-biri	'two people'
		abaantu bá-shatu	'three people'
		abaantu bá-na	'four people'
		abaantu bá-taano	'five people'
	b.	enkók' f-biri	'two chickens'
		enkók' f-shatu	'three chickens'
		enkók' f-na	'four chickens'
		enkók' f-taano	'five chickens'
	c.	ebiñeebwa bí-biri	'one peanut'
		ebiñeebwa bí-shatu	'three peanuts'
		ebiñeebwa bí-shatu	'four peanuts'
		ebiñeebwa bí-taano	'five peanuts'

The exception to HDEL appears when a high toned noun is followed by a high toned number. As shown in (26), where the high tone of the head noun persists despite the following high-toned word (the number).

(26)	abakáma mukáaga	'six chiefs'
	abakáma munáana	'eight chiefs'
	embwáá mukáaga	'six dogs'
	enkóko mukáaga	'six chickens'

Compare also the following minimal pairs in which we might expect the contrast to be neutralized by HDEL. In fact, the tonal contrast remains. The lexical high tone of the noun stem is retained in the examples in (27).

- (27) a. enda mukáaga 'six stomachs'
 endá mukáaga 'six lice'
 b. enzhu mukáaga 'six houses'
 enzhú mukáaga 'six gray hairs'

On the other hand, HINS does take place before toneless numbers. Because of this there is neutralization if the number is toneless, as in (28) and (29).

- (28) a. endá mushaanzhu 'seven lice'
 endá mushaanzhu 'seven stomachs'
 b. endá mweenda 'nine lice'
 endá mweenda 'nine stomachs'
- (29) a. enzhú mushaanzhu 'seven gray hairs'
 enzhú mushaanzhu 'seven houses'
 b. enzhú mweenda 'nine gray hairs'
 enzhú mweenda 'nine houses'

The underlined vowels in *endá* 'lice' and *enzhú* 'gray hair', indicate that noun stem is underlyingly high toned, as distinct from *enda* 'stomach' and *enzhu* 'house', which are underlyingly toneless. Because the numbers *mushaanzhu* 'seven' and *mweenda* 'nine' are toneless as well, a high tone appears on the head noun.

To summarize, a following number can create an environment for the application of HINS. However, a following number does not create an environment for HDEL. As we have seen, some numbers (*mukaaga* 'seven' and *mweenda* 'nine') lack high tones. This is evidence that the domain for HINS seems to be larger than the domain for HDEL. There are high-toned words, which we will examine later, that fail to condition HDEL. We assume that these words pattern with numbers. Unfortunately, none of the categories of words that fail to condition HDEL have any toneless members, apart from numbers.

In (30) we see the numbers twenty through one hundred. Before considering these words, recall that the numbers one through five have high-toned prefixes, which are just vowels in some cases. Because of this, the final vowel of *makúmi* 'ten(s)' undergoes glide formation. Forms for sixty, seventy, eighty, and ninety, which have been borrowed from Luganda, appear to be the more usual form now and will also appear below.

(30) Runyankore 20-100

	Runyankore	Luganda Borrowings
10	ikúmi	
20	makúmy áábiri	
30	makúmy ááshatu	
40	makúmy áána	
50	makúmy áátaano	

	Runyankore	Luganda Borrowings
60	makými mukáaga	nkáaga
70	makúmi mushaanju	ñshaanzhu
80	makými munána	cinána
90	makúmi mweenda	ceenda
100	eigana	cikumi

Recall that 'ten' *ikúmi* is high toned. However, this part of the number is subject to HDEL when followed by a number with a high tone, as are the numbers with initial vowel and 'six' *mukáaga* and 'eight' *munána*. Normally numbers do not condition HDEL on a preceding noun. One important point to keep in mind is that *ikúmi* 'ten' is a number *and* a noun. It is class five in the singular, *ikúmi*, and class six in the plural, *makúmi*.⁶ As a noun, the word 'ten' appears in the plural when followed by a number (*makými áábiri* 'tens two' 'twenty'). It also forces agreement with the following word (in Runyankore numbers only agree between two and five, inclusive). The *a-* is the class six prefix for numbers. So that the number 'two' agrees in class with the noun/number 'ten' *ikúmi*.

However, a number followed by a number can be a domain for HDEL. Sequences like *makými mukáaga* 'sixty' differ from phrases like *enkóko mukáaga* 'six chickens'. In that the former is subject to HDEL while the latter is not.

- (31) 'sixty' 'six chickens'
- NumP

Num Num

| |

makými mukáaga

NP

NP NumP

| |

N N NumP

| | |

enkóko mukáaga

A high tone anywhere in the number phrase blocks HINS on a noun that precedes the number. This is illustrated in (32). Although 'shoe(s)' *enkaito* is toneless, it is not targeted by HINS.

- (32) enkaito makými mukáaga 'sixty shoes'
 enkaito makúmi mushaanzhu 'seventy shoes'
 enkaito makými munána 'eighty shoes'
 enkaito makúmi mweenda 'ninety shoes'

Below, under (33) are the numbers 100 through 900. Note that the combining form for 'hundred' *magana* is toneless. When the following word is also toneless (the

⁶ Numbers, like *ikúmi/makúmi* 'ten/s' do not take the initial vowel prefix. Predicting where this prefix appears turns out to be fairly difficult. See Hyman & Katamba 1990 for a discussion of the prefix vowel in Luganda.

numbers 'seven' *mushaanzhu* and 'nine' *munáana*) the word 'hundred' is targeted for HINS, as in seven hundred and nine hundred.

(33) Runyankore Numbers 100–900

	Long Form	Short Form
100	cikúmi	
200	magan' áábiri	bfbiri
300	magan' ááshatu	bishatu
400	magan' áana	bína
500	magan' áátaano	bítaano
600	magana mukáaga	rukáaga
700	maganá mushaanzhu	rushaanzhu
800	magana munáana	runáana
900	maganá mweenda	rweenda

Unlike the hundreds numbers, the numbers in the thousands are the target for HDEL, shown in (34). This is because the word 'thousand' *orukúmi* is high toned. When the following word, the unit, is high toned, then the word 'thousand' loses its high tone. Recall that the number one through five have high-toned initial vowels. So, the only place where 'thousand' does not lose its high tone is when it stands by itself, or is followed by the numbers seven or nine.

(34)	orukúmi	'thousand'
	enkum' ífbiri	'two thousand'
	enkum' íshatu	'three thousand'
	enkum' ína	'four thousand'
	enkum' ítano	'five thousand'
	enkumi mukáaga	'six thousand'
	enkúmi mushaanzhu	'seven thousand'
	enkumi munáana	'eight thousand'
	enkúmi mweenda	'nine thousand'

However, if the word 'and' *na* is part of the number, then the preceding number is insulated from HDEL.⁷

(35)	a. nkáaga n'émwe	'sixty-one'
	nkáaga n'ífbiri	'sixty-two'
	nkáaga na mukáaga	'sixty-six'
	nkáaga ná mushaanzhu	'sixty-seven'

⁷ We will discuss the appearance of the high tone on *na* 'and' in greater detail below.

b. rukáága na mukáága	'six hundred and six'
rukáága ná mushaanzhu	'six hundred and seven'
rukáága na ikúmi	'six hundred and ten'
rukáága na mukumy áábiri	'six hundred and twenty'

There is a difference between a series of number word in a number phrase and the type of phrasal number given in (35). When the word *na* 'and' appears in the number, we there is a significant break that prevents the application of HDEL.

3.3.2 Quantifiers and HDEL

HDEL does not occur when the word following the head noun of the phrase is the universal quantifier 'all'. The examples in (36) illustrate this with phrases comprising a noun and a following universal quantifier.

(36) abakáma bóona	'all chiefs'
aboozhó bóona	'all boys'
amaarwá góona	'all beer'
embwá zóona	'all dogs'
enzhú zóona	'all gray hair'
embuzí zóona	'all goats'

We also find the failure of HDEL before another type of quantifier: *-inji* 'many', shown in (37).⁸

(37) amakáma baínji	'many chiefs'
enkóko ñíñji	'many chickens'
endá ñíñji	'many lice'
abahíñji baínji	'many farmers'

Two other quantifiers that do not conditioning HDEL on following words are given in (38).

(38) a. -ónka	'only'
omuhíñji wéenka	'only a farmer'
ecikópo cóonka	'only a cup'
embwáá yóonka	'only a dog'
obúro bwóonka	'only millet'

⁸ The final high tone of *-inji* retracts in phrase-final position.

b. -ómbi	'both'
ahííñji bóombi	'both farmers'
emisyó yóombi	'both knives'
embáá zóombi	'both dogs'
ebikópo byóombi	'both cups'

Interestingly, the question of HINS does not really come up with these quantifiers because they are all high toned and thus block the appearance of an inserted high tone on a toneless noun phrase head. But, remember that some numbers are toneless and do condition HINS.

3.3.3 Determiners and Demonstratives

Like the quantifiers, a number of other high toned words also fail to condition HDEL. These words are also members of the class of words containing quantifiers, demonstratives, and determiners. The first example includes various types of demonstrative words, as shown in (39).

(39) a. abakáma báhi	'which chiefs'
aboozhó báhi	'which boys'
embwá zíha	'which dogs'
enzhú zíha	'which gray hairs'
b. omukám' óoha	'which chief'
enzhú zíha	'which gray hairs'
c. omukám' óogu	'this chief'
omukám' óogwe	'that chief'
omukám' ooríya	'that chief'
omukám' oogwo	'that chief (visible, close)'
d. abakám' áaba	'these chiefs'
abakám' áabwe	'those chiefs'
abakám' áabo	'these chiefs'
abakám' ábaríya	'those chiefs'
e. enkók' ééji	'this chicken'
kaankomáángw' ééji	'this woodpecker'

Like these words, we find that postposed phrasal modifiers of nouns (definite adjectives, relatives, possessives, etc.) also do not condition HDEL.

3.3.4 Definite Adjectives and Phrasal Modifiers

There is a distinction between an indefinite adjective and a definite adjective in many Bantu language. In Runyankore, the pre-prefix vowel is absent in indefinite adjectives. However, if the adjective is definite in meaning, an initial vowel is present. The

definite form of adjectives ("the good dog" versus "a/some good dog") is structurally similar to relatives and can be considered sentential in nature. One possible translation or paraphrase for these forms is "a dog that is good", showing their relationship with relative clauses.

First, let us consider some definite forms of the adjective. The following forms all include head nouns that are high toned in the input. Observe that they retain their high tone.

(40)	ecikóp' éé-cí-bi	'the bad cup'
	emótok' éé-m-bi	'the bad car'
	erín' éé-ri-háango	'the large cup'
	ebitóósh' éé-bi-háango	'the large mushrooms'
	omwáán' óó-mu-háango	'the large child'
	ebáruh' éé-n-uunji	'the good letter'

The definite form of the adjectives differs from the indefinite in its possession of an initial or augment vowel. However, one thing to note from the data in (40) is that this vowel is high toned and that it absorbs the preceding vowel (which, unless high, disappears completely leaving only its mora). Because of this output configuration, it is impossible to tell definitively whether HINS had taken place—the target vowel for HINS will be high already.

Another phrasal complement to a head noun is the relative clause.

(41)	omuhíinj' á-bazire	'the farmer who counted'
	omuhíinj' á-bónire	'the farmer who found'
	omukám' á-baziire	'the chief who sewed'
	omukám' á-káaraanjire	'the chief who dry roasted'

These phrases are tonally similar to those in (40). Again, HDEL does not apply.

3.3.5 Prepositional/Possessive Phrases

HDEL also fails to occur when there is a following prepositional phrase within the phrase in question. This fact turns out to be highly relevant later in this analysis as we shall see that an NP comprising two conjoined NPs behaves differently.

Some examples of prepositional phrases within the noun phrase illustrate the persistence of the high tone on the head noun.

(42)	a. enkóko y'ómuhínji	'chicken of the farmer'
	embwáá y'ómwáana	'dog of the child'
	embúzi y'ómuhínji	'goat of the farmer'
	ecitaandá c'ómwáana	'bed of the child'

- | | | |
|----|----------------------|---------------------------------|
| b. | embúzi y'ómurimi | 'goat of the farmer' |
| | mareeré y'ómurimi | 'hawk of the farmer' |
| | embfo zá kaarweenda | 'seeds of a karwenda' |
| | ecikópo cáá kaarweza | 'cup of karweza (a thin sauce)' |

The head of the whole NP in (42) is high toned. Observe that in all the cases this high tone is retained. The difference between (42a) and (42b) is the presence of a high tone on the stem of the lower noun. In (42a), the lower noun is high toned while in (42b) it is toneless. However, this apparently makes no difference in the application of HDEL in this construction. The tonelessness of the noun stems in (42b) is made somewhat irrelevant by the appearance of a high tone on the initial vowel of the noun or on the vowel of the associative preposition.

3.3.6 Multiple Words in the Phrase and HDEL

When a string of adjective, quantifier, and/or possessive words follows the head noun, only the word immediately following the noun is relevant for the application of HDEL. There is a change in emphasis when a quantifier appears first; however, the basic meaning of the phrase remains the same. In (43), the high tone of the noun stem only deletes when the high-toned adjective is the immediately following word.

- | | | | |
|------|----|--------------------------|--------------------|
| (43) | a. | abakáma báfnji baruunji | 'many good chiefs' |
| | | abakáma baruunji baífnji | 'many good chiefs' |
| | b. | abakáma báfnji bakúru | 'many old chiefs' |
| | | abakama bakúru baífnji | 'many old chiefs' |
| (44) | a. | abahífnji bóona baruunji | 'all good farmers' |
| | | abahífnji baruunji bóona | 'all good farmers' |
| | b. | abahífnji bóona bakúru | 'all old farmers' |
| | | abahífnji bakúru bóona | 'all old farmers' |

In (43) and (44), the (a) phrases contain a toneless adjective and a high-toned quantifier while the (b) phrases contain a high-toned adjective and a high-toned quantifier. Note that the high tone of the noun only deletes when a high toned adjective *immediately* follows the noun.

The same relationship holds in the following two sets of data but with a demonstrative instead of a quantifier. Again, note that the high tone of the noun only deletes when the following word is a high-toned adjective.

- | | | | |
|------|----|-----------------------|-------------------|
| (45) | a. | omukám' óógu muruunji | 'this good chief' |
| | | omukáma muruunj' óógu | 'this good chief' |
| | b. | omukám' óógu mukúru | 'this old chief' |
| | | omukama mukúr' óógu | 'this old chief' |

- (46) a. enKók' ééji nuunji 'this good chicken'
 enkóko nuunj' ééji 'this good chicken'
- b. enKók' ééji nkúru 'this old chicken'
 enkókoo nkúr' ééji 'this old chicken'

The same patterns hold true when the demonstrative or quantifier is replaced with a number, as shown in (47)

- (47) a. enKóko mukááгаа nkúru 'six old chickens'
 enkókoo nkúru mukáaga
- b. enKóko mushaanzhu nkúru 'seven old chickens'
 enkókoo nkúru mushaanzhu
- c. amakáma mukááгаа baruunji 'six good chiefs'
 abakáma baruunji mukáaga
- d. abakáma mushaanzhu baruunji 'seven good chiefs'
 abakáma baruunji mushaanzhu

The high tone on the noun only deletes when the triggering word immediately follows the target. If two adjectives follow the noun, only the first one is relevant for the application of HDEL. Compare the two word order variants given in (48).

- (48) a. abaana bató baruunji 'young good children'
 abáana baruunji báto 'good young children'
- b. embwaa nkúru nuunji 'old good dog'
 embwáá nuunjii nkúru 'good old dog'

The high tone of the head noun only deletes when the high-toned adjective, *bató* 'young' or *nkúru* 'old', immediately follows the head noun.

In comparison to HINS, the principles of HDEL are more restricted. HDEL only considers the immediately following phrase, even if it is only a single word. Furthermore, we shall see that HINS can be blocked by a high tone that is *not* in the immediately following word.

3.3.7 Verbs and HDEL

Verbs are not subject to the application of HDEL. This sets Runyankore apart from some of the other familiar Interlacustrine languages that do have the deletion of high tones on verbs: Zinza (Odden 1997), Runyambo (Hubbard 1992), Kinyambo (Bickmore 1989), for example. The verb forms in (49) illustrate several verb tenses with high tones appearing on the verb despite a following high-toned object.

(49) Failure of HDEL to target verbs

- | | | |
|----------------------------------|------------------------------|---------------------------------------|
| a. Infinitive | | |
| | oku[téécera kakúru | 'to cook for Kakuru' |
| | oku[shéédecereza kakúru | 'to escort Kakuru' |
| b. Remote Past Tense | | |
| | akakwááta kaankomáángwa | 's/he caught the woodpecker' |
| | akahéédecereza kaankomáángwa | 's/he destroyed the woodpecker' |
| c. Yesterday Past Tense | | |
| | aréébire kaankomáángwa | 's/he saw the woodpecker' |
| | akwaasiré kaankomáángwa | 's/he caught the woodpecker' |
| d. Yesterday Past Tense Negative | | |
| | taréébire kankomáángwa | 's/he didn't see the woodpecker' |
| | takwaasiré kaankomáángwa | 's/he didn't catch the woodpecker' |
| e. Habitual | | |
| | arééba kaankomáángwa | 's/he sees the woodpecker' |
| | akwaatá kaankomáángwa | 's/he catches the woodpecker' |
| f. Perstative | | |
| | naacibazífirira káto | 's/he is still sewing for Kato' |
| | naacikaraanjirá káto | 's/he is still dry roasting for Kato' |

As described above, HDEL applies only to nouns. As these various verbs have illustrated, HDEL does not apply to them.

From the data presented above, we may generalize that HDEL applies to the head of a noun phrase when a high-toned complement immediately follows the noun. Furthermore, that complement can only be either an indefinite adjective (i.e., one lacking an initial vowel) or a possessive pronoun.

3.3.8 Concluding Remarks on HDEL

As the preceding sections have detailed, HDEL has a rather limited range of application. In summary, it only applies when the following word is high toned, and when that word is of a particular lexical/grammatical category. These include adjectives and possessives. Numbers, quantifiers, demonstratives, and phrases all fall *outside* of the domain of HDEL.

In the next section, we will examine the limitations on HINS so that we may compare these two principles later.

3.4 Application of HINS

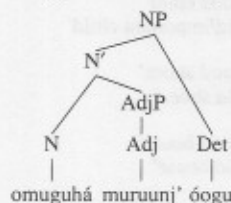
Only the immediately following constituent is crucial for the application of HINS (we shall see below that it is not just a following word that is relevant). If the word following a toneless head noun is toneless, then a high tone appears on the last vowel of the head noun. For example, consider the phrases in (50), where a toneless noun is followed by a toneless modifier and a high-toned word (quantifiers, numbers, or determiner).

- | | | | |
|------|----|--|---|
| (50) | a. | omuguhá muruunj' óogu
enkaitó nuunj' éeji | 'this good rope'
'this good shoe' |
| | b. | enkaitó nuunji mukáaga
emiguhá yaanje mukáaga | 'six good shoes'
'my six ropes' |
| | c. | enkaitó zaanje nkúru
enzhú yaanje nkúru | 'my old shoes'
'my old house' ⁹ |
| | d. | emiguhá yaanje yóóna
enkaitó zaanje zóóna | 'all my ropes'
'all my shoes' |
| | e. | emiguhá yaanje mikúru yóóna
emiguhá yaanje miruunji yóóna | 'all my old ropes'
'all my good ropes' |
| | f. | emiguhá miruunji yóonka
abaantú baruunji bóombi | 'only good ropes'
'both good people' |

In these examples, the toneless nouns have a high tone on their final syllable because the following word is toneless. If any high tone in the entire noun phrase were sufficient to block HINS, we would not expect to find the inserted high tone.

The phrases in (50) would have the following structure, given in (51).

- (51) omuguhá muruunj' óogu 'this good rope'



⁹ Unlike in the nearby language Kikerewe, the word for house in Runyankore, *enzhu*, is toneless underlyingly. Compare it to *enzhu* 'gray hairs', which is underlyingly high toned.

When there are multiple words in the noun phrase, the determination of the tone of the head noun is based upon the phrase that follows. What is interesting is that the order of the words that follow (adjectives, quantifiers, determiners, and possessives) is not entirely fixed, though there do seem to be some restrictions. However, there does seem to be a preference for the order that places the adjective first (i.e., immediately after the head noun). Semantically, the post-head position seems to be the more prominent—the emphasis is more likely to be placed there.

- (52) a. *enkaito mukááгаа nkúru* 'six old shoes'
 enkaitoo nkúru mukáaga
- b. *enkaitó mushaanzhuu nkúru* 'seven old shoes'
 enkaitoo nkúru mushaanzhu
- c. *enkaitó nuunji mukáaga* 'six good shoes'
 enkaito mukáága nuunji
- d. *enkaitó musaanzhu nuunji* 'seven good shoes'
 enkaitó nuunji mushaanzhu

Again, HINS only takes place when the following word is adjectival and toneless. HDEL also only takes place when the head is high toned and the immediately following word is a high-toned adjective.

Interestingly, we might expect any following high-toned adjective or possessive to condition HDEL. However, when these words are not immediately after the head noun, no HDEL occurs. In (53), the high tone of the head noun, the first word in the phrase, is not deleted, despite a high tone that appears later.

- (53) a. *enzhú zaanje nuunji* 'my good gray hairs'
 enzhú zaanje nkúru 'my old gray hairs'
- b. *omwáána waanje muruunji* 'my good child'
 omwáána waanje mukúru 'my old/important child'
- (54) a. *enkaitó zaanje nuunji* 'my good shoes'
 enkaitó zaanje nkúru 'my old shoes'
- b. *enzhú yaanje nuunji* 'my good house'
 enzhú yaanje nkúru 'my old house'
- c. *enkaito záftuu nuunji* 'my good shoes'
 enkaito záftuu nkúru 'my old shoes'

The data in (54) suggest that only the following word is relevant. HINS still takes place when a toneless possessive follows a toneless noun, despite the high-toned adjective later in the phrase: *enkaitó zaanje nkúru* 'my old shoes'. However, we should

consider whether the conditioning factor is a single word, or a phrase. We can test this by adding the word *munóonga* 'very' after the adjective. If HINS still occurs, then the high on *munóonga* would appear not to be relevant. However, if HINS is blocked, then it is not just the following word that is relevant, but the entire phrase. The noun phrases in (55) begin with a toneless noun, followed by an adjective phrase containing a toneless adjective and the word *munóonga* 'very'. There is no HINS in (55).

- (55) enkaito nuunji munóonga 'very good shoes'
 omuguha muruunji munóonga 'very good rope'
 omuhoro muruunji munóonga 'very good panga'
 eipapa riruunji munóonga 'very good wing'

- (56) 'very good shoes'



From the data in (55), we can conclude that HDEL is blocked when there is a high tone in the following phrase, even if it is not adjacent to the target. The high tone on *munóonga* 'very' is within the AdjP that follows the noun, as illustrated in (55). Recall from the data just examined in (54) that a high tone later in the phrase does *not* block HINS.

We also see the same limitation placed on HDEL. In all cases in (57) with the configuration high–low–high, the high on the head noun persists despite the later high tone on an adjective. This high tone would otherwise condition HDEL.

- (57) a. embwáá nuunji zóonka 'only good dogs'
 ebikópo biruunji byóombi 'both good cups'
 b. embwáá zóómbi nuunji 'both good dogs'
 embwáá zóómbii nkúru 'both old dogs'

3.4.1 Extensions to the principle of HINS

As promised above, the following sections detail the fact that HINS looks not just at the following word in the higher phrase, but at the phrase following the target HINS. First, we examine the types of phrases that may follow a noun head and the tonal facts that are relevant to them.

In order to explain fully the limitations of HINS, we have to have a good understanding of the syntax. I assume for the purposes of argument an X-Bar syntactic

structure approach (Jackendoff 1977, Cook & Newson 1996, and Horrocks 1987, see also Carstens 1993).

4 Phrasal Heads and HINS

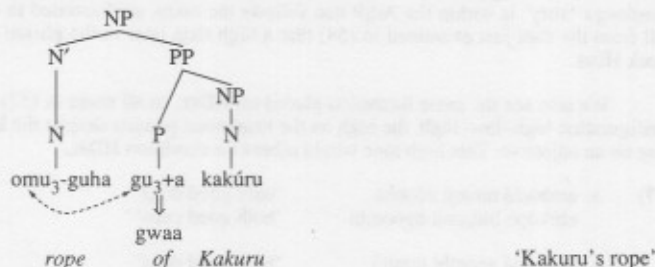
In this section, we examine more examples of HINS. In particular, we note the application of HINS to other types of phrasal heads, not just nouns. This section also briefly introduces the phrase structure of Runyankore. While HDEL looks only to an immediately following word for its trigger, HINS scans for high tones within the entire following phrasal unit. Any high tone in a lower phrase is sufficient to block HINS.

First, we examine two types of prepositional phrase, the possessive and non-concord-governed prepositions like *na* 'with'. Second, we examine a toneless quantifier, *huri* 'every' which it acts as a phrasal head (and Quantifier Phrase, QP) that subcategorizes for a noun phrase.

4.1 Possessive Phrases

Possessive phrases are prepositional phrases that must agree in noun class with the head noun of the higher phrase. The structure of a possessive phrase in Runyankore is given in (58).

(58) Possessive Structure



The preposition (P) comprises two morphemes: the first agrees with the preceding noun (the possessed) as indicated by the dotted line. The second is the vowel *-a*. The vowel *-a* is frequently lost before another vowel via elision. Tonally, we will find that a high tone appears on the preposition when the following NP is toneless. Structurally, the prepositional phrase (PP) is a sister to the N' node under NP.

Let us consider a number of tone patterns in the input, varying the tonal character of the possessed and the possessor, giving four variations. The phrases in (59)–(62) exemplify these four possibilities.

- (59) L of L
- | | |
|---------------------|--------------------------|
| omuguha gwáá buremu | 'rope of Buremu' |
| ecijere cáá buremu | 'foot of Buremu' |
| enda yá kapa | 'stomach of the cat' |
| enkoni yá karweenda | 'cane of cypress (wood)' |
| eihuri yá buremu | 'Buremu's egg' |
| ebijere byáá buremu | 'Buremu's feet' |

When the possessed and possessor nouns are both toneless, a high tone appears on the associative preposition. It is necessary to use words that are consonant-initial to see the high tone on the preposition.

- (60) H of L
- | | |
|---------------------|-----------------------------|
| ecikópo cáá buremu | 'cup of Buremu' |
| omukóno gwáá buremu | 'arm of Buremu' |
| entééka yá buremu | 'cooking (style) of Buremu' |
| eríno ryáá buremu | 'Buremu's tooth' |
| ecicére cáá buremu | 'Buremu's frog' |
| amaarwáá gá buremu | 'Buremu's beer' |

The phrases in (60) show that the tone of the possessed noun does not affect the appearance of a high tone on the preposition when the possessor (the lower NP) is toneless. Contrast the tone of the preposition when the possessor noun is toneless, (59)–(60), with cases where the possessor noun is high-toned, (61)–(62), which follow.

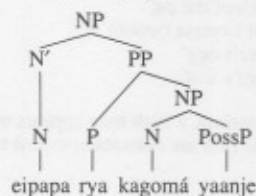
- (61) L of H
- | | |
|---------------------|----------------------------|
| omuguha gwaa kakúru | 'rope of Kakuru' |
| omuguha gwa kakúru | 'rope of Kakuru' |
| ecijere caa kakúru | 'foot of Kakuru' |
| eipapa ryaa maréere | 'wing of a bateleur eagle' |
| eihuri ya kakúru | 'Kakuru's egg' |
| ebijere byaa kakúru | 'Kakuru's feet' |
- (62) H of H
- | | |
|---------------------|------------------|
| omukóno gwaa kakúru | 'arm of Kakuru' |
| ecikópo caa kakúru | 'cup of Kakuru' |
| eríno ryaa kakúru | 'Kakuru's tooth' |
| ecicére caa kakúru | 'Kakuru's frog' |
| amaarwáá ga kakúru | 'Kakuru's beer' |

The phrases in (61) and (62) show the *failure* of HINS on the preposition when the following word is high-toned. The tone of the possessor is irrelevant—the tonal quality of the preposition does not change when the possessed noun changes.

However, if there is a high tone anywhere lower in the phrase, then no high appears on the possessive preposition. A high tone in the phrase following the prepo-

sition will block HINS on the preposition. One such structure involves a possessive pronoun following the possessor noun. Syntactically, this would appear as in (63).

- (63) "wing of my eagle"



This observation is further confirmed by the phrases in (64).

- (64) a. eipapa rya kagomá yaanje 'wing of my eagle'
 eipapa rya kagomá nuunji 'wing of a good eagle'
 amapapa ga kagomá mushaaanzhu
 'wings of seven eagles'
- b. eipapa rya kagoma nkúru 'wing of an old eagle'
 eipapa rya kagoma yaftu 'wing of our eagle'
 amapapa ga kagoma mukáaga 'wing of six eagles'

In all of these phrases, there is a high tone somewhere after the preposition. In (64a), a high appears because of HINS. In (64b), the high tone that blocks HINS appears lexically on a word that follows the possessor noun: *nkúru*, 'old', *yaftu* 'our', or *mukáaga* 'six'. The phrases in (65) illustrate what happens if a high tone appears somewhere in the embedded NP. When the NP within the PossP is toneless, a high tone appears on the preposition: *eipapa ryá kagoma* 'wing of a bataille eagle'. However, if there is a high tone within the embedded NP, HINS cannot target the preposition. Also, this inserted high tone, or any other high tone within the PossP will block HINS onto the head noun, as shown in (65).

- (65) a. eipapa ryá kagoma 'wing of a bataille eagle'
 eipapa rya kagomá nuunji 'wing of a good b. eagle'
 eipapa rya kagomaa mpáango 'wing of a big b. eagle'
 eipapa rya kagomaa nkúru 'wing of an old b. eagle'
 eipapa rya kagomá yaanje 'wings of my b. eagle'
 eipapa rya kagoma yaftu 'wings of our b. eagle'
- b. amapapa ga kagoma mukáaga 'wings of six b. eagles'
 amapapa ga kagomá mushaaanzhu 'wings of seven b. eagles'
- c. eipapa rya mareére 'wing of a hawk'
 eipapa rya mareeree mpáango 'wing of a big hawk'

- d. ecaashuri cáá kagoma 'nest of a b. eagle'
 ecaashuri caa kagomá nuunji 'nest of a good b. eagle'
 ecaashuri caa kagomaa mpáango 'nest of a big b. eagle'

The examples in (65) illustrate the *failure* of HINS before a possessive phrase. A high tone anywhere in the PossP will be sufficient to prevent HINS on the head noun of the entire NP, in this case *eipapa* 'wing' or *amapapa* 'wings'.

Before taking up a fuller analysis of both HDEL and HINS we need to examine in more detail the tonal properties of a noun and noun phrase within another phrase. As we will see in the next section, principles related to phrasal tone have a broader application than between two adjacent words. In the next section, we examine the tonal properties of the initial vowel and morphemes that appear to occupy a similar syntactic position.

HINS will also target the NP that precedes the PP if there is a toneless adjective in it. In the phrases in (65), HINS targets the highest noun if there is a toneless adjective or possessive pronoun after it. The presence of a high tone in the PossP does not block HINS in this case.

- (66) ei-papá ri-runji ryáá kagoma
 CL5.wing CL5.good CL5.of eagle
 'good wing of the eagle'
 enkaitó nuunji y'ómuuntu mukúru
 'good shoe of the old person'
 amapapá gaanje ga maréere
 'my wings of a hawk'
 eñamá yaanje y'émpuno
 'my meat of the pig'

The introduction of the adjective or possessive seems to allow for the possibility of HINS targeting both the head noun and the preposition (as in the first example).

4.2 Quantifier Heads

In most noun phrases, the first element is the noun itself, as we have seen above. However, several kinds of words can precede the head noun of an NP. They occupy the position normally taken by the initial vowel. These words seem to include, but not limited to: *huri* 'each/every'; *ibára* 'any'; *-ndí* 'other'; *-ndíízhó* 'other' (different) and some demonstratives.¹⁰ The word *ibára* 'each (type of)' is related to the word

¹⁰ Interestingly, the word *kana* 'owner of' does not seem to be within my informant's command. In fact, it does not appear in Taylor's dictionary of Runyankore-Rukiga either. It is found in the nearby, related language Kikerewe.

eibára 'type, kind' as in a particular variety of something: *eibára ry-éente* 'type of cow', *eibára ry-óómurimi* 'type of farmer'. When the noun is preceded by one of these words, it loses its initial vowel. Some various example of this are given in (67).

- | | | |
|------|---------------------|------------------------|
| (67) | <i>burí</i> mu-rimi | 'every farmer' |
| | every CL.I.farmer | |
| | <i>ibára</i> murimi | 'each farmer' |
| | owúúndi murimi | 'another farmer' |
| | ondíízhó murimi | 'another (new) farmer' |

Of particular interest in this discussion of tone is the word *huri* 'every'. All other pre-nominal modifiers have a lexical high tone. When the following noun is toneless, the word *huri* appears with a high tone. However, if the following word is high toned, then *huri* appears as toneless. Both types of noun appear in (68).

- | | | |
|------|---------------------------------|----------------------|
| (68) | a. <u>Toneless Nouns</u> | |
| | <i>burí</i> murimi | 'every farmer' |
| | <i>burí</i> muguha | 'every rope' |
| | <i>buríí</i> nkaito | 'every shoe' |
| | <i>burí</i> ípapa ¹¹ | 'every wing' |
| | b. <u>High Nouns</u> | |
| | <i>huri</i> mwáana | 'every child' |
| | <i>huri</i> músyó | 'every knife' |
| | <i>huri</i> íbáare | 'every stone' |
| | <i>huri</i> kabarágára | 'every banana (sp.)' |

There is a high tone on *huri* 'every' only if the following word is toneless. This also holds true of the following phrase. In other words, just as we saw with noun heads of phrases, we also find the HINS is blocked when the phrase following the word *huri* 'every', contains a high tone.

- | | | |
|------|--------------------------------------|------------------------------|
| (69) | <i>huri</i> mwáana mukúru | 'every old/important child' |
| | <i>huri</i> muhíjji mukúru | 'every old/important farmer' |
| | <i>huri</i> murumi mukúru | 'every old/important farmer' |
| | <i>huri</i> muguha mukúru | 'every old rope' |
| | <i>huri</i> nkaitoo nkúru | 'every old shoe' |
| | <i>huri</i> murimi muruunji munóonga | 'every very good farmer' |

As the phrases in (69) illustrate, there is no HINS on *huri* when there is a high tone either on some following adjective, as in (69). In particular, the high tone that appears on the noun in (69c) is a product of phrasal high tone insertion.

¹¹ The high inserted on the *i* of the word *huri* appears on both morae of the long vowel *ii* because falling tones may appear only in phrase-penultimate position.

In the case of *ibára*, given in (70) that the high tone is present whether or not there is a high tone on the noun stem.

- (70) a. Toneless Nouns
 ibára murimi 'each farmer'
 ibára muguha 'each (type of) rope'
 ibára muti 'each tree'
- b. High Nouns
 ibáraá mbwa¹² 'each (type of) dog'
 ibáara nkóko 'each (type of) chicken'

Unlike the word *huri*, *ibára* is underlyingly specified for a high tone. Because of this, only *huri* shows a tonal alternation because this word is not a target for HDEL but only for HINS. As mentioned previously, HDEL has a more limited domain of application when compared to HINS.

Some further examples may help to clarify the issue of the immunity of the pre-head words from HDEL. For example, what happens if the following noun is subject to HDEL (because of a following high-toned adjective)? The phrases in (71) illustrate this pattern.

- (71) a. owúúndi murimí muruunji 'another good farmer'
 owúúndi murimi mukúru 'another important farmer'
- b. owúúndi mwáána muruunji 'another good child'
 owúúndi mwaána mukúru 'another important child'
- c. ogúúndi muhoró muruunji 'another good panga'
 ogúúndi muhoro mukúru 'another old panga'
- d. ogúúndi muhoró gwaanje 'another panga of mine'
 ogúúndi muhoro gwaítu 'another panga of ours'

As with *ibara*, the tonal quality of the word *ogúúndi* 'another' is not dependent upon the tonality of the following words.

Other types of words also serve as targets for HINS, as we shall see in the following section.

¹² The high tone of [embwá] 'dog' retracts in phrase final position. Additionally, the coda nasal lengthens the preceding vowel. A narrower transcription of this phrase would be [ibáraámbwá].

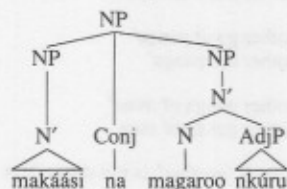
4.3 Prepositions and Conjunctions

The word *na* 'and/with' functions both as a preposition and as a conjunction. It can be a site of HINS, as long as the following phrase is toneless.

- (72) a. ná buremu 'with Buremu'
 ná magaro 'with pliers'
- b. makáási ná magaro 'scissors and pliers'
 kakúru ná buremu 'Kakuru and Buremu'
- cf. c. na kakúru 'with Kakuru'
 na káawa 'with coffee'
 magaro na mkáási 'pliers and scissors'

The phrases in (72a) *na* functions as the preposition 'with'. As long as the following complement to the preposition is toneless, a high tone appears on *na*. In (72b), *na* functions as a conjunction, joining the two NPs. Again, it is a site for HINS if the NP that follows it is toneless. In (73), we see some examples of the blocking of HINS by a high tone somewhere in the following phrase. In the first example, the high-toned adjective *nkúru* 'old' blocks HINS. In the second example, the high tone inserted onto the noun *magaro* 'pliers' is responsible for blocking.

- (73) makáási na magaroo nkúru 'scissors and old pliers'
 makáási na magaró mushaanzhu 'scissors and seven pliers'
- (74) makáási na magaroo nkúru 'scissors and old pliers'



However, prepositions and conjunctions do not have entirely the same behavior with respect to HINS. Significant to later analysis, we find that they have different blocking effects when they are located within an NP that is scanned for HINS blocking of a higher word—when they are within an NP complement to a verb. Consider the two sets of data in (75).

- (75) a. a-ka[reebá kaarweenda ná kaartuusi
 3S.REM[see cypress and eucalyptus
 'S/he saw a cypress and a eucalyptus.'

- akagaambirá buremu na kakúru 'S/he told Buremu and Kakuru.'
 akareebá kagoma na mareére 'S/he saw an eagle and a hawk.'
 akareebá magaro n'ómuguha 'S/he saw the pliers and rope.'
 akagurá magaro na makáasi 'S/he bought pliers and scissors.'
- b. akareeba mareeré ná kagoma 'S/he saw a hawk and an eagle.'
 akaguza makáasi ná magaro 'S/he saw the scissors and pliers.'
 akareeba kaankomúngwa ná kagoma
 'S/he saw the woodpecker and the eagle.'

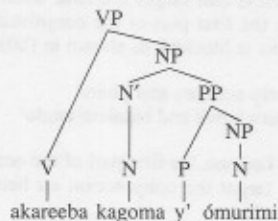
In (75a), HINS targets the verb, *akareeba* 's/he saw', despite the later high tone. Blocking of HINS by a following coordinated NP structure is only accomplished when the high tone is in the immediately following constituent, as in (75b). Contrast these facts with the sentences in (76).

- (76) akareeba kagoma y'ómurimi 'S/he saw the eagle of the farmer.'
 akareeba kagoma y'ómwána 'S/he saw the eagle of the child.'
 akareeba magaro zá buremu 'S/he saw the pliers of Buremu'
 akareeba bukaando zá buremu 'S/he saw the pants of Buremu'

Here, there is no HINS despite the fact that the word following the verb is toneless, *kagoma* 'bataleur eagle'. The high tone found within the prepositional phrase *is* responsible for the lack of HINS.

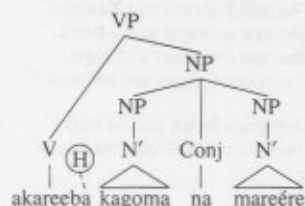
The different structures that these two NP complements have would appear to be relevant. Consider first the NP with an embedded PP, in (77).

- (77) 'S/he saw the eagle of the farmer.'



Here, no high tone appears on the verb because of the high tone on the noun [...ómurimi] 'farmer'. Now, consider the phrase where the complement to the VP contains a conjoined NP, in (78).

- (78) 'S/he saw the eagle and the hawk.'



Here, a high tone is inserted on the final vowel of the verb. In essence, the high tone that is located within the second NP, 'hawk' *mareére*, is not visible to whatever principles are responsible for HINS. This fact will be significant in the discussion of theories accounting for these tone insertion and deletion.

HINS can also take place on other words apart from verbs, as the examples in (79) illustrate.

- (79) a. *enzhu yá buremu na kakúru* 'the house of Buremu and Kakuru'
eipapa ryaa kagoma y'ómurimi 'wing of the b. eagle of the farmer'
eibabi ryaa kaartuusi yá buremu 'leaf of the eucalyptus of Buremu'
- b. *burí cijere n'éénkaito* 'every foot and shoe(s)'
burí muguha na makáasi 'every rope and (a) scissors'
burí kagoma na mareére 'every bataleur eagle and a hawk'

In (79a), HINS is blocked before an NP containing a PP with a high tone—HINS cannot target the first word of the NP. In (79b), HINS *can* target the first word of the phrase (*burí*) before a conjoined NP as long as the first part of the conjoined NP is toneless. If the order of elements is reversed, HINS is blocked, as shown in (80).

- (80) a. *huri makáasi ná magaro* 'every scissors and pliers'
huri mareéré ná kagoma 'every hawk and bataleur eagle'

HINS cannot target the head of the phrase (*huri*) because the first part of the conjoined NP is high toned. Notice also that HINS does target the conjunction *na* because it stands before a toneless noun (*magaro* or *kagoma*).

Just as we saw blocking of HINS before an NP containing a high-toned prepositional phrase (in (76)), we can also expect the failure of HINS on *huri* when its complement NP contains a high-toned prepositional phrase.

- (81) *huri muguha gwáá buremu* 'every rope of Buremu'
huri ciibo caa kakúru 'every basket of Kakuru'
huri nzhu yá buremu 'every house of Buremu'

As noted above, these two types of NP have different structures. In both of the models examined in this discussion, there is some reference to syntactic structure. In the following sections we consider how this and other facts can be dealt with by various theories explaining the interaction between phonology and syntax.

4.4 Verbs

The verb is also a possible site for HINS. There appears to be a greater degree of sensitivity to specific morphological information with respect to a verb. However, the general principle is that a toneless verb followed by a toneless argument will have a high tone on its final syllable.

The verbs in (82) are in the distant past tense. When the following object of the verb is toneless, a high is inserted onto the final vowel of the verb.

- | | | | |
|------|----|--------------------------|---------------------------------------|
| (82) | a. | akareeba kaankomáangwa | 's/he saw the woodpecker' |
| | | akareebá kanyaanaanga | 's/he saw the potato caterpillar' |
| | b. | akaramusya kaankomáangwa | 's/he greeted the woodpecker' |
| | | akaramusyá kanyaanaanga | 's/he greeted the potato caterpillar' |
| | c. | akabaziira buraanjíti | 's/he sewed the blanket' |
| | | akabaziirá bukaando | 's/he sewed the trousers' |

Compare the verbs in (82) with those given in (83).

- | | | | |
|------|----|-------------------------------|---|
| (83) | a. | akakwááta kaankomáangwa | 's/he caught the woodpecker' |
| | | akakwááta kanyaanaanga | 's/he caught the potato caterpillar' |
| | b. | akahééndecereza kaankomáangwa | 's/he destroyed the woodpecker' |
| | | akahééndecereza kanyaanaanga | 's/he destroyed the potato caterpillar' |

The verbs in (83) are high-toned. This high tone blocks the application of HINS. Notice also that the adjacency of the tone bearing units is not necessary to block HINS: there is none on the verb *akahééndecereza* 's/he destroyed'. Further examples of verb tenses that permit HINS are given in (84).

- | | | | |
|------|----|---------------------------|---|
| (84) | a. | Recent Past | |
| | | yáá[reebá kanyaanaanga | 's/he has seen the potato caterpillar' |
| | | yáá[reeba kaankomáangwa | 's/he has seen the woodpecker' |
| | b. | Immediate Past | |
| | | yáá[kareebá kanyaanaanga | 'he has just seen the potato caterpillar' |
| | | yáá[kareeba kaankomáangwa | 'he has just seen the woodpecker' |

- | | |
|---------------------------------|---|
| c. Immediate Past Relatives | |
| ayáá[reebá kanyaanaanga | 'one who has just seen the caterpillar' |
| ayáá[reeba kaankomángwa | 'one who has just seen the woodpecker' |
| d. Negative Hodiernal Past | |
| tibáka[reebiré buremu | 'they had not seen Buremu' |
| tibáka[téceire buremu | 'they had not cooked for Buremu' |
| e. Present Progressive Negative | |
| táku[baziirirá buremu | 'he is not sewing for Buremu' |
| táku[káraanjira buremu | 'he is not dry roasting for Buremu' |
| f. Habitual Relative | |
| areebiré karoma | 'one who sees the bataleur eagle' |
| areebire mareére | 'one who sees the hawk' |

Only the verb stem is relevant for determining whether or not HINS should occur. High tones in the inflectional portion of the verb (see Poletto, in progress, for more information) do not block HINS. Notice, however, that if the verb root is high toned, as in *víéek* 'cook' or *vkáraang* 'dry roast' found in (84d-e), then HINS is blocked.

Not all verbs are possible targets for HINS, the verb tenses in (84) do not have high tones that are required by the tense/aspect morphology (see Poletto, in progress, for more information). However, there is a set of verb tenses where there a high tone is always inserted onto the stem. For example, the yesterday past tense appears with a high tone somewhere on the verb stem regardless of the input tone of the root. In these cases, there is no HINS. In (85) and (86), the toneless verb root *vreeb* 'see' appears in the affirmative and negative forms of the yesterday past tense. The high tone that appears on the stem is part of the verb morphology. Its presence is sufficient to block HINS regardless of the tonal qualities of the following word. Compare the pairs of sentences given in (85) and (86). The object in the first sentence of each pair is toneless.

- | | | |
|------|----------------------------------|--|
| (85) | Yesterday Past Tense Affirmative | |
| | a[réébire kanyaanaanga | 's/he saw the potato caterpillar' |
| | a[réébire kaankomángwa | 's/he saw the woodpecker' |
| (86) | Yesterday Past Tense Negative | |
| | ta[réébire kanyaanaanga | 's/he didn't see the potato caterpillar' |
| | ta[réébire kankomángwa | 's/he didn't see the wood pecker' |

Note that there is no HINS when there is a high tone on the verb stem. In these cases, the input verb root is *vreeb* 'see', which is underlying toneless. However, the morphologically inserted high tone is sufficient to block HINS.

4.5 Summary of HDEL and HINS

The preceding sections outline the appearance of HINS and HDEL. However, we have not attempted to provide a formal account. At this point, however, it should be clear that HINS has a larger set of possible targets and has a wider range of triggering configurations. On the other hand, HDEL only targets nouns when they are immediately followed by a high-toned possessive pronoun or indefinite adjective. In the following sections, we compare the different theories presented at the outset and show that HINS and HDEL cannot be accounted for under one unified theory that refers only to syntactic or to prosodic structure. In fact, both levels of grammatical representation must be called upon in order to explain these two processes.

5 Accounting for HDEL and HINS

Now that we have considered a wide range of the possible instances where HDEL and HINS can take place, let us continue with a discussion of accounting for and predicting these phenomena. What should be apparent from the preceding discussion is that HDEL has a much more restricted range of application: it only applies to nouns followed by a high-toned adjective or possessive. Verbs are not subject to HDEL (unless they are infinitives, which are both nouns and verbs). On the other hand, HINS has a very broad range of application, targeting nouns, verbs, and prepositions.

As discussed earlier, there are two major theories that can be used to account for these phenomena. The direct reference theory, following Kaisse 1985, Odden 1990, 1996, accounts for these principles in terms of relationships that are directly related to the syntactic structure of the word. An alternative account makes use of Selkirk's (1985) theory of derived domains. Specifically, the interaction between phonology and syntactic structure is mediated by the creation of prosodic domains that are based on syntactic structure. More precisely, these prosodic domains, primarily the phonological phrase (PPh), are defined in terms of edges.

We shall compare these two models for Runyankore and for both HINS and HDEL. What is particularly interesting here is the fact that we have two principles with similar, but not identical, domains of application. Does either theory provide a better account of both of these? Ultimately, we shall find that the range of operation of the principles is in fact quite different. Because of the relatively narrow scope of HDEL we shall see that direct reference to syntactic information is the most perspicacious means to account for the phenomenon. On the other hand, HINS has a very wide range of application. Not only in terms of the lexical categories of the possible targets, but also in the sense that HINS applies between the last two words of a phonological phrase. Following Selkirk, this phonological phrase will be defined in terms of the right edge of a maximal projection.

5.1 Direct Reference Theory

The direct-reference theory (referring to Max-command) appears to account for these facts because of the importance of *heads* of phrases in locating the site for HINS and the target of HDEL.

5.1.1 HDEL

How might Kaisse's direct reference theory account for HDEL? Recall that HDEL only takes place when a high-toned noun is immediately followed by an indefinite adjective or possessive within the same phrase. Is there a syntactic relationship that can pick out this type of complement to a noun but ignore those that do not condition HDEL, such as quantifiers, numbers, demonstratives, phrases, etc.?

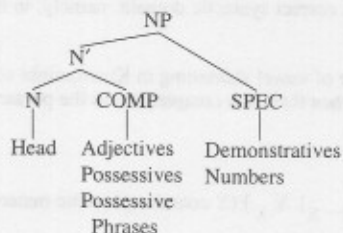
It has been suggested by Hyman & Byarushengo (1984) for Haya, Hubbard (1992) for Runyambo, and Odden for Kimatuumbi (1996) and Zinza (1997) that the sister to the phrasal head within the X' phrase is relevant for certain sandhi effects. In Haya, which is closely related to Runyankore, a high tone is deleted in the following contexts: before a high-toned possessive, before a possessive phrase, and before a high-toned adjective. These are exemplified in (87)

(87) Haya High Tone Deletion (=Hyman & Byarushengo, 1984, p. 73)

a.	ekikómbe	'cup'
	ekikombe kyáitu	'our cup'
	ekikombe kyaa káto	'Kato's cup'
	ekikombe kilúngi	'a beautiful cup'
b.	ekikómbe kyange	'my cup'
	ekikómbe kyaawe	'your (sg.) cup'
	ekikómbe kili	'that cup (over there)'
	ekiómbe kimo	'one cup'

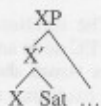
As these various phrases involving the word 'cup', *ekikómbe*, illustrate, high tone deletion in Haya involves a similar environment. Hyman & Byarushengo note that demonstratives and numerals generally occur later in the noun phrase, after adjectives and possessives. They hypothesize that adjectives and possessives are in a "tighter" relationship with the noun (the target of high deletion). Their proposal, then, is that these words stand as sisters to the N under the N' node, while demonstratives, numbers and the like are outside of N' and are expansions of the SPEC node.

(88) NP Structure in Haya



In Runyambo, a very similar process of high tone deletion takes place on noun and verb heads of phrases when a high-toned complement follows them. This process, dubbed high tone reduction (HTR) by Hubbard, targets both noun and verb heads of phrases. Hubbard proposes that both of these phrasal types map to a structure like (89).

(89) Hubbard's Satellite Slot



Apart from nomenclature, this structure is the same as that proposed for Haya in (88). However, Hubbard claims that the "Sat" or satellite slot is privileged in the language and is only generated in certain category-specific instances. Thus, in Runyambo, the satellite position only receives and argument (is generated) in the genitive construction.

For Zinza, Odden notes that a similar principle involving high tone deletion on verbs only takes place if the immediately following high-toned word is a complement of the verb. However, high deletion will not be triggered by a post-posed, coindexed object, as shown in (90), from Odden 1997.

- | | | |
|------|---------------------|----------------------|
| (90) | ateekifile | 'he cooked for' |
| | ateekiile káto | 'he cooked for Kato' |
| | amu,teekifilé káto, | 'he cooked for Kato' |

Additionally, high deletion in Zinza cannot be triggered by a post-posed object, as shown in (91).

- | | | |
|------|------------------|---------------|
| (91) | bulemo, y,-áagwa | 'Bulemu fell' |
| | y,-áagwa bulemu, | 'Bulemu fell' |

Odden assumes that these post-verbal words/phrases do not condition high deletion because they are not within the correct syntactic domain, namely, in the satellite position as a daughter to V'.

Odden (1996) describes principle of vowel shortening in Kimatuumbi wherein a vowel of a phrasal head is shortened when there is a complement in the phrase.

(92) Kimatuumbi Vowel Shortening

$$\begin{array}{c} \sigma \\ / \quad \backslash \\ \mu \quad \mu \end{array} \rightarrow \begin{array}{c} \sigma \\ | \\ \mu \end{array} / [X' [X \text{---} X] Y X'] \text{ (Y contains phonetic material)}$$

This example is similar if we consider that Odden points out that certain pre-head words do not undergo shortening.

- (93) $[_{V''} [_{SPEC} \text{keénda}_{SPEC} [_{V'} \text{akákaláanga}_{V'}]_{V''}]$
 if he-had-fried
 'if he had fried'

In (93), vowel shortening fails to apply to the word *keénda* 'if'. The solution suggested by Odden is that the demonstrative *keénda* 'if' is under the SPEC node and not within the V'. The relationship between the target and the trigger for vowel shortening here is essentially the same as for the preceding examples. The exclusion of the demonstratives echoes the exclusion of demonstratives from the domain of HDEL in Runyankore that we have seen above and will examine in more detail below.

What should be striking is the similarity between these languages. The application of HDEL in Runyankore follows a pattern similar to that found in Haya. The significant difference is that possessive phrases do not condition HDEL as they do in Haya. Following the work and observations of these three, I propose that the structure of the NP is such that only adjectives and possessive pronouns may occupy the COMP position, i.e., be sisters to the N under the N' node. The structure of a phrase like 'all old farmers' appears as in (94)

(94) 'all the old/important farmers'



The nodes corresponding to the COMP and the SPEC nodes are labeled in the tree.

In this phrase, the adjective appears as a sister to the N, under N'. In Runyankore, only indefinite adjectives (i.e., those lacking the initial vowel prefix) and possessives can occupy this slot. So, if a phrase has only a quantifier, a number, or some other non-HDEL inducing phrasal element after the noun, then it must appear in a phrase that is sister to N', as in (95).

- (95) 'all the farmers' 'the good farmers'
-

Under direct reference theory, we can isolate this position by allowing for another type of command relationship. As suggested by Odden 1997, this is one based on the single-bar node: X'-command:

- (96) X'-command (Odden 1997)
 α X-commands β iff the first X' node which dominates α also dominates β .

In Runyankore, HINS is restricted to occur only when a noun X'-commands a high-toned element. Recall that an adjective phrase can condition HDEL *omuhííjji muruunji munóonga* 'a very good farmer'. In this case, the sister to the N under N' contains a high tone. This structure is given in (97).

- (97) 'very good farmer'
-

The noun *omuhííjji* 'farmer' X'-commands everything in the AdjP. Because there is a high tone in that AdjP, on the word *munóonga* 'very', HDEL targets the noun. This type of example is particularly interesting because it shows evidence for a long-distance triggering of a phonological effect. The target, *omuhííjji* 'farmer', and the trigger, *munóonga* 'very' are not adjacent words. The word that separates them, *muruunji* 'good', is toneless and thus cannot be the trigger for HDEL on the noun.

One may recall that we saw instances above where the order of the elements in the noun phrase did not follow strictly the order described in (88). I propose that

the language allows for the possibility of some reordering of the elements in the phrase. This is discussed in the following section.

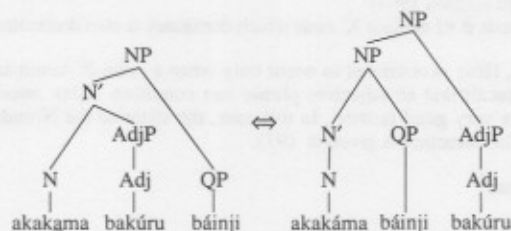
5.1.2 Phrasal Reorganization and Tone Deletion

Recall that the order of the adjective and the quantifier/demonstrative apparently is subject to some variation. A representative sample from (43) is repeated here as (98).

- (98) a. *abakáma báinji baruunji* 'many good chiefs'
 abakáma baruunji báinji 'many good chiefs'
- b. *abakáma báinji bakúru* 'many old chiefs'
 abakáma bakúru báinji 'many old chiefs'

Note that HDEL only targets the noun when the high-toned adjective immediately follows it, as in (98d). The reason that HDEL does not occur in (98c) is because the high-toned adjective is no longer in the same syntactic relationship with the noun *abakáma* 'chiefs'.

(99) NP Reorganization



The claim made by (99) is that there is a systematic relationship between these two sentences. In the version on the right, the AdjP *bakúru* 'old' occupies the SPEC position of a higher NP. The relationship in the second tree is one of adjunction. Whether this is accomplished by a transformation (i.e., by movement) or simply by a parallel type of derivation is not crucial to this analysis.

The significant point, however, is that the adjective phrase in this example no longer stands in the same syntactic relationship with the head noun *abakáma* 'chief'. Because of this, we theorize, HDEL cannot target the head of the phrase.

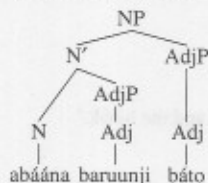
5.1.3 Multiple Adjective Phrases

There may be multiple adjectives or a combination of adjectives and possessives after a noun. Which of these are relevant for the application of HDEL? First, consider the following.

- (100) a. *abáána baruunji baáto* 'good young children'
 abaána bató baruunji 'young good children'
- b. *embwáá nuunjii nkúru* 'good old dog'
 embwaa nkúru nuunji 'old good dog'
- c. *embwáá yaanje nuunjii nkúru* 'my good old dog'
 embwaa yáitu nuunjii nkúru 'our good old dog'

The phrases in (100) illustrate the fact that HDEL only considers the immediately following adjective. If a high-toned adjective is separated from the noun by a toneless adjective, HDEL does not occur. For these phrases, I propose that the structure of the noun phrase is the determining factor in the deletion of the high tone. This structure is given in (101).

- (101) 'young good children'



In the phrase *abáána baruunji báto* 'good young children', HDEL would target the noun *abáána* 'children'. However, because it does not X'-command a high-toned complement HDEL does not occur. The high-toned adjective *báto* 'young' has no effect on the noun because it is above the N' node and is not X'-commanded by the noun. Rather, it occupies the SPEC node under the NP.

5.2 Contrasting the Domains of HDEL and HINS

Before continuing with this analysis, let us take a moment to compare the differences between HDEL and HINS. One of the important differences between these two is the difference in the domains of their application.

5.3 HINS, Phrasal Constituency and Domain Construction

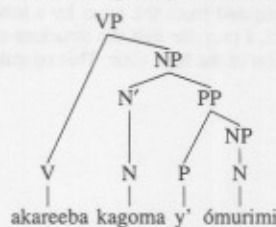
Under the prosodic domain approach to the syntax-phonology interface (Selkirk 1986, discussed in section 2.2.1 above), the application of a phonological rule is restricted within a particular prosodic domain. This domain is constructed based upon the ends of a specified syntactic category (usually XMax).

In the case of Runyankore, HDEL and HINS, as seen above, have different domains of application. We have just examined HDEL and have seen that we can refer to its characteristics by referring to the X'-command relationship that holds between the

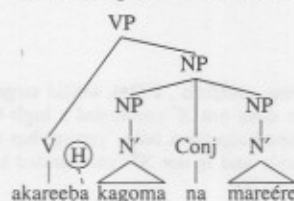
target and the triggering phrase. We will continue to assume that HDEL only considers what is within the X' category, while HINS has a wider domain of application, namely one that extends up to the edge of an XMax category.

The Direct Reference Theory can account for the data pertaining to HDEL. However, as promised above, the contrast between NPs with embedded prepositional phrases and conjoined NPs plays an important role. I repeat examples of these two structures here (from (77) and (78)).

- (102) akareeba kagoma y'ómurimi 'S/he saw the eagle of the farmer.'



- (103) akareebá kagoma na mareére 'S/he saw the eagle and the hawk.'

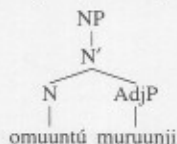


Notice that HINS fails in (102) (presumably because of the high tone on *ómurimi* 'farmer'). However, it *succeeds* in (103), *despite* the high tone on *mareére* 'hawk'. If the requirement is that the verb (the target of HINS) max-command a toneless phrase, then why is HINS not blocked in (103)? Because the high tone blocks HINS, it would appear that we only want to look as far as the first maximal projection. So, with respect to (103), only the NP containing *kagoma* is relevant. However, the Max-command relationship does not permit us to make this kind of distinction. The verb *akareeba* max-commands everything within the following NP, including *mareére*, which has a high tone. This presents a significant problem for an account that would rely solely upon the max-command relationship.

What this issue *does* suggest is that the scansion for high tones only searches as far as the end of the next maximal projection, without regard to embedding. This is exactly the kind of relationship that Selkirk's end-based prosodic theory tackles.

The application of HINS in Runyankore from an edge-based perspective is trivial. In fact, it is able to explain the differences between an NP with an embedded PP and an NP containing two conjoined NPs. First, let us examine a simple case, exemplified in (104).

- (104) 'a good person' (*omuuntu muruunji*)



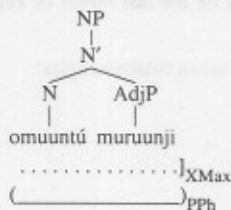
Here, HINS targets the word preceding the word at the end of an XMax phrase (in this case, NP). Following Selkirk, the parameters for the construction of a prosodic domain would be:

- (105) HINS parameters

- | | |
|---|--|
| <p>a. J_{XMax}</p> <p>b. PPh</p> <p>c. $\emptyset \rightarrow H / [_ \#]_{\alpha} [X]]_{PPh}$
X is toneless</p> | <p>Insert a boundary at the right edge of an XMax category.</p> <p>The edge is the edge of a prosodic phrase.</p> <p>Insert a high tone on the right edge of a toneless word that stands before the last element (X' or X^0) of the PPh.</p> |
|---|--|

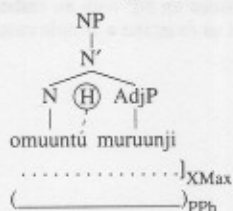
By (105a & b), the following domain would be constructed.

- (106) Domain Mapping onto 'a good person'



Based upon the PPh domain, the principle of HINS in (105) can apply, inserting a high tone onto *omuuntu* 'person'.

- (107) HINS onto 'a good person'

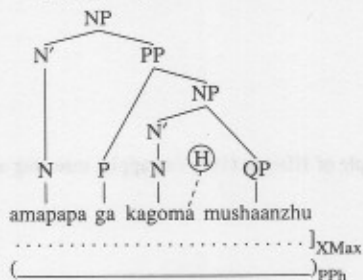


According to the specification of HINS given in (105c), only the word preceding the last element, word or phrase, of the PPh is targeted for HINS. Because of the structure of Runyankore, the successful target will be the word immediately prior to the last word in PPh. A counterexample would involve a toneless phrase appearing after a word that is a target for HINS. However, because of the conditions on HINS, that following toneless phrase should get a high tone (blocking HINS further to the left). Under a direct reference account, this would block any HINS onto a higher head (whether or not it X'-commands the lower unit). Furthermore, there are no examples of toneless phrases failing to undergo HINS. Unfortunately, adjectives take only *munóonga* 'very' as a complement. Because of the high toned *munóonga* HINS cannot target the adjective. Thus, we cannot test to see whether HINS would also target a toneless adjective. Note, however, that the phrases in (108) do not have high tones on the head nouns (*omuguha* 'rope' and *omuhoro* 'panga').

- (108) omuguha muruunji munóonga 'a very good rope'
 omuhoro muruunji munóonga 'a very good panga'

Let us consider a longer example examine the problem of recursive embedded domains. In the phrase in (109), a high tone appears on the last vowel of *kagoma* 'bataleur eagle'.

- (109) amapapa ga kagomá mashaanzhu 'wings of seven bataleur eagles'



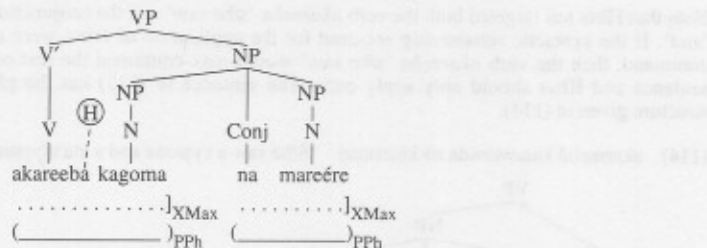
All the words in the input to the phrase in (109) are toneless. Under the direct reference account, we needed to specify that only the innermost head receives the high tone. However, in the prosodic domain account all the higher head of phrases are subsumed within the same prosodic domain. The principles of domain creation in (105) scans until the end of the XMax category. Any earlier sites for HINS are effectively ignored because they are not penultimate in the PPh, as required by the principle of HINS as formalized in (105c).

Another problematic area for the direct reference account, one whose resolution within that theory is not clear, involves the different behaviors of NPs depending upon their internal structure. These two possibilities are exemplified in (110). Recall that HINS will target a word when its NP complement contains a conjoined NP, as long as the first NP within it is toneless; it does not care about the tonal value of the second NP. On the other hand, a high tone within an embedded prepositional phrase will be sufficient to block HINS. See (110a) and (110b), respectively.

- (110) a. akareebá kagoma na mareére 'S/he saw an eagle and a hawk.'
 b. akareeba kagoma y'ómwáana 'S/he saw the eagle of the child.'

We know that these two types of NP have different internal structures. It is the different in the structures that allow the edge computation algorithm in (105) to create different prosodic domains, and thus predict the correct application of HINS.

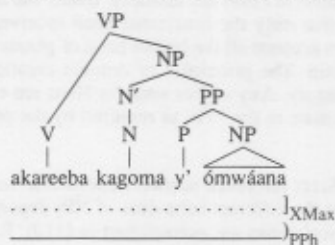
- (111) akareebá kagoma na mareére 'S/he saw an eagle and a hawk.'



In (111), the scansion of the VP reveals an edge at the end of the word *kagoma* 'eagle'. Unlike the direct reference theory, which would include the rest of the parent NP in the XMax domain of the verb *akareeba*, the prosodic phrase ends before the rest of the conjoined construction. In fact, a second prosodic phrase is created based on the next end of XMax. If this final NP had been toneless, we would have also gotten HINS on the conjunction *na* 'and' (see (75) and (80) for several examples of HINS onto this word).

Compare the prosodic structure of (111) with that found in (112).

- (112) akareeba kagoma y'ómwáana 'S/he saw the eagle of the child.'



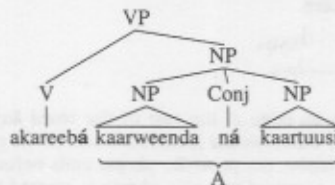
Here, the end of an XMax is not encountered until the very end of the entire VP. Because of this, the entire VP maps to one prosodic phrase. In this case, then, the verb *akareeba* is not a possible target for HINS given the principle in (105c).

Another piece of evidence that the XMax edge is relevant to domains is the fact that HINS can apply twice within a domain that would be a single max-command domain. Consider the following sentence, repeated from (75).

- (113) a-ka-reeb-á kaarweenda ná kaartuusi
-
- 3S-REM-saw-FV cypress and eucalyptus
-
- 'S/he saw a cypress and a eucalyptus.'

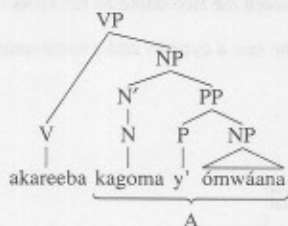
Note that HINS has targeted both the verb *akareeba* 's/he saw' and the conjunction *na* 'and'. If the syntactic relationship required for the application of HINS were max-command, then the verb *akareeba* 's/he saw' would max-command the rest of the sentence and HINS should only apply once. The sentence in (113) has the phrase structure given in (114).

- (114) akarreebá kaarweenda ná kaartuusi 'S/he saw a cypress and a eucalyptus.'



The domain "A" is the range of the max-command relationship of the verb *akareeba* 's/he saw'. The problem lies in the fact that the exact same max-command relationship holds in a sentence with a prepositional phrase after the verb, such as the sentence in (110b). However, HINS cannot occur in this sentence, repeated here as (115).

- (115) akareeba kagoma y'ómwáana 'S/he saw the eagle of the child.'

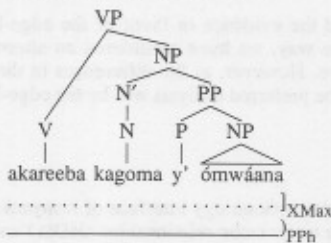


Observe that the max-command domain of the verb *akareeba* 's/he saw', A, is the same in the sentence in (115). However, the tonal output is not the same. The failure of HINS to apply (inserting a high tone on the verb) is attributed to the high tone that is present on the object of the preposition *ómwáana* 'child'. Why does this high tone block HINS while the high tone on the conjunction *na* 'and' in (114) fail to block HINS? If there is a domain for HINS that includes the verb then it must also include the object of the preposition in (115). On the other hand, there must be two separate HINS domains in the sentence where two high tones are inserted, as in (114).

The problem with computing the domains of HINS by referring to the max-command relationship is that it makes the wrong prediction, in the case of a sentence with a conjunction. The conjunction should not present a barrier to the verb max-commanding the two NPs conjoined by the conjunction. We would expect a parallel behavior between a NP containing two conjoined NPs and an NP containing a noun and a prepositional phrase.

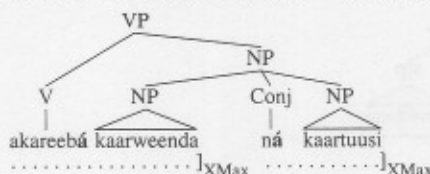
We therefore conclude that the direct-reference account that makes use of the max-command relationship is unable to distinguish between these two structures. On the other hand, the edge-based account is able to distinguish between these two sentences. Notice that the edge of the XMax category in the sentence in (115) comes at the very end of the utterance.

- (116) akareeba kagoma y'ómwáana 'S/he saw the eagle of the child.'



On the other hand, a conjoined NP contains an NP maximal projection within it, and this is apparently where the boundary between the two domains for HINS lies.

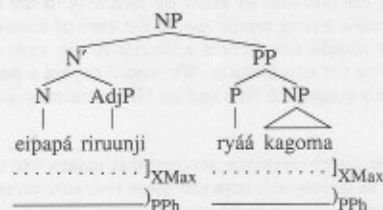
- (117) akareebá kaarweenda ná kaartuusi 'S/he saw a cypress and a eucalyptus.'



In the sentence in (117), the right edges of the XMax define the edges of the domains for HINS, viz. the phonological phrase.

The end-based account also allows us to explain why we find HINS on the head noun when there is an intervening toneless modifier, despite a prepositional phrase with a high tone. Examples of this appear in (66). In (118), repeated from (66), the right edges of the XMax phrases delimit the phonological phrases.

- (118) eipapá riruunji ryáá kagoma 'good wing of the eagle'



With the addition of an adjective phrase, *riruunji* 'good', an additional phonological phrase appears. Because of this, the high tone that appears within the PP is not seen from within the N'.

In this section, we have examined the evidence in favor of the edge-based analysis of high tone insertion. Along the way, we have considered an alternative analysis based upon syntactic relationships. However, as the differences in the data and the application of HINS have shown, the preferred analysis will be the edge-based analysis.

5.4 HDEL and the Phrasal Analysis

What is striking about this analysis the syntax-phonology interface of Runyankore is the proposal that one rule makes reference to syntactic relationships (HDEL) and that

another (HINS) depends upon the edges of a prosodic category, the phonological phrase, which is constructed based upon the right edge of a maximal projection.

As we have just seen, the principle of phrasal HINS cannot be as neatly accounted for under the rubric of direct reference. But, on the other side of the theoretical coin, can HDEL be accounted for by means of a prosodic domain?

The first problematic issue with this approach would be determining what, in fact, the prosodic domain for HDEL is. Leaving aside the possibility that it also is the phonological phrase, we would have to consider a prosodic unit lower in the hierarchy (as the domain for HDEL lies within the domain for HINS). Could we refer to the clitic group or the phonological word? The most compelling counter-evidence to such a claim is the fact that an adjective phrase comprising a toneless adjective and the high-toned adverb *munóonga* 'very, a lot' can trigger HDEL (recall the examples given in (55): *omuhinji muruunji munóonga* 'a very good farmer'). There does not seem to be any good evidence that these three words constitute a phonological word.

6 Conclusion

One of the significant debates in the study of the interface between syntax and phonology involves the type of information that is accessible to the phonology of a language from the syntactic structure. The primary question seems to be "can phonological rules make reference to syntactic structure?" Or, is the phonology limited to information that is mediated through levels of prosodic structure created from (restricted) syntactic information.

In Runyankore, the application of the two main phonological principles that must have access to syntactic information suggests that both types of rules may in fact be necessary. Consider that the principle of HDEL has such a limited range of application. Because it only applies to nouns when a particular type of complement follows, the principle that directs its application should have access to this type of specific syntactic information. On the other hand, the principle governing HINS appears to be quite broad, targeting any toneless word that comes before another toneless word at the end of some expanse. Recall the facts of coordinated expressions, which are one unit syntactically, but have a break in before the conjunction. These facts support the notion that the *end* of some syntactic domain is relevant. Furthermore, the more general application of HINS at least allows for the possibility that a more general category (in this case, the phonological phrase) defines the domain of application for these rules.

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Monotonicity Constraints on Negative Polarity in Hindi

Shravan Vasishth

0 Introduction

Certain aspects of negative polarity item (NPI) licensing in languages like English and Dutch have been accounted for in the literature in terms of downward monotonicity. It is shown here that such a treatment must be augmented in the case of languages like Hindi to take into consideration the interaction of focus particles with NPIs.

In this paper, by Hindi I mean the dialect spoken in Delhi and referred to variously as Hindi-Urdu, Urdu, and Hindustani. The discussion is organized as follows: Section 1 introduces the relevant empirical facts about English and the theoretical background; Section 2 discusses NPIs in Hindi from the logical perspective introduced in Section 1; and Section 3 consists of concluding remarks.

1 NPIs and monotonicity

The role of downward monotone or monotone decreasing expressions in NPI licensing has been well known since (Ladusaw 1979). In this section, I begin by summarizing the known facts about NPI licensing in English. These facts, along with related work on Dutch and German NPIs (see Zwarts 1986, van der Wouden 1997, among others), seem to indicate that NPIs tend to present a hierarchical behavior in these languages and presumably cross-linguistically. Next, I examine the mathematical notion of monotonicity in natural language in order to set the stage for the discussion to follow. I conclude this section by summarizing van der Wouden's (1997) account of NPI licensing.

1.1 Some facts about NPIs

Klima (1964) showed that certain words and phrases must appear within the scope of a negative element in order to be acceptable in a well-formed sentence. Some simple examples from English, where the licenser in question is *not* (or *n't*), are *any*, *a bit*, and *half bad*; see van der Wouden (1997:141) and McCawley (1988:562–3) for a detailed discussion of these and other NPIs. Comparing the pairs given in examples (1) to (3), it is clear that each of the NPIs must be licensed by—in other words, must appear in the presence of—the negative element *n't*. (In subsequent examples, the licensing environment is shown in **bold letters** and the NPIs in *italics*; bold letters do not indicate intonational prominence.) In (2b), although a literal reading is available in the positive context, the NPI reading is not; such NPIs are known as *minimizers* (see Bolinger 1972 and Horn 1989:399–400).

- (1) a. John hasn't talked about *any* of these problems.
 b. *John has talked about *any* of these problems.
- (2) a. John wasn't *a bit* happy about these problems.
 b. #John was *a bit* happy about these problems.
- (3) a. This new book on semantics isn't *half bad*.
 b. *This new book on semantics is *half bad*.

It turns out, however, that the presence of such a negative element is a sufficient but not a necessary condition for NPI licensing, and that English NPIs display a hierarchical behavior with respect to their licensing environments. As an illustration of this hierarchical behavior, consider the three NPIs *any*, *a bit*, and *half bad* and the constraints on their appearance in the presence of the licensers *few students*, *no-one*, and *not*.

- (4) a. **Few students** are aware of *any* of these facts.
 b. **No-one** is aware of *any* of these facts.
 c. John hasn't read *any* of these books.
- (5) a. ***Few students** were *a bit* happy about these facts.
 b. **No-one** was *a bit* happy about these facts.
 c. John wasn't *a bit* happy about these facts.
- (6) a. ***Few amateur actors** were *half bad*.
 b. *Among the amateur actors, **no-one** was *half bad*.
 c. This new book on semantics isn't *half bad*.

The above facts may be conveniently summarized in tabular form:

Table 1

	<i>any</i>	<i>a bit</i>	<i>half bad</i>
few students	✓	*	*
no-one	✓	✓	*
not/n't	✓	✓	✓

A caveat is in order here. It is arguable whether *half bad* is in fact an NPI as claimed, *inter alia*, by McCawley (1988:562–3), and it may turn out that English has very few or no NPIs that appear only with *not* or *n't* and not with licensors like *no-one* (Yoshimura 1996, and M. Israel, p.c.). This latter view may well be correct and it may be that English only has NPIs that have the same distribution as *any* and *a bit* as shown above. However, English NPIs are used here merely for illustrative purposes. The point is that NPIs of several languages (Dutch and Japanese, among others) display the kind of three-way distinction presented for English above. The specific claims for English are not crucial in this respect to the discussion that follows.

With this caveat in mind, what is required for the above data is an explanation of three facts: why is the NPI *any* permitted in the scope of all the three licensors *few students*, *no-one*, and *not*, as in (4); why is *a bit* allowed only in the scope of *no-one* and *not* but not *few students*, as in (5); and why does *half bad* appear only in the scope of *not* and not *few students* or *no-one*, as in (6). Zwarts (1986), van der Wouden (1997), and others, developing Ladusaw's (1979) ideas, have in fact provided an account of these English facts. Before describing Zwarts' and van der Wouden's treatment of NPI licensing, first let us review the phenomenon of monotonicity in natural language.

1.2 Monotonicity and Natural Language

Ever since Barwise and Cooper 1981, noun phrases (NPs) have been treated as generalized quantifiers, that is, as (higher order) set-theoretic entities consisting of collections of sets. Moreover, certain quantified NPs, such as *few N* and *at most n N*, happen to have the set-theoretic property of being closed under subsets: given a universe U , sets X and Y , and a (generalized) quantifier Q , if $X \in Q$ and $Y \subseteq X \subseteq U$, then $Y \in Q$. Such quantifiers are known as *downward entailing* or *monotone decreasing* (Barwise and Cooper 1981).

Monotone decreasing quantifiers contrast with *upward entailing* or *monotone increasing* quantifiers such as *every N*, and *at least n N* which have the property of being closed under *supersets*. In set-theoretic notation, upward entailment amounts to the following statement: if $X \in Q$ and $X \subseteq Y \subseteq U$, then $Y \in Q$.

As an example of downward entailing expressions, consider the sentence *few men ran* which contains the downward entailing quantifier *few men*. Given the truth of this expression, we can conclude that the expression *few men ran slowly* must also be true. Here, the set of slow runners is in general a proper subset of the set of runners. The converse, however, is not true. That is, given that *few men ran slowly* is true, we cannot conclude that *few men ran* must also be true. In other words, we can't reason from a set such as one characterizing the property of running slowly to one of its supersets, which in this case is the set characterizing the property of running. The discussion in this paper is limited to noun phrases as generalized quantifiers, which take the verb phrase denotation as argument. However, it is also possible to consider a determiner as a two-place relation which takes the noun and the verb phrase as arguments. In such a case, one can then speak of downward and upward monotonicity applying independently to both the first and second arguments of the determiner. For example, the generalized determiner *every* can be regarded as taking two arguments, a first argument, such as *woman*, with which it forms an NP, *every woman* and a second argument, such as the verb phrase *is running*, to form the sentence *every woman is running*. As the reader can verify, *every* happens to be downward monotone in its first argument, but upward monotone in its second argument: *every woman is running* entails *every tall woman is running* but not *every woman is running in the park*. In this paper, when talking about NPs as NPI licensors, in the case where I describe an NP as monotone decreasing, it should be clear that I am referring to the monotonicity property as applying to the second argument of the generalized determiner in question.

Zwarts (1996:175) and van der Wouden (1997:94–111) note that there is an alternative, boolean algebraic way of determining monotonicity. I adapt their results to present the following simplified schemata.

- (7) a. **Schema 1**
An NP is monotone decreasing iff the following is logically valid:
 $NP (VP_1 \text{ or } VP_2) \rightarrow (NP VP_1 \text{ and } NP VP_2)$
- b. **Schema 2**
An NP is anti-additive iff the following is logically valid:
 $NP (VP_1 \text{ or } VP_2) \leftrightarrow (NP VP_1 \text{ and } NP VP_2)$
- c. **Schema 3**
An NP is antimorphic iff the following are logically valid:
 $NP (VP_1 \text{ or } VP_2) \leftrightarrow (NP VP_1 \text{ and } NP VP_2)$
 $NP (VP_1 \text{ and } VP_2) \leftrightarrow (NP VP_1 \text{ or } NP VP_2)$

Next, we examine the natural language counterparts of these three classes of functions. Looking first at monotone decreasing functors as defined in Schema 1, note first of all that Schema 1 corresponds to one half of the first of De Morgan's laws of negation, stated

below. In other words, monotone decreasing functors are weakly negative contexts, since they satisfy only part of De Morgan's first law.

(8) a. De Morgan's First Law:

$$\neg(p \vee q) \leftrightarrow (\neg p \wedge \neg q)$$

b. De Morgan's Second Law:

$$\neg(p \wedge q) \leftrightarrow (\neg p \vee \neg q)$$

In English, several NPs qualify as monotone decreasing on the basis of the test given in Schema 1; Zwarts (1996:176) lists twenty-one such NPs but we consider only two, *few N* and *at most n N*, by way of illustration. Applying Schema 1 to the expression *few men*, we find that it does indeed satisfy the schema.

(9) a. **Few men** drink or smoke \rightarrow (\nrightarrow) **few men** drink and **few men** smoke.

b. **At most two men** drink or smoke \rightarrow (\nrightarrow) **at most two men** drink and **at most two men** smoke.

Turning now to anti-additive functors as defined in Schema 2, notice that the definition corresponds to the first of De Morgan's laws in its entirety. In other words, these constitute a stronger negative context than monotone decreasing functors. Zwarts (1996:184) lists eleven NPs that qualify as anti-additive, but we consider only two for purposes of illustration, *no N* and *none of the N*.

(10) a. **No men** drink or smoke \leftrightarrow **no men** drink and **no men** smoke.

b. **None of the men** drink or smoke
 \leftrightarrow **none of the men** drink and **none of the men** smoke.

It is obvious from the schemata in (7) that anti-additive expressions constitute a subset of monotone decreasing ones, since anti-additivity is simply a more restrictive condition than monotone decreasingness. The significance of this fact is that if an NPI is licensed in a monotone decreasing context, it must necessarily be licensed in an anti-additive one as well; however, the converse is not true, as we will presently see. Put another way, all anti-additive contexts, which satisfy the more restrictive biconditional in Schema 2, are also monotone decreasing ones, since they naturally satisfy the less restrictive implication of Schema 1 in (7a); the converse is not true. A similar distinction holds between anti-additive expressions and antimorphic expressions: antimorphic expressions are a subset of anti-additive expressions. By transitivity, it follows that antimorphic expressions are a subset of monotone decreasing ones as well.

With these distinctions in mind, I now present a summary of van der Wouden's (1997) conclusions regarding negative polarity and its connection to downward monotonicity.

1.3 Strong, medium and weak NPIs and monotonicity in English

To recall the case of English, shown in (4) to (6) and repeated below, *any* appears in all downward entailing contexts (i.e., monotone decreasing, anti-additive, and antimorphic), *a bit* only in anti-additive contexts (i.e., anti-additive and antimorphic), and *half bad* only in antimorphic contexts.

- (11) a. **Few students** are aware of *any* of these facts.
 b. **No-one** is aware of *any* of these facts.
 c. John hasn't read *any* of these books.
- (12) a. ***Few students** were *a bit* happy about these facts.
 b. **No-one** was *a bit* happy about these facts.
 c. John wasn't *a bit* happy about these facts.
- (13) a. ***Few amateur actors** were *half bad*.
 b. *Among the amateur actors, **no-one** was *half bad*.
 c. This new book on semantics isn't *half bad*.

Van der Wouden (1997) refers to NPIs like *any* as 'weak', those like *a bit* as 'medium', and those like *half bad* as 'strong'. The idea is that weak NPIs appear in all weak negative contexts (and this encompasses the three kinds of negative contexts), medium NPIs appear in medium negative contexts (all anti-additive contexts, and therefore all antimorphic contexts), and strong NPIs appear only in strong negative contexts (antimorphic contexts). To summarize van der Wouden's view of NPIs:

- (14) a. **Definition 1**
 An NPI is weak iff it is licensed in monotone decreasing contexts.
- b. **Definition 2**
 An NPI is medium iff it is licensed in anti-additive contexts.
- c. **Definition 3**
 An NPI is strong iff it is licensed in antimorphic contexts.

These facts indicate that, at least in the case of English, the strong, medium, and weak distinction of NPIs is meaningful and sheds new light on the factors constraining the occurrence of NPIs in natural language. Moreover, van der Wouden claims similar results for Dutch, and Vasishth (1998a) for Japanese.

These results are summarized in Table 2 below. The first row in Table 2 lists the three kinds of NPIs discussed above; the next three rows give examples of such NPIs from English, Dutch, and Japanese; and the remaining three rows show the three different NPI licensing contexts. A check mark (✓) indicates that the NPI-type in question is allowed in a given licensing context. For example, *any* is allowed in any monotone decreasing context. Similarly, an asterisk (*) indicates that the NPI-type in question is not allowed in a given licensing context. For example, *a bit* is only allowed in anti-additive (and therefore also antimorphic) contexts.

Table 2

	weak NPI	medium NPI	strong NPI
English	<i>any</i>	<i>a bit</i>	<i>half bad</i>
Dutch	<i>kunnen uitstaan</i>	<i>ook maar iets</i>	<i>mals</i>
Japanese	<i>hitokoto-demo-morasu</i>	<i>siyooto-demo-suru</i>	<i>dare-mo</i>
monotone decreasing	✓	*	*
anti-additive	✓	✓	*
antimorphic	✓	✓	✓

These results for English, Dutch and Japanese naturally raise the question whether other languages have a similar distinction among their NPIs. The next section is an attempt to answer this question with regard to Hindi.

2 Hindi Negative Polarity Items

In this section I examine the licensing constraints on Hindi NPIs. First, I establish the existence of monotone decreasing, anti-additive, and antimorphic contexts in Hindi. Then, a diverse collection of NPIs is introduced, which are classified according to whether they (optionally or obligatorily) take the suffix *-bhii*, 'also, even', and/or *-tak*, 'until, even' (see Vasisht 1997 for more details on the semantics of *-bhii* and *tak*). Next, it is demonstrated that these NPIs separate into three classes, corresponding to van der Wouden's (1997) three-way distinction. That is, I provide two distinct classifications of the NPIs in question: (a) a classification based on suffixation restrictions; and (b) another based on licensing restrictions.

To anticipate the generalizations empirically arrived at below, several facts emerge about Hindi NPIs with respect to their co-occurrence with the focus particles *-bhii* and *-tak*. When *-bhii* is suffixed to an NPI, it forces that NPI to become weak, irrespective of whether the NPI itself was originally weak, medium, or strong. Moreover, whenever *-tak* is suffixed to an NPI, that NPI becomes medium, irrespective of whether the NPI itself was

weak, medium, or strong. These results appear to have cross-linguistic validity since the tendency of elements like *-bhii* and *-tak* to participate crucially in the licensing of NPIs is present in Japanese as well, although the interaction with NPIs of the corresponding Japanese elements *mo*, 'also, even', and *demo*, 'even', is quite different (Vasishth 1998a).

2.1 Negative Polarity licensors in Hindi

First consider *kam-hii N*, 'few-ENCL(ITIC) N', and *aadhe se kam N*, 'less than half (of all the) N'. These turn out to be monotone decreasing but not anti-additive or antimorphic, as the bracketed invalid implications indicate. In the following discussion, although the enclitic *-hii* functions as a marker indicating emphasis, *-hii* has a somewhat more complex semantics: it also corresponds semantically to *only*, but only in a restricted sense, as discussed in detail in Vasishth 1998b.

- (15) a. **kam-hii bacce** naacte yaa gaate haī
 few-ENCL children dance or sing are
 → (✓) **kam-hii bacce** naacte haī aur **kam-hii bacce** gaate haī
 few-ENCL children dance are and few-ENCL children sing are
 'Few children dance or sing → (✓) few children dance and few children sing.'
- b. **aadhe se kam** bhaaratīya jaapaanii bol yaa paḍh sakte haī
 half from less Indians Japanese speak or read can are
 → (✓) **aadhe se kam** bhaaratīya jaapaanii bol sakte haī
 half from less Indians Japanese speak can are
 aur **aadhe se kam** bhaaratīya jaapaanii paḍh sakte haī
 and half from less Indians Japanese read can are
 'Less than half of all Indians can speak or read Japanese → (✓) less than half of all Indians can speak Japanese and less than half of all Indians can read Japanese.'

By contrast, the antecedent of the conditional *agar*, 'if ...', and the phrasally negated proper noun (PN) *PN nahī*, 'not PN', exhibit anti-additivity, as (16a) and (17a) show, but not antimorphicity, as (16b) and (17b) show.

- (16) a. muj-he bahut dukh hogaa **agar** tum-ne sharaab yaa sigareṭ piinii shuruu
 me-to much sadness will-be if you-ERG alcohol or cigarette drink begin
 kii ↔ muj-he bahut dukh hogaa **agar** tum-ne sharaab piinii shuruu kii aur
 do me-to much sadness will-be if you-ERG alcohol drink begin do and
agar tum-ne sigareṭ piinii shuruu kii
 if you-ERG cigarette drink begin do

'I'll be very unhappy if you start drinking or smoking ↔ I'll be very unhappy if you start drinking and I'll be very unhappy if you start smoking.'

- b. muj-he bahut dukh hogaa **agar** tum-ne sharaab aur sigareṭ piinii shuruu
 me-to much sadness will-be if you-ERG alcohol and cigarette drink begin
 kii ↔ muj-he bahut dukh hogaa **agar** tum-ne sharaab piinii shuruu kii yaa
 do me-to much sadness will-be if you-ERG alcohol drink begin do or
agar tum-ne sigareṭ piinii shuruu kii
 if you-ERG cigarette drink begin do

'I'll be very unhappy if you start drinking and smoking ↔ I'll be very unhappy if you start drinking or if you start smoking.'

- (17) a. **samiir nahī** naactaa yaa gaataa
 Samir not dance or sing
 ↔ **samiir nahī** naactaa aur **samiir nahī** gaataa
 Samir not dance and Samir not sing
 'It is not Samir who dances or sings ↔ It is not Samir who dances and it is not Samir who sings.'
- b. **samiir nahī** naactaa aur gaataa
 Samir not dance and sing
 ↔ **samiir nahī** naactaa yaa **samiir nahī** gaataa
 Samir not dance or Samir not sing
 'It is not Samir who dances and sings ↔ It is not Samir who dances or it is not Samir who sings.'

Finally, sentential negation *nahī* and *naa*, like their English counterpart *not* or *n't*, are antimorphic (I do not present the corresponding sentences for *naa* here or in subsequent examples, but this can easily be done):

- (18) a. rahul naactaa yaa gaataa **nahī** ↔ rahul naactaa **nahī** aur rahul gaataa **nahī**
 Rahul dances or sings not Rahul dances not and Rahul sings not
 'Rahul does not dance or sing ↔ Rahul does not dance and Rahul does not sing.'
- b. rahul naactaa aur gaataa **nahī** ↔ rahul naactaa **nahī** yaa rahul gaataa **nahī**
 Rahul dances and sings not Rahul dances not or Rahul sings not
 'Rahul does not dance or sing ↔ Rahul does not dance and Rahul does not sing.'

Thus it is clear that Hindi also has the three kinds of downward entailing expressions (i.e., monotone decreasing, anti-additive, and antimorphic expressions) discussed for English. Before looking at the behavior of several Hindi NPIs in these licensing environments, I first present a classification of the NPIs.

2.2 A suffixation-based classification of Hindi NPIs

Nineteen NPIs in Hindi are considered in the following discussion. These NPIs fall into three groups: Group I, whose members do not accept either of the focus particles *-bhii* or *-tak*; Group II, whose members can accept *-bhii* but never *-tak*; and Group III, whose members can accept *-bhii* or *-tak*, or both. In the following examples, I give each NPI in the antimorphic context *nahī*; in a corresponding positive sentence, each NPI is ungrammatical or, if the NPI is a minimizer, allows only a jocular or literal reading, not the NPI reading.

2.2.1 Group I (or Bare) NPIs

- (19) a. *koi baat (*-bhii/*-tak) nahī*
 IDIOM even not
 'It doesn't matter.'
- b. *tum-he uttar dene-kii koi-zarurat (*-bhii/*-tak) nahī*
 you-to answer giving some-need even not
 '(There is) no need for you to answer.'
- c. *tum-he uttar dene-kii koi-aavashyaktaa (*-bhii/*-tak) nahī*
 you-to answer giving some-necessity even not
 '(There is) no need for you to answer.'
- d. *muj-he us kitaab-kaa sir-pair (*-bhii/*-tak) nahī samajh aayaa*
 me-to that book-of head-foot even not understand came
 'I couldn't make head or tail of that book.'
- e. *maī us siḍ-siḍe-ke muh (*-bhii/*-tak) nahī lagtaa*
 I that rotten head mouth even not attach to
 'I don't interact with that bad-tempered (man/woman) at all.'
- f. *muj-he kuch fark (*-bhii/*-tak) nahī padtaa*
 me-to some difference even not fall
 'It doesn't make any difference to me.'

2.2.2 Group II (or Bhii) NPIs

As mentioned earlier, these NPIs accept the suffix *-bhii* but not *-tak*. Note that the NPI in (20d) differs from the others in that the presence of *-bhii* is obligatory.

- (20) a. *koi (-bhii/*-tak) nahī aayaa*
 some even not came
 'Nobody cam.' (Lit. 'Anyone did not come.')

- b. mai-ne kisii-ko (-bhii/*-tak) nahī dekhaa
I-ERG some-ACC even not saw
'I didn't see anyone.'
- c. sudhir apne-aap padhai karne-kii zaraa (-bhii/*-tak) koshish nahī kartaa
Sudhir himself study doing little even attempt not does
'Sudhir doesn't try (even) a bit to study on his own.'
- d. mā̃ kisii haalat-mē (-bhii/*-tak) tumharii madad nahī karuungaa
I some state-in even your help not will do
'I will not help you under any circumstances.'
- e. tuu-to praṇav-ke juuti-ke nōk-ke baraabar (-bhii/*-tak) nahī
you-FOC Praṇav-of shoe-of tip-of equal even not
'You're no match for Praṇav.'
- f. harii kataii (-bhii/*-tak) nahī aisaa karegaa
Hari completely even not like this will do
'Hari would never do such a thing.'
- g. ramesh bilkul (-bhii/*-tak) nahī kaam kartaa
Ramesh totally even not work does
'Ramesh doesn't do a shred of work.'

2.2.3 Group III (or Bhii/Tak) NPIs

These NPIs accept *-bhii* or *-tak* (or both) as a suffix. The second NPI given below, *uf karnaa*, consists of an interjection, *uf* and the verb *karnaa*, 'to do', (past tense form: *kii*) and may be translated as '(not) to show distress'. For convenience, I gloss *uf* as ONOM, for onomatopoeic.

- (21) a. ramesh-ne harii-ko girte dekhaa
Ramesh-ERG Hari-ACC falling saw
lekin vo *tas se mas* (-bhii/-tak) nahī huua
but he budge an inch even not became
'Ramesh saw Hari fall, but he didn't budge an inch (to help).'
- b. us-ne sab-kuch bec daalaa lekin vimlaa-ne *uf* (-bhii/-tak) nahī kii
(s)he-ERG everything sold gave but Vimla-ERG ONOM even not did
'(S)he sold off everything, but Vimla didn't show even the slightest distress.'
- c. ramesh-ne apni bahin-kii shaadii-mē *tinkaa* (-bhii/-tak) nahī hilaayaa
Ramesh-ERG own sister-POSS marriage-in straw even not moved
'Ramesh didn't lift a finger to help in his sister's marriage.'

- d. ravii-ne ganit-ke prashnō-kaa uttar dene-kii *koshish* (-bhii/-tak) **nahī** kii
 Ravi-ERG maths-of questions-of answer give-that attempt even not did
 'Ravi didn't even try to answer the maths questions (in the exam).'
- e. ravi-ne sharaab-ko *muh* (-bhii/-tak) **nahī** lagaayaa
 Ravi-ERG alcohol-ACC mouth even not adhered
 'Ravi didn't (even) touch the alcohol.'
- f. harish-ne pitaa-jii-ke saamne dar-ke-maare
 Harish-ERG father-HON-of in front of fear-of-due to
muh (-bhii/-tak) **nahī** kholaa
 mouth even not open
 'Out of fear, Harish didn't (even) open his mouth in front of his father.'

Next, we determine the licensing constraints on these three types of NPIs, using the three kinds of NPI licensors discussed earlier.

2.3 Strong, medium and weak NPIs in Hindi

In this section, we will look at each group in turn, and try to determine if van der Wouden's three-way distinction is valid for these NPIs.

2.3.1 Group I NPIs

The NPI considered in this group appear to be only strong or weak; no medium NPIs seem to exist among the Group I or Bare NPIs. An example of a strong Group I NPI is *sir-pair*, 'head or tail'; it is strong because it is only licensed in antimorphic contexts (like *nahī*), but in general not in monotone decreasing contexts (like *kam-hii log*) or anti-additive ones (like *agar*).

- (22) a. ***kam-hii logō-ko** us kitaab-kaa *sir-pair* samajh aayaa
 few-ENCL people-ACC that book-of head-foot understand came
 'Only a few people could make head or tail of that book.'
- b. ***agar** tum-he us kitaab-kaa *sir-pair* samajh aayaa ho
 if you-to that book-of head-foot understand came be
 to muj-he samjhaao
 then to-me explain
 'If you have been able to make head or tail of that book, please explain it to me.'

- c. muj-he us kitaab-ka *sir-pair nahī* samajh aayaa
 to-me that book-of head-foot not understand came
 'I couldn't make head or tail of that book.'

An example of a weak Group I NPI is *kuch-fark*, 'some difference'; it is weak because it is licensed in all the three kinds of downward entailing contexts, as shown below.

- (23) a. **kam-hii vidyaarthiō-ko kuch-fark** paḍtaa hai
 few-ENCL students-ACC some-difference fall is
 agar vo fel ho jaayē
 if they fail become go
 'It bothers only a few students if they fail.'
- b. **agar** tum-he *kuch-fark* paḍtaa ho to abhii kah do
 if you-to some-difference fall be then now say give
 'Say so now if it makes any difference to you.'
- c. muj-he *kuch-fark nahī* paḍtaa
 me-to some-difference not fall
 'It doesn't make any difference to me.'

2.3.2 Group II NPIs

All these NPIs are strong or medium when they appear without the suffix *-bhii*, but become weak if *-bhii* is suffixed.

An example of a medium NPI is *kisii*, 'any(one)'; it is medium because it is not licensed in every monotone decreasing context, a case in point is *kam-hii log*, but is licensed in all anti-additive contexts (including, of course, antimorphic ones). Note that in (24a) the NPI reading of *kisii* is being considered. The literal interpretation of *kisii*, 'some(one)', would be acceptable in (24a), but this is not the interpretation we are interested in.

- (24) a. ***kam-hii log kisii-kii** naukrii karnaa pasand karte haī
 few-ENCL people some-of service do like do are
 'Few people like to work for anyone.'
- b. **agar kisii-ko** paise caahiye hō to muj-he kaho
 if some-ACC money wants be then to-me say
 'Ask me if anyone needs money.'
- c. *kisii-ko* inaaam **nahī** milaa
 some-ACC prize not received
 'No-one got a prize.' (Lit. 'Anyone did not get a prize.')

However, this NPI becomes weak following the suffixation of *-bhii*. Note in the examples given below that the NPI *kisii-ko-bhii* (or *kisii-kii-bhii*) is licensed in all downward entailing contexts.

- (25) a. **kam-hii log** *kisii-kii-bhii* naukrii karna pasand karte haĩ
 few-ENCL people some-of-even service do like do are
 'Few people like to work for anyone.'
- b. **agar** tum-ne *kisii-ko-bhii* yah baat bataayii to bahut buraa hogaa
 if you-ERG some-ACC-even this story tell then very bad will-be
 'It won't be good (for you) if you reveal this story to anyone.'
- c. *kisii-ko-bhii* inaam **nahii** milaa
 some-ACC-even prize not received
 'No-one got a prize.' (Lit. 'Anyone did not get a prize.')

2.3.3 Group III NPIs

Group III includes NPIs that are either strong, medium, or weak when they appear without the suffix *-bhii* or *-tak*, but suffixing *-bhii* makes them weak and, alternatively, suffixing *-tak* makes them medium.

Consider first the NPI *muh lagaanaa*, 'to touch'. Without *-bhii* or *-tak*, the NPI is medium, since it appears only in anti-additive contexts as in (26b) and antimorphic contexts as in (26c), but sounds odd or literal in the monotone decreasing, but not anti-additive, context in (26a).

- (26) a. **#kam-hii log** sharaab-ko *muh lagaatee* haĩ
 few-ENCL people alcohol-ACC mouth adhere are
 'Few people touch alcohol.'
- b. **agar** tum-ne sharaab-ko *muh lagaayaa* to maĩ tum-he chor duungii
 if you-ERG alcohol-ACC mouth adhere then I you-to leave give
 'If you as much as touch (the) alcohol, I'll leave you.'
- c. ravi-ne sharaab-ko *muh nahii lagaayaa*
 Ravi-ERG alcohol-ACC mouth not adhered
 'Ravi didn't (even) touch the alcohol.'

Judgements vary for (26a); for some speakers, (26a) is grammatical, rendering the NPI medium, not weak as I claim above. However, it is immaterial for this discussion whether this NPI is weak or medium; the crucial facts relate to the suffixation of *-bhii* and *-tak*, discussed below, and the judgements for these seem to be clear.

If *-bhii* is suffixed to the NPI *muh lagaanaa*, it becomes acceptable in monotone decreasing contexts as well, as shown in (27a).

- (27) a. **kam-hii log** sharaab-ko *muh-bhii lagaatee* haī
 few-ENCL people alcohol-ACC mouth-even adhere are
 'Few people even as much as touch alcohol.'
- b. **agar** tum-ne sharaab-ko *muh-bhii lagaayaa*
 if you-ERG alcohol-ACC mouth-even adhere
 to maī tum-he chor̄ duungii
 then I you-to leave give
 'If you as much as touch (the) alcohol, I'll leave you.'
- c. ravi-ne sharaab-ko *muh-bhii nahī* lagaayaa
 Ravi-ERG alcohol-ACC mouth-even not adhered
 'Ravi didn't even as much as touch the alcohol.'

Suffixing *-tak* instead of *-bhii* to the NPI results in a literal reading when the NPI appears in the scope of a monotone decreasing expression, as shown in (28a). Here, as earlier, the judgement mark # indicates that the literal reading is possible, but the NPI reading is not.

However, in an anti-additive context, shown in (28b), and in an antimorphic context, shown in (28c), with *-tak* the NPI is grammatical.

- (28) a. #**kam-hii log** sharaab-ko *muh-tak lagaatee* haī
 few-ENCL people alcohol-ACC mouth-even adhere are
 'Few people even touch alcohol.'
- b. **agar** tum-ne sharaab-ko *muh-tak lagaayaa*
 if you-ERG alcohol-ACC mouth-even adhere
 to maī tum-he chor̄ duungii
 then I you-to leave give
 'If you as much as touch (the) alcohol, I'll leave you.'
- c. ravi-ne sharaab-ko *muh-tak nahī* lagaayaa
 Ravi-ERG alcohol-ACC mouth-even not adhered
 'Ravi didn't (even) touch the alcohol.'

To take another example, *uf karnaa*, 'to express distress', is a strong NPI when it appears without any suffix. Notice that in (29a) and (29b) only the literal reading is available, which is consistent with the fact that *uf karnaa* is a minimizer (Bolinger 1972). We will not go into the details of the behavior of Hindi minimizers here; this is considered in detail in Vasishth 1998b.

- (29) a. #*gaṇit-mē fel hone-par kam-hii vidyarthii uf kartee haī*
 mathematics-in fail become-on few-ENCL students ONOM do are
 'It matters to few students if they fail in mathematics.'
- b. #*agar tum-ne injekshan lagne-par uf kii*
 if you-ERG injection apply-on ONOM do
 to maī tum-he ḍarpok samjhuun-gaa
 then I you-to coward consider-will
 'I'll consider you a coward if you make even a sound when you get the injection.'
- c. *us-ne sab-kuch bec ḍaalaa lekin vimlaa-ne uf nahī kii*
 (s)he-ERG everything sold gave but Vimla-ERG ONOM not did
 '(S)he sold off everything, but Vimla didn't show even the slightest distress.'

However, suffixing *-bhii* to *uf karnaa* transforms it into a weak NPI:

- (30) a. *gaṇit-mē fel hone-par kam-hii vidyarthii uf-bhii kartee haī*
 mathematics-in fail become-on few-ENCL students ONOM-even do are
 'It matters to few students if they fail in mathematics.'
- b. *agar tum-ne uf-bhii kii to maī tum-he ḍarpok samjhuun-gaa*
 if you-ERG ONOM-even do then I you-to coward consider-will
 'I'll consider you a coward if you make even a sound.'
- c. *us-ne sab-kuch bec ḍaalaa lekin vimlaa-ne uf-bhii nahī kii*
 (s)he-ERG everything sold gave but Vimla-ERG ONOM-even not did
 '(S)he sold off everything, but Vimla didn't show even the slightest distress.'

Moreover, if *-tak* is suffixed instead of *-bhii*, *uf karnaa* is transformed into a medium NPI:

- (31) a. ??*gaṇit-mē fel hone-par kam-hii vidyarthii uf-tak kartee haī*
 mathematics-in fail become-on few-ENCL students ONOM-even do are
 'It matters to few students if they fail in mathematics.'
- b. *agar tum-ne uf-tak kii to tum-he ḍarpok samjhuun-gaa*
 if you-ERG ONOM-even do then you-to coward consider-will
 'I'll consider you a coward if you make even a sound.'
- c. *us-ne sab-kuch bec ḍaalaa lekin vimlaa-ne uf-tak nahī kii*
 (s)he-ERG everything sold gave but Vimla-ERG ONOM-even not did
 '(S)he sold off everything, but Vimla didn't show even the slightest distress.'

To summarize the conclusions one can draw from the foregoing data:

- Bare NPIs (Group I) are either strong or weak.
- Bhii NPIs (Group II), when they appear without any suffix, are strong or medium, but the NPIs become weak if *-bhii* is suffixed.
- Bhii/Tak NPIs (Group III), when unsuffixed, are either strong, medium or weak, but suffixing *-bhii* makes them weak and suffixing *-tak* makes them medium.

These facts indicate that the presence of *-bhii* is associated with the logically less restrictive monotone decreasing context, while *-tak* is associated with the logically more restrictive anti-additive context.

2.4 Some open questions

In this subsection, I mention several other related facts that could shed more light on the above facts or are currently unaccounted for.

A natural question to ask is: why do *-bhii* and *-tak* behave differently? One could argue from a lexicalist perspective that they simply have the boolean algebraic properties outlined in this paper. There are, however, some other differences between these two particles. I briefly mention these as a first step towards answering this question more comprehensively, and begin by listing some of the obvious differences.

- *-bhii* is a Sanskrit loanword, or a *tatsama* word, etymologically related to *-api*, 'also'; whereas, *-tak* is a *tadbhaava* loanword, taken from Middle Indo-Aryan *taavatkaa*.
- *-bhii* has all the properties of an *even*-NPI, while *-tak* behaves partly like a *wh*-NPI (Rullman 1996:7).
- *-bhii* behaves like an *inclusive focus particle* (König 1991) since, for example, (a) it is correlated with conjunction; (b) it combines with interrogative quantifiers like *koi* to form 'indefinite pronouns'; and (c) it is a part of the concessive connective *phir-bhii*, 'even so'. All of these are properties associated with inclusive focus particles; *-tak* has none of these characteristics.
- In a sentence like *raam-bhii nahī aayaa*, 'Ram also didn't come', there is no scalar presupposition that Ram was expected to come. However, in *raam-tak nahī aayaa*, 'Even Ram didn't come', a scalar presupposition exists to the effect that Ram was expected to come. In this connection, Lahiri (1998:59) argues that when *Raam* is focused, the utterance *raam-bhii aayaa* has an additional implicature to the effect

that Ram was the least likely to come, but he adds that this extra implicature could be the contribution of focus. He does not pursue this latter view, but this seems more plausible to me, and is the subject of a different paper (Vasishth 1997).

An interesting puzzle relates to an ordering constraint on *-bhii* and *-tak* when they co-occur. In the case of all the Group III NPIs (Bhii/Tak NPIs), if both *-bhii* and *-tak* occur simultaneously as suffixes, only the sequence *-tak-bhii* is permitted, never the sequence *-bhii-tak*. This is illustrated using one of the Group III NPIs.

- (32) a. ramesh-ne aadmii-ko girte dekhaa
 Ramesh-ERG man-ACC falling saw
 lekin vo *tas se mas-tak-bhii nahii* huaa
 but he budge an inch-even not became
 'Ramesh saw the man fall, but he didn't budge an inch (to help).'
- b. *ramesh-ne aadmii-ko girte dekhaa
 Ramesh-ERG man-ACC falling saw
 lekin vo *tas se mas-bhii-tak nahii* huaa
 but he budge an inch-even not became
 'Ramesh saw the man fall, but he didn't budge an inch (to help).'
- c. kam-hii log ramesh-ko girte dekhkar *tas se mas-tak-bhii* hue
 few-ENCL people Ramesh-ACC falling seeing budge an inch-even became
 'Few people saw Ramesh fall and bugged an inch (to help).'
- d. *kam-hii log ramesh-ko girte dekhkar *tas se mas-bhii-tak* hue
 few-ENCL people Ramesh-ACC falling seeing budge an inch-even became
 'Few people saw Ramesh fall and bugged an inch (to help).'

What seems to be happening here is that the weak suffix *-bhii* must take wide scope over the medium suffix *-tak*. Why this happens is still an open question.

3 Conclusion

Given the foregoing evidence from Hindi, we can conclude, firstly, that Hindi patterns with English, Dutch, and Japanese in possessing weak, medium, and strong NPIs. This is summarized in Table 3.

Table 3

	weak NPI	medium NPI	strong NPI
English	<i>any</i>	<i>a bit</i>	<i>half bad</i>
Dutch	<i>kunnen uitstaan</i>	<i>ook maar iets</i>	<i>mals</i>
Japanese	<i>hitokoto-demo-morasu</i>	<i>siyouto-demo-suru</i>	<i>dare-mo</i>
Hindi	<i>kisii-ko-bhii</i>	<i>uf-tak karnaa</i>	<i>sir-pair</i>
monotone decreasing	✓	*	*
anti-additive	✓	✓	*
antimorphic	✓	✓	✓

Secondly, it is evident that Hindi NPIs present a somewhat more intricate behavior than being simply weak, medium, or strong: an NPI's logical nature changes depending on the suffix it takes. Generally, if the suffix is *-bhii*, then NPI becomes weak, and if the suffix is *-tak*, the NPI becomes medium.

In sum, this paper reveals a new aspect of Hindi NPIs, not present in the NPIs of languages studied by the Dutch and other linguists. The Hindi facts provide new insight into the logical properties of NPIs in language: we now know that although the pioneering research by Ladusaw, Zwarts, van der Wouden, and others has revealed a systematic connection between a hierarchy of negative contexts and NPIs, in languages like Hindi focus particles impose a further constraint on NPI licensing. An indication that this extra constraint on NPIs is systematic cross-linguistically is the independent evidence from Japanese (Vasishth 1998a).

Acknowledgements

This paper represents ongoing research, and the interested reader is invited to contact the author (vasishth@ling.ohio-state.edu) for a longer, more detailed version. This research was conducted at Osaka University during 1996; I am grateful to the Monbusho (The Japanese Ministry of Education) for making my study at Osaka University possible. An earlier version was presented at the 18th South Asian Languages (SALA 18) Roundtable, held in New Delhi, India, in January 1997. I am very grateful to the community of scholars at Osaka University for valuable feedback, and to the participants of SALA 18 for their insightful comments. I am particularly indebted to Rajesh Bhatt, David Dowty, Takao Gunji, Jack Hoeksema, Sushama Jain, Martin Jansche, Ayesha Kidwai, Kazuhiko Machida, Hiroshi Mito, You Nakamura, Taisuke Nishigauchi, Akira Ohtani, Craige Roberts, Peter Sells, Gautam Sengupta, Andrea Vasishth, Ashwani Vasishth, Michael T. Westcoat, Derek Wyckoff, and Akiko Yoshimura. I am especially grateful to Martin Jansche for extensive help with editing and \LaTeX typesetting. The usual disclaimer applies.

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Bare-NP Adverbials and Adjunct Extraction*

Neal Whitman

"A special place to eat and drink." That sign on a local restaurant brought to my attention the issue of Bare-NP Adverbials. I knew what they really meant was "a special place to eat and drink *at*," or even "a special place *at which* to eat and drink," but somehow, even without the preposition, the phrase "a special place" was functioning adverbially. Clearly, the management didn't mean for people to somehow physically eat and drink the restaurant itself! After I'd noticed the restaurant sign, I became more aware of Bare-NP Adverbials (BNPAs) like the one on the sign in contexts other than infinitival relative clauses. There are also finite BNPA relative clauses, and of course BNPAs that don't occur in a relative clause at all. BNPA structures aren't limited to those denoting place; they can involve expressions of time, manner or reason as well. A few representative examples are shown below:

- (1) a. Infinitival relative: "the day to meet"
- b. Finite relative: "the reason (that) I called"

* Thanks to Bob Kasper, Craige Roberts, and Bob Levine for their useful suggestions on earlier drafts of this paper. It has been much improved as a result of their comments. Remaining errors are, of course, my own.

c. "Regular" BNPA: "Practice this way."

In this paper, I offer an HPSG-style treatment of BNPA's that builds on previous treatments of BNPA's while providing greater coverage of some phenomena that other researchers have not (to my knowledge) addressed. In section 1, I briefly present the prime facts about BNPA's that any explanation needs to deal with. In section 2, I present the views of Larson (1983, 1985, 1987) and Kasper (1998) on BNPA's, and in the following two sections propose my own explanations for additional BNPA-related facts that Larson and Kasper do not examine. In section 5, I address adjunct extraction, an issue that must be faced before any serious account of BNPA's can be made complete. In section 6, I present an HPSG-style framework in which to carry out my synthesis of and additions to previous approaches, employing the adjunct extraction constraints presented in section 5.

1 The facts reviewed

One of the easiest observations to make about BNPA's is that only a few nouns are eligible to head them. Consider the data in (2), which includes some ungrammatical BNPA's with the good ones. The data consist of infinitival relative clauses, although the results are equally valid for other BNPA constructions (with some exceptions noted in section 3).

- (2) a. a place/spot to stay
 b. *a location to stay
 c. a place to go
 d. *a location to go
 e. a time to die

(Note: also with *day, year, hour, moment, etc.*)

- f. *a period to die
 g. a way to talk
 h. *a manner to talk
 i. a reason to stay
 j. *a purpose to stay

The distinction is clearly neither syntactic nor semantic, since two identical structures, say (2a) and (2b), with nearly synonymous heads (*place, location*) can differ in grammaticality. Larson (1983, 1985, 1987) presents similar data and judgments; especially informative is chapter 2 of his 1983 dissertation. BNPA's of direction (*They went that way*) and duration of time (*We stayed there six days*) are possible, but the remainder of this paper will not be focusing on them.

2 Previous explanations

2.1 Larson (1983, 1985, 1987)

Given data like those in (2), Larson reasonably moves for a lexical solution. He proposes that the selected words that can head BNPA's assign a case to themselves, instead of having it assigned to them by a verb or preposition. Specifically, (according to the most recent version of his explanation) they optionally self-assign a general "Oblique" case, which can then be further specified as +TEMP(oral), +LOC(ation), +DIR(ection) or +MAN(ner), depending on the context (Larson 1985, 1987). With case thus assigned, a BNPA is allowed to take its place in a sentence. (This explanation varies slightly from that in Larson (1983), in which he has BNPA's subordinate to prepositionless PP nodes). Furthermore, with case assigned, BNPA words can participate in adverbial relative clauses in the same way that ordinary words with, say, an +ACC case-marking can participate in an object-modifying relative clause (as in *a book to read*). The optionality of this case-marking keeps open the possibility of using BNPA words in non-adverbial relative clauses, as in *the place we visited*.

Larson does not propose an Oblique case of +REASON, and in fact, treats BNPA adverbials with *reason* separately from the others. In other words, Larson would maintain that (2i, j) really don't belong with the rest of the data in (2), even though they seem to have the very same structure. Strange as such a claim might sound, Larson actually presents convincing evidence for it, and ultimately recommends treating a phrase like *the reason (that/why) I left* similarly to *the claim (that) I left*, or *the decision (whether) to go*: as an NP plus a complement, with the twist that *why* is classified as a complementizer instead of a relativizer like all its *wh*-friends. Of course, *the reason I left* and *the claim that I left* are semantically different in that in the latter, the clause *I left* identifies the claim, while in the former, *I left* is the result of the reason. However, Larson points out that there can, in fact, be a "complex-NP" reading of a *reason* NP, as seen in the following contrast:

- (3) (from Larson (1983), (94))
 a. I left for the same reason that John left.
 b. I left for the simple reason that John left.

In sentence (3b), *John left* identifies the reason, just as *I left* identifies the claim in *the claim that I left*. To account for the two different ways of interpreting a head-complement phrase headed by *reason*, Larson attributes the relative-clause meaning (as in (3a)), to the entire relative clause construction (Larson 1983), an approach that parallels Sag's (1997) treatment of relative clauses, which will be described in section 6.

2.2 Kasper (1998)

Kasper also puts forth a lexically-based explanation of BNPA's, showing how they can be handled by his general treatment of "recursive modification" in HPSG. One of the claimed advantages of Kasper's system is the ability to represent words that have the same basic meaning as a single definition, even though they may behave quite differently depending on syntactic usage. The prime example of these different-behaving but same-meaning words is attributive vs. predicative adjectives. While Pollard and Sag (1994) would treat an attributive and predicative version of the same adjective as two homophonous lexical entries, Kasper's formalization allows both usages to be contained in a single (underspecified) entry. Kasper then shows how his scheme could be applied to other modifiers, including adverbs and (the relevant part for our purposes) BNPA words, which, like attributive and predicative adjectives, have basically the same meaning wherever they appear, but make radically different meaning contributions depending on how they are used. For instance, *place* always has the same basic meaning of "place," even though it functions as a direct object in *Search the place* and as an adverb in *live someplace*. The basic, constant meaning is what Kasper calls a sign's ICONT (mnemonic for *internal content*), while the ECONT (*external content*) carries the more specific meaning contribution that will depend on how the sign is used.

An example will be helpful at this point. Kasper gives a general template for locative BNPA heads, which can be used to represent BNPA words of place or time. This template is shown in (4), but has been specified so that it represents *place*:

(4) HPSG specification for *place* (adapted from Kasper (1998))

$$\left[\begin{array}{l} \text{HEAD} | \text{MOD} \left(\left(\begin{array}{l} \text{ARG} | \text{CONT} [4] \left[\begin{array}{l} \text{psoa} \\ \text{LOCATION} [3] \end{array} \right] \\ \text{ICONT} | \text{INDEX} [3] \\ \text{ECONT} [4] \end{array} \right] \vee \text{none} \right) \right) \\ \text{CONT} \left[\begin{array}{l} \text{place} \\ \text{INDEX} [1] \\ \text{RESTR} | \text{INST} [1] \end{array} \right] \end{array} \right]$$

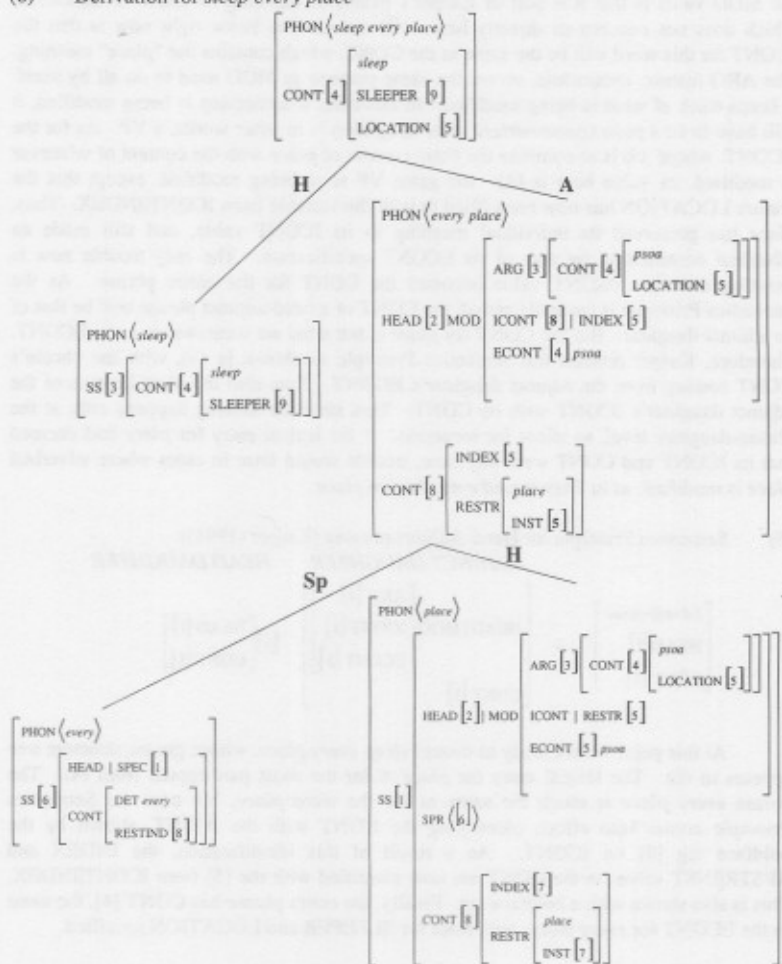
Notice first that Kasper gives a disjunctive MOD value for a BNPA lexical head, one disjunct of which is *none*. This disjunction allows a word like *place* to be used either as a modifier, as when it occurs in a BNPA, or as a regular noun, as when it appears as a normal subject or object. Here we will concentrate on the first disjunct, to see how a VP is modified. It will be noticed first that MOD has been split up into three features, one of which is the ICONT that was mentioned above. The reason ICONT is tucked away inside

the MOD value is that it is part of Kasper's means of handling recursive modification, which does not concern us directly here. All we need to know right now is that the ICONT for this word will be the same as the CONT, which contains the "place" meaning. The ARG feature, meanwhile, serves the same purpose as MOD used to do all by itself: it keeps track of what is being modified. In this case, if something is being modified, it will have to be a *psoa* (*parametrized state of affairs*) -- in other words, a VP. As for the ECONT, whose job is to combine the basic content of *place* with the content of whatever is modified, its value here is [4]: the same VP as is being modified, except that the feature LOCATION has now been filled in with the variable from ICONT|INDEX. Thus, *place* has preserved its individual meaning in its ICONT value, and still made an adverbial contribution by way of its ECONT specification. The only trouble now is ensuring that this ECONT value becomes the CONT for the entire phrase. As the Semantics Principle is currently stated, the CONT of a head-adjunct phrase will be that of its adjunct daughter. But the CONT for *place* is not what we want; we want its ECONT. Therefore, Kasper restates the Semantics Principle as shown in (5), with the phrase's CONT coming from the adjunct daughter's ECONT. Note also the identification of the adjunct daughter's ICONT with its CONT. This structure sharing happens only at the phrase-daughter level, to allow for recursion. If the lexical entry for *place* had decreed that its ICONT and CONT were the same, trouble would arise in cases where adverbial *place* is modified, as in *They stayed every known place*.

(5) Semantics Principle for Head-Adjunct phrases (Kasper (1998))

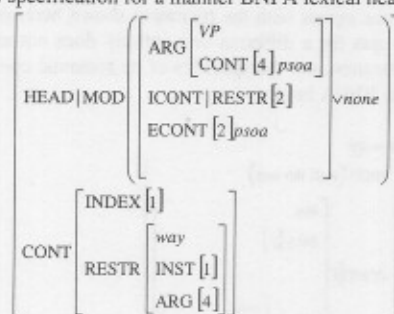
$$\begin{array}{c}
 \left[\begin{array}{l}
 \textit{hd-adj-struct} \\
 \text{HEAD [1]} \\
 \text{CONT [2]}
 \end{array} \right] \Rightarrow \begin{array}{c}
 \text{ADJUNCT DAUGHTER} \quad \text{HEAD DAUGHTER} \\
 \left[\begin{array}{l}
 \text{HEAD | MOD} \left[\begin{array}{l}
 \text{ARG [4]} \\
 \text{ICONT [3]} \\
 \text{ECONT [2]}
 \end{array} \right] \\
 \text{CONT [3]}
 \end{array} \right] \left[\begin{array}{l}
 \text{HEAD [1]} \\
 \text{CONT [5]}
 \end{array} \right]
 \end{array}
 \end{array}$$

At this point we are ready to dissect *sleep every place*, whose phrase structure tree appears in (6). The lexical entry for *place* is for the most part copied from (4). The phrase *every place* is much the same as for the word *place*, but now the Semantics Principle comes into effect, identifying the CONT with the ICONT, shown by the boldface tag [8] on ICONT. As a result of this identification, the INDEX and RESTR|INST values in the CONT are now identified with the [5] from ICONT|INDEX. This is also shown with a boldface tag. Finally, the entire phrase has CONT [4], the same as the ECONT for *every place*, with roles for SLEEPER and LOCATION specified.

(6) Derivation for *sleep every place*

Though Kasper does not address BNPA's of manner, they could be handled similarly. Below is a lexical specification for *way*:

(7) HPSG specification for a manner BNPA lexical head



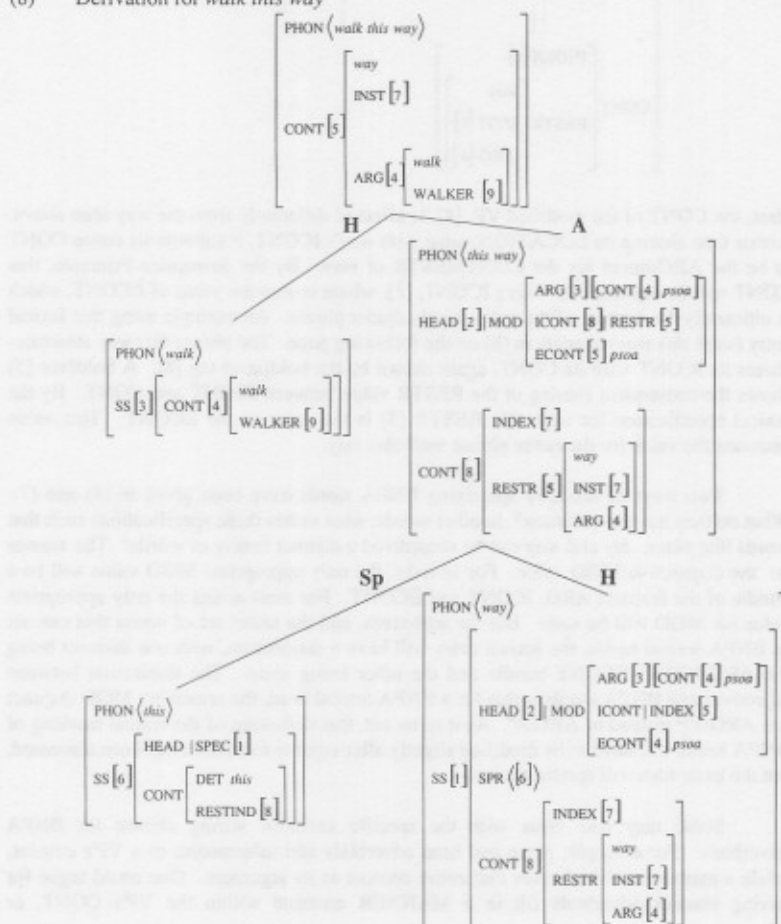
Here, the CONT of the modified VP, [4], is affected differently from the way seen above. Rather than sharing its LOCATION value with *way*'s ICONT, it submits its entire CONT to be the ARGument for the CONT|RESTR of *way*. By the Semantics Principle, this CONT will be equated with *way*'s ICONT, [2], which is also the value of ECONT, which is ultimately the content of the entire head-adjunct phrase. An example using this lexical entry (*walk this way*) appears in (8) on the following page. The phrase *this way* structure-shares its ICONT with its CONT, again shown by the boldfaced tag [8]. A boldface [5] shows the consequent sharing of the RESTR value between ICONT and CONT. By the lexical specification for *way*, this RESTR [5] is the same as the ECONT. This value becomes the value for the entire phrase *walk this way*.

Two ways of lexically specifying BNPA words have been given in (4) and (7). What do they have in common? In other words, what unites these specifications such that words like *place*, *day* and *way* can be considered a distinct family of words? The answer is: the disjunctive MOD value. For adverbs, the only appropriate MOD value will be a bundle of the features ARG, ICONT and ECONT. For most nouns the only appropriate value for MOD will be *none*. But for adjectives, and the select set of nouns that can act as BNPA lexical heads, the lexical entry will have a disjunction, with one disjunct being the ARG-ICONT-ECONT bundle and the other being *none*. The distinction between adjectives and BNPA words is that for a BNPA lexical head, the nonempty MOD disjunct has ARG:VP instead of ARG:N'. As it turns out, this definition of the lexical marking of BNPA heads will need to be modified slightly after adjunct extraction has been discussed, but the basic idea will remain the same.

Some may take issue with the specific semantic wiring chosen for BNPA adverbials. For example, place and time adverbials add information to a VP's content, while a manner adverbial takes that entire content as its argument. One could argue for having manner adverbials fill in a MANNER attribute within the VP's CONT, or

conversely, having time and place adverbials act as semantic functors with the modified VP as an argument. Whether one agrees with the treatment shown here, or chooses one of the two just mentioned, or opts for a different one entirely does not matter. It is a word's disjunctive MOD specification, not the specifics of its semantic contribution, that determine its membership in the BNPA family.

(8) Derivation for *walk this way*



In fact, that last thought should be emphasized: *A word is not just a BNPA word when its MOD value is nonempty.* If it has the disjunctive MOD value of the type discussed here, it will have the properties of BNPA words even if its MOD is *none*. To illustrate, consider the verb *behave*, which subcategorizes for an adverbial. In a phrase like *behave this way*, as Bob Levine (p.c.) points out, the MOD value for *this way* is *none*. Even so, it is being used without a preposition, because *way* is a BNPA word. In all the data that will be explored in sections 3 and 4, it will make no difference whether the chosen verb subcategorizes for a place or manner (or theoretically, temporal) adverbial or not. These facts are just further evidence that BNPA's are a lexical phenomenon, not a syntactic or semantic one.

2.3 In summary: advantages and drawbacks

Both Larson and Kasper have useful ingredients in their solutions. Each treats BNPA's on a lexical basis, which is the most reasonable tack to take; and each has some mechanism by which a BNPA can specify another thematic role in a VP's content, which is something that will have to take place somehow in any explanation. Larson's story has an advantage over Kasper's in that it takes into account the peculiar behavior of *reason* in BNPA constructions (which we'll look at shortly), and specifically puts forth a separate account for it. Kasper's has an advantage over Larson's in that it is formally more rigorous. However, neither account explains *all* the data about BNPA behavior; it is to these unexplained phenomena that I now turn.

3 Non-relative BNPA's: Not just any determiner is allowed

3.1 Overview

The first aspect of BNPA's that previous explanations fail to capture is that even the words that can function as BNPA's cannot do so entirely freely. Specifically, not just any determiner can combine with a BNPA word, as is shown in (9), below. Note that with some phrases containing *place*, there is a corresponding lexicalized form, specifically, *someplace*, *everyplace*, and *noplace*. These lexicalizations cause confusion in that they are often acceptable where their phrasal counterparts are not; for example, *Kim lived someplace* is fine, while *Kim lived some place* is questionable. More will be said about this issue later, but in reviewing the grammaticality judgments in (9a), the distinction between these phrases and their lexical counterparts should be borne in mind.

- | | |
|---|--|
| <p>(9) a. <i>place</i></p> <p>i. *Kim lived a place</p> <p>ii. *Kim lived the place</p> <p>iii. ?Kim lived some place</p> <p>iv. ?Kim lived every place</p> | <p>b. <i>day</i> (or <i>time</i>, <i>night</i>, <i>year</i>, <i>hour</i>, <i>Monday</i>, etc.)</p> <p>i. *Kim sang a day</p> <p>ii. *Kim sang the day</p> <p>iii. *Kim sang some day</p> <p>iv. Kim sang every day</p> |
|---|--|

- | | |
|------------------------------|----------------------------|
| v. ?Kim lived no place | v. ?Kim sang no day |
| vi. *Kim lived this place | vi. Kim sang this day |
| vii. *Kim lived that place | vii. Kim sang that day |
| viii. *Kim lived my place | viii. ?Kim sang my day |
| ix. Kim lived many places | ix. Kim sang many days |
| x. Kim lived two places | x. ?Kim sang two days |
| xi. What place did Kim live? | xi. What day did Kim sing? |

c. *way*

- i. *Kim slept a way
- ii. *Kim slept the way
- iii. ?Kim slept some way
- iv. Kim slept every way
- v. *Kim slept no way
- vi. Kim slept this way
- vii. Kim slept that way
- viii. Kim slept my way
- ix. Kim slept many ways
- x. Kim slept two ways
- xi. What way did Kim sleep?

d. *reason*

- i. *Kim stayed a reason
- ii. *Kim stayed the reason
- iii. *Kim stayed some reason
- iv. *Kim stayed every reason
- v. *Kim stayed no reason
- vi. *Kim stayed this reason
- vii. *Kim stayed that reason
- viii. *Kim stayed my reason
- ix. *Kim stayed many reasons
- x. *Kim stayed two reasons
- xi. ?What reason did Kim stay?

3.2 A non-problem: the *reason* data

Some of the data above can be dismissed out of hand: the data in (6d) can be handled without any explanation beyond that provided by Larson. Larson (1983) predicts that no (non-relative) BNPA's are possible with *reason*, simply because *reason* doesn't have the lexical permission slip to act as an adverb the way *place*, *way* and time words do (as mentioned in section 2.1). His prediction, as verified in (6d), is true for the most part. A problem arises with (9d.xi), which Larson predicts should be ungrammatical. But in some dialects, it is acceptable, and even in my dialect (where it is unacceptable), it is not quite as bad as the other *reason* BNPA's.

There are two ways to explain the possible grammaticality of (9d.xi). One is to go back and give *reason* permission to participate in BNPA expressions, but then we are faced with explaining the ungrammaticality of (9d.i-x), as well as re-explaining all the facts that motivated Larson's explanation in the first place.

The second way is just to say that the collocation *What reason* has itself acquired the meaning of *why*. This "lexical wastebasket" solution might not be as unpalatable as it sounds, since at least one other language appears to have done exactly the same thing. Consider the sentence in (10), from ChiNdali, a Bantu language spoken in Malawi (Stewart (1997)):

- (10) Chifukwa chili ndangabuka munyumba?
 chi-fukwa chi-li n- ta- 0- nga-buka mu-ny-umba
 7-reason 7-which 1sg-Neg-Pres-can-go 18-9-house
 "Why can't I go into the house?"

Chifukwa chili "reason which" is translated as "Why," which shows that such a relexicalization is not unprecedented. (Note furthermore that the phrase here is working as a BNPA: there is no affix or adposition to change the NP into an adverb.) This example is also further crosslinguistic evidence of a basic difference between reason adverbs and the others. Specifically, in ChiNdali, the first element of a sentence -- whether or not it is the verb's subject -- in most cases must agree grammatically with the verb. These initial phrases can include locatives (indeed, locatives are the focus of Stewart (1997)). When a reason adverbial phrase is fronted, however, there is no agreement with the verb; the only agreement seen here is the noun-class agreement within the phrase (showing that this noun belongs to class 7), manifested in the *chi-* prefixes.

I have no strong preference for this last solution or the previous one, and will not attempt to choose one of them here. The important finding is that Larson's 1983 account, with some minor additions, successfully explains the behavior of *reason* with the various determiners; therefore, my attempts at explanation need not cover this ground.

3.3 A real problem: the rest of the data

The BNPAs of place, time and manner are more difficult to explain. However, before an attempt is made to explain all the unacceptable determiner+BNPA combinations, it should be noted that in some cases, the utterances sound bad even with a preposition, as seen in (11):

- (11) a. *place*
 i. *Kim lived a place / *Kim lived in a place
 ii. *Kim lived the place / *Kim lived in the place¹
 iii. ?Kim lived some place / ?Kim lived in some place
 iv. ?Kim lived every place / ?Kim lived in every place
 v. ?Kim lived no place / ?Kim lived in no place
- b. *day (or time, night, year, hour, Monday, etc.)*
 i. *Kim sang a day / *Kim sang on a day
 ii. *Kim sang the day / *Kim sang on the day²

¹ *Kim lived in the place* is actually acceptable when it is an instance of epithet anaphora, for example, in response to *Has Kim ever been to Columbus?* However, since outside such a context this sentence is ungrammatical, I have marked it as such in this data set.

² Likewise, I have marked *Kim sang on the day* as ungrammatical, even though it might not be so bad in some dialects if in response to a question like *What did Kim do on her birthday?*

- iii. *Kim sang some day / *Kim sang on some day
- v. ?Kim sang no day / ?Kim sang on no day
- viii. ?Kim sang my day / ?Kim sang on my day

c. *way*

- i. *Kim slept a way / *Kim slept in a way
- ii. *Kim slept the way / *Kim slept in the way
- iii. ?Kim slept some way / ?Kim slept in some way
- v. *Kim slept no way / *Kim slept in no way

There is a good possibility, then, that the badness of BNPs in (11) is not really our problem. Perhaps whatever explains why the prepositional adverbials here are no good will account for the corresponding BNPs as well. Such an explanation would probably not be syntactic, since both BNPs and PPs are occurring in the exact same sentence structures here. A semantic explanation is not impossible, but will be difficult to formulate, given the different behavior of the same determiner in different types of adverbials as seen above. Therefore, a pragmatic explanation might be a reasonable hypothesis. However, although there is some tantalizing evidence supporting a pragmatic approach, in the end there are too many unanswered questions to claim this issue can be resolved pragmatically.

In support of a pragmatic explanation, there is the data in (12). As can be seen, in most cases the addition of some context improves the situation.

(12) a. *place*

- i. *Kim lived a place that I liked to visit / Kim lived in a place that I liked to visit
- ii. *Kim lived the place that I liked to visit / ?Kim lived in the place that I liked to visit
- iii. Kim lived some place that I liked to visit / Kim lived in some place that I liked to visit
- iv. Kim lived every place that I liked to visit / Kim lived in every place that I liked to visit
- v. Kim lived no place that I liked to visit / Kim lived in no place that I liked to visit

b. *day (or time, night, year, hour, Monday, etc.)*

- i. Kim sang a day that I remember well / Kim sang on a day that I remember well
- ii. Kim sang the day that I remember well / Kim sang on the day that I remember well
- iii. ?Kim sang some day that I remember well / ?Kim sang on some day that I remember well
- v. ?Kim sang no day that I remember well / ?Kim sang on no day that I remember well

viii. ?Kim sang my day, which was Saturday / ?Kim sang on my day, which was Saturday

c. way

- i. Kim slept a way that I recommended / Kim slept in a way that I recommended
- ii. Kim slept the way that I recommended / Kim slept in the way that I recommended
- iii. Kim slept some way that I recommended / Kim slept in some way that I recommended
- v. Kim slept no way that I recommended / Kim slept in no way that I recommended

Some of the above data makes sense. For example, sentences with the indefinite article such as **Kim lived (in) a place* could reasonably be deemed infelicitous because they are so uninformative: Kim's living at all entails that there is some place where she lived. But even here, there is already evidence against a pragmatic approach, in that there are some cases where having more context does not improve the sentence (the first sentences in 12a.i-ii, and the sentences in 12b.iii, v, viii, though judgments vary). Furthermore, a pragmatic explanation cannot easily explain why the definite articles in (11) would be infelicitous in the first place. To use a *place* example again, **Kim lived the place* should be a perfectly informative sentence, since saying that Kim lived does not entail that she lived in some particular known place.

Of course, even if all the sentences in (12) were improved by context, there are still the determiners that were omitted in (11), some of which do not fit the pattern of matching grammaticality between BNPA's and PPs. For example, in *place* adverbials, *this*, *that* and possessives sound bad only with BNPA's, but improve when a preposition is present (13a-c). Just the opposite occurs in (13d): *every* in a time adverbial. As can be seen, *every* is fine in a time BNPA, but adding a preposition actually decreases its acceptability:

- (13) a. *Kim lived this place / Kim lived in this place
 b. *Kim lived that place / Kim lived in that place
 c. *Kim lived my place / Kim lived in my place
 d. Kim sang every day / ?Kim sang on every day

A pragmatic explanation would have nothing to say about the data in (13).

All these factors are grounds for not adopting a pragmatic explanation for what determiners can appear in BNPA's. Not even the slippery distinction between *every place* and *everyplace* (and the corresponding forms with *some* and *no*) can be turned into a basis for an explanation: such an explanation would, after all, only apply to *place* adverbials.

3.4 Emerging conclusion: *place* BNPA's are different

Even though it has been determined above that syntactic, and, so far, pragmatic accounts will not be able to clarify the situation with determiners and BNPA's, there is still something that can be salvaged from the data examined in (9-14). All in all, *place* BNPA's are turning out to behave somewhat differently from those of time or manner. Notice that the determiners shown in (13) are all in *place* BNPA's, and recall that in (12), it was only the *place* adverbials that were unquestionably not improved by the addition of context. Thus, the most cautious conclusion is that *place* BNPA's simply cannot be formed with *a*, *the*, *this*, *that*, and possibly possessive determiners³. Why this should be the case is an open question, but it is evidence that *place* BNPA's are somehow different from other kinds.

3.5 A final complication

Before moving to section 4, one last wrinkle must be noted. In the case of *the*, there are a very few situations in which it can be used in a *place* BNPA (example 14b due to Levine (p.c.)):

- (14) a. Kim lived the same place that Sandy did.
 b. Kim lived the only/one place that she could afford.

This fact seems to point to a semantic explanation for why *the* (and perhaps *a*, *this*, and *that*) cannot be used in *place* BNPA's, but on the other hand, data like those in (13) show that semantics alone cannot fully explain the situation. Therefore, I suspect that the final account will manage to identify some common semantic property of *this*, *that*, *a*, and *the* (but not *the same*), which will be incorporated into a lexical constraint on the word *place* that forbids it to select determiners having this property.

4 Relative BNPA's: Some prepositions aren't optional -- they're forbidden!

³ There is a clean explanation for one item in (13): the anomalous **Kim stayed my place*. This sentence can be explained in terms of the specialized meaning of *place* to mean 'dwelling, home' when it appears after a possessive. If it is accepted that there are two lexical entries for *place*: *place1* with the more general meaning and BNPA eligibility, and *place2* with the specialized 'home' meaning and no BNPA eligibility -- then it makes perfect sense that **Kim stayed my place2* should be ungrammatical, since *place2* is not a BNPA word. Implicit in this claim is the prediction that with sufficient context, *Kim stayed my place1* would be grammatical. Unfortunately, *place2* seems to have quite a strong claim to the territory following a possessive, and it is difficult to construct a context strong enough to make a listener hear a phrase like *my place* as *my place1* instead of *my place2*. For this reason, such a hypothesis is hard to test, but in any case, it cannot be disputed that *place* does indeed have the specialized meaning of 'home' following a possessive, and it is not unreasonable that this separate meaning could have a separate, non-BNPA-eligible lexical entry. Of course, even if the preceding explanation is true, it is still possible that *my* is also forbidden by whatever factor disallows *a*, *the*, *this*, and *that*.

4.1 Overview

The other aspect of BNPA behavior that previous treatments fail to address concerns BNPA's in relative clauses. As can be seen in (15), some bare adverbial relative clauses not only are able to survive without a preposition at the end, but actually forbid one to be there. That is, in some cases, a BNPA version of a relative clause exists alongside the version that has a preposition (15a, b), and in some cases the BNPA version is the only option (15c-h):

- (15) a. the place to stay (at)
 b. no place we stayed (at)
 c. any day to sing (*on)
 d. what day we sang (*on)
 e. every way to speak (*in)
 f. the way you speak (*in)
 g. no reason to go (*for)
 h. two reasons she went (*for)

Neither Larson nor Kasper makes any provision to rule out stranding for any of the head nouns seen above. In fact, Larson (1983: 44-45) claims that "any NP which can appear as the object of a preposition" can head up a bare adverbial relative with a stranded preposition, which the data in (15) directly contradict.

4.2 Cruising the BARs

As we begin to look for an explanation for this problem, the first thing to notice is that preposition stranding in adverbial relatives (like the determiners in section 3) is not really a pure BNPA issue: even though we declared *reason* not to be a BNPA word, it is behaving like one in disallowing preposition stranding. Therefore, a unified explanation of the data in (15) cannot be put entirely in terms of BNPA words. Instead, we will need to refer to a class of words that have in common whatever it is that unites *reason* with the BNPA words. That common trait, I suggest, is the ability to be modified by a bare adverbial relative clause (i.e., one without an overt relativizer, like those in (15)), and I accordingly call this set the set of B(are) A(dverbial) R(elative) words. BAR words suggest a canonical adverbial relation that holds with respect to the verb that occurs in the adverbial relative clause. For example, the phrase *the place we stayed* can never be interpreted as *the place why we stayed*; it has to be interpreted as something like *the place where we stayed*. Likewise, *the day the music died* has to be interpreted *the day when the music died*. Recognizing this family of words has the advantage of filling in a hole in Larson's explanation of *reason* adverbials. Recall that he pointed out two possible readings for the phrase *reason (that) Bill left*: one was the true adverbial reading, and the other was the "complex-NP" reading (more easily gotten when the phrase appears as *the simple reason that ...*). However, the situation as Larson left it would seem to allow the

analogous *claim that Bill left* also to have two readings, one of which was some kind of adverbial reading instead of the correct complex-NP reading. If *reason* is in a separate class of words that allow the formation of these bare adverbial relatives, nothing more need be said about other complex NPs.

To clinch the status of BNPA words as a subset of BAR words, consider the fact that for non-BAR words (for instance, *cat*), there can be no BNPA, no matter what adverbial relation it bears to the verb, as seen in (16):

- | | | | |
|------|---------------------------------|----------------------------------|------------------------|
| (16) | a. modified by a BAR | b. used in a BNPA | |
| | i. a cat to live *(with) | i. I lived *(with) a cat. | <i>Accompaniment</i> |
| | ii. a cat to talk *(to) | ii. I talked *(to) a cat. | <i>Benefactive (?)</i> |
| | iii. a cat to buy food *(for) | iii. I bought food *(for) a cat. | <i>Benefactive</i> |
| | iv. a cat to give the toy *(to) | iv. I gave a toy *(to) a cat. | <i>Indirect object</i> |
| | v. a cat to clean up *(after) | v. I cleaned up *(after) a cat. | <i>Other</i> |

Since BNPA words are a subset of BAR words, describing when prepositions can be stranded in bare adverbial relative clauses will automatically cover preposition-stranding in adverbial relative clauses with bare NPs. Such a description follows in section 4.3.

4.3 A rule for preposition-stranding

A reasonable question that could be asked about the data in (15) is whether it is truly a property of BAR words that they forbid preposition stranding in non-place adverbials, or whether the ungrammaticality of (15c-h) is related to what determiner appears with the BAR word, or whether the relative adverbial is finite (*the place we stayed*) or infinitival (*the place to stay*), or the semantics of the VP in the following relative clauses. In fact, the type of determiner does not seem to bear on the grammaticality of a bare adverbial relative. Even *a* and *the*, which behaved so differently from other determiners in non-relative BNPA's, follow the same patterns as the other determiners when it comes to preposition stranding. (The examples in this section will use *a*, *the*, and *every*, but the results also hold for *no*, *some*, *this*, *that*, cardinal numbers and possessives.) Nor did infinitival status have an effect on grammaticality. (The examples to follow use infinitival BARs, but the results apply also to finite BARs.) Concerning the semantics of the VP, several factors were tested: whether the VP had an "implicit" argument of place, time, or manner; whether it was telic or atelic; and whether it consisted of a single verb. Though these tests do not exhaust the ways of semantically classifying VPs, the tests that were done do suggest that BAR words have an inherent property that affects preposition stranding with them.

Before the "implicit argument" hypothesis can be tested, "implicit argument" should be defined. Since in many (if not most) sentences, there is a place and time in which the event takes place, it could be said that most verbs already have implicit

arguments of place and time. Nevertheless, for a verb like *stay*, there is a tighter link to the idea of location. One useful criterion for capturing this kind of implicit argumenthood is whether it is possible to define the verb without referring to the idea of location or time. As it turns out, there are very few verbs that satisfy this definition. For an implicit argument of place, *stay* may be the only relevant verb. For an implicit argument of time, the best examples are *be early/late*. For manner, there is *behave*. (Of course, with *behave*, a manner adverbial is an explicit as well as implicit argument.) The test results are shown in (17).

- (17) A. Implicit argument of place: *stay*
- i. Determiner *a*
 - a. a place to stay at
 - b. *a day to stay on
 - c. *a way to stay in
 - ii. Determiner *the*
 - a. the place to stay at
 - b. *the day to stay on
 - c. *the way to stay in
 - iii. Determiner *every*
 - a. every place to stay at
 - b. *every day to stay on
 - c. *every way to stay in
- B. Implicit argument of time: *be late*
- i. Determiner *a*
 - a. *a place to be late at
 - b. ?a day to be late on
 - c. *a way to be late in
 - ii. Determiner *the*
 - a. *the place to be late at
 - b. ?the day to be late on
 - c. *the way to be late in
 - iii. Determiner *every*
 - a. *every place to be late at
 - b. ?every day to be late on
 - c. *every way to be late in
- C. Implicit argument of manner: *behave*⁴
- i. Determiner *a*
 - a. ?a place to behave well at
 - b. ?a day to behave well on

⁴ Since *behave* requires an explicit argument of manner, it has been provided one (*well*) in the place and time BARs.

- c. *a way to behave in
- ii. Determiner *the*
 - a. ?the place to behave well at
 - b. ?the day to behave well on
 - c. *the way to behave in
- iii. Determiner *every*
 - a. ?every place to behave well at
 - b. *every day to behave well on
 - c. *every way to behave in

Though having an implicit argument of time does seem to help the time BARs (they are questionable, but not outright wrong), there are two reasons that this cannot be the explanation we are looking for. First, the manner adverbials are not improved at all when a verb with an implicit argument of manner (*behave*) is used. Second, with place BARs, some verbs that do not have an implicit place argument are not ungrammatical; for example, *?a place to behave well at*, as seen in (14.C.i.a), and *a place to eat at*, as discussed at the beginning of this paper.

Telicity likewise does not hold the key to accounting for preposition stranding with BAR words. Whether a verb is telic or atelic, it may be good in some BARs, and bad in others, as seen in (18):

- (18) A. Telic verb: *die*
- i. Determiner *a*
 - a. a place to die at
 - b. ?a day to die on
 - c. *a way to die in
 - ii. Determiner *the*
 - a. the place to die at
 - b. ?the day to die on
 - c. *the way to die in
 - iii. Determiner *every*
 - a. every place to die at
 - b. ?every day to die on
 - c. *every way to die in
- B. Atelic verb: *sleep*
- i. Determiner *a*
 - a. a place to sleep at
 - b. ?a day to sleep on
 - c. *a way to sleep in
 - ii. Determiner *the*
 - a. the place to sleep at
 - b. ?the day to sleep on

- c. *the way to sleep in
- iii. Determiner *every*
 - a. every place to sleep at
 - b. ?every day to sleep on
 - c. *every way to sleep in

The pattern that is emerging is that manner BARs cannot have stranded prepositions, while place and time BARs sometimes can. This pattern is also borne out when controlling for single- or multiple-word VPs, though this test has not been shown. Put another way, stranded prepositions in BARs must denote physical or temporal location. Such a constraint correctly rules out all the stranded prepositions in manner BARs, and allows for stranded prepositions to be grammatical in place and time BARs. It can be encoded as shown in (19):

(19) Rule for preposition stranding in relative adverbials

$$\left[\begin{array}{l} \text{HEAD } \textit{prep} \\ \text{COMPS } \left\langle \left\langle \begin{array}{l} \textit{gap-sx} \\ \text{BAR } + \end{array} \right\rangle \right\rangle \end{array} \right] \Rightarrow [\text{CONT } \textit{nom-obj}]$$

This constraint states that if a preposition is stranded by a BAR word (in other words, has a BAR+ gap-synsem as its complement), then that preposition must have a nominal object as its content (i.e., must denote spatiotemporal location).

Now, according to (19), all preposition stranding in place or time BARs should be acceptable. It will not rule out the questionable or ungrammatical examples of stranded prepositions in place or time BARs, such as **a place to sing at*, or **the day to swim on*. Nonetheless, I believe the constraint stated in (19) is on the right track for two reasons. First, it does filter out the stranded prepositions in manner BARs, which are uniformly bad. Second, many of the judgments of ungrammaticality in place or time BARs are more open to dispute. Some people will judge them as completely grammatical, others as completely ungrammatical, and others take the position that, "I wouldn't say it myself, but I would understand it." This suggests that other factors are at work which we should not expect the syntactic/semantic rule above to capture. (For those who categorically reject time BARs with stranded prepositions, (19) could be refined to have the content of the preposition denote physical locations only.)

Now that the issues of determiners and preposition stranding have been addressed at least to the point of getting the facts right, we can start to formalize how BNPs will be handled. To do that, though, we need to settle another vexing issue: adjunct extraction.

5 Adjunct extraction

5.1 Complements and adjuncts

Much has been written over several decades on what the proper definition of complements and adjuncts should be. The most basic rule of thumb is that a complement is an element that is required to be present by some word or phrase (a verb, in our case), while an adjunct is optional. This rule, however, quickly runs into trouble when a verb like *eat* is considered: sometimes it takes a direct object, and sometimes it does not. Since direct objects are considered one of the most prototypical examples of complements, it would seem that for *eat*, a direct object is an optional complement. Conversely, adverbs are considered some of the most prototypical adjuncts, but there are the rare verbs that require an adverb to follow them: *treat*, *behave*. Thus, the adverbs in these cases are usually deemed complements. There are other diagnostics for determining whether a phrase is an adjunct or a complement (iterability, nature of semantic contribution, among others), but none has yet been able to give foolproof results in all cases. Here, too, an ultimate definition that distinguishes adjuncts from complements will not be attempted (though a syntactic diagnostic will be used to distinguish the two categories in English); instead, the focus will be on extracting them.

5.2 Adjunct extraction *is* extraction

Extraction is the term used, even in non-transformational approaches, to denote the kind of filler-gap dependency seen in sentences like *Who do you like?* *Like* is a transitive verb; it requires an NP to follow it; since no NP follows it in this sentence, there is said to be a gap. But what of a sentence like *When did you eat?* *Eat* doesn't require a time-adverb to follow it, so is there a gap corresponding to the adjunct *when* or not? If there is not, then adjunct extraction does not really exist at all.

Conclusive evidence is difficult, though not impossible, to find in English; there are, however, a number of languages with richer morphology that overtly mark a verb phrase when something has been extracted from it, so that a diagnosis is relatively simple. Hukari and Levine (1995) find that in such languages, in sentences like *When did you eat?*, the VPs are marked morphologically in just the same way as they are in sentences like *Who do you like?* Extensive cross-linguistic evidence to this effect is arrayed in their article, from such diverse sources as to make it almost incontestable that adjunct extraction is real, and maybe even universal. Moreover, even in the morphologically uninformative English, they adduce evidence, based on strong and weak crossover effects, that adjuncts are extracted in the same way as complements.

5.3 What about traces?

5.3.1 No traces assumed

Given that adjunct extraction exists, the next question is how it works. One of the first decisions that needs to be made is whether extraction operates with or without traces. I will be assuming a traceless theory for two reasons. First, there are the telling examples in Pollard and Sag (1994) (p. 377), taken from Pickering and Barry (1991):

- (20) Which box did you put the very large and beautifully decorated wedding cake bought from the expensive bakery in ___?
- (21) In which box did you put the very large and beautifully decorated wedding cake bought from the expensive bakery ___?

Assuming that traces are real, both sentences would have a trace at the end, separated from the filler by a long, rambling NP; thus, each sentence should be equally difficult to process. The second sentence, however, is much easier to process. Pickering and Barry's explanation is that a filler is not held in a listener's memory until its trace is encountered, but only until whatever element calls for the filler (in this case, the verb *put*) is processed. This argument joins forces with another convincing point in Fodor & Sag (1994). They challenge one of the traditional pieces of evidence taken to prove the existence of traces, specifically, the idea that a trace blocks contractions, as in:

- (22) Who do you want ___ to sing the national anthem?
*Who do you wanna sing the national anthem?

If this claim were really true, they say, it would be impossible to get sentences like this:

- (23) Who do you think's gonna win?

The above evidence does not rule out the existence of traces, but it does call into question the evidence that has been used to promote them. Therefore, it will be taken as the null hypothesis here that traces do not exist. The formal machinery of extraction, especially adjunct extraction, becomes more difficult with no traces allowed. Nevertheless, traces will play no part in the explanation of adjunct extraction to follow.

5.3.2 Consequences of not having traces

Levine (1997) presents some significant problems for a traceless adjunct-extraction theory. He observes that traceless extraction of complements is relatively easy to accomplish, since a traceless extraction rule is allowed to take any element on a lexical head's COMPS list and put it into the SLASH set. Thus, a filler can be processed as soon

as the lexical head that subcategorizes for it, and therefore has an appropriate value in its SLASH set, is encountered. The very definition of adjuncts, however, is that they are not subcategorized for: they do not appear on the COMPS list. Consequently, they cannot be removed from the COMPS list, and the SLASH set can keep no record of them when they are extracted. Traceless extraction of adjuncts is therefore impossible unless some way can be found to put them into a verb's SLASH set.

There are two ways of accomplishing this aim. One is to have a lexical rule put extracted adjuncts directly into a verb's SLASH set. However, this approach (known as an adjunct extraction lexical rule, or AELR) runs aground when there is more than one adjunct. Levine gives the following example:

- (24) a. Robin washed the car frequently rather rarely.
b. Rather rarely, Robin washed the car frequently.

Sentences a and b above should have the same meaning, with *rather rarely* taking wide scope with respect to *frequently*, but the way that an AELR must be stated forces *rather rarely* to have narrow scope. The other way of getting extracted adjuncts into the SLASH set is to have a lexical rule put extractable adjuncts on the COMPS list, from which those that are actually extracted will be recorded in SLASH in the same way as extracted complements are. In other words, this approach is to allow adjuncts to be treated as complements. Such an approach is ultimately what will be pursued here, but it raises a host of problems that will need to be dealt with. An overview of the adjuncts-as-complements approach and associated problems is presented immediately below, in section 5.4.

5.4 Treating adjuncts as complements

5.4.1 The basic approach

The idea of treating adjuncts as complements starts out simply enough: an adjunct is placed on a verb's COMPS list. The first complication that arises is due to the Semantics Principle, which states that the semantic head in a head-complement structure is the same as the syntactic head, while the semantic head in a head-adjunct structure is the adjunct. So if adjuncts are treated as complements, then the CONTENT of the verb that takes them must somehow "pre-incorporate" the meaning of the added adjuncts if it is to remain the semantic head of the phrase. This is often done by a lexical rule like (25), modeled on van Noord and Bouma (1994) and adapted to fit Kasper's approach to modification. As can be seen, the CONTENT of the original verb is not same as the CONTENT of the verb with the added adjunct. Once such a lexical rule has been posited, adjunct extraction is possible, but not without certain shortcomings, as will be discussed below.

(25) Adjunct Addition Lexical Rule

$$\begin{array}{c} \text{verb} \\ \left[\begin{array}{l} \text{COMPS [4]} \\ \text{CONT [1]} \end{array} \right] \end{array} \Rightarrow \begin{array}{c} \text{verb} \\ \left[\begin{array}{l} \text{COMPS [4]} \oplus \left[\begin{array}{l} \text{MOD} \left[\begin{array}{l} \text{ARG [5]} \text{CONT [1]} \end{array} \right] \\ \text{ICONT [2]} \\ \text{ECONT [3]} \end{array} \right] \\ \text{CONT [2]} \end{array} \right] \\ \text{CONT [3]} \end{array} \right] \end{array}$$

5.4.2 Problems

There are several objections that have been raised with respect to treating adjuncts as complements. Three of them, which are concisely presented in Kasper and Calcagno (1997), can be called the Quantifier Scope issue, the Linear Order issue, and the Depth-of-Derivation issue. Levine (1997) also discusses the Linear Order issue, and brings up a fourth problem related to facts about cataphora.

5.4.2.1 Quantifier scope

As discussed in Kasper and Calcagno (1997), treating adjuncts as complements can cause problems when quantifiers enter the picture. Consider sentence (26):

- (26) (from Kasper and Calcagno (1997))
Kim apparently almost saw two unicorns.

It is possible to retrieve the quantifier, *two unicorns*, so that its scope is "intermediate between [the] adjuncts" (here, *apparently* and *almost*); that is, one reading of (26) could be paraphrased, "It is *apparently* the case that there were *two unicorns* and that Kim *almost* saw them." However, the usual methods of adding adjuncts to a verb's COMPS list involve "pre-incorporating" the meaning of the adjuncts into the meaning of the verb, so that by the time the verb combines with its quantified complement, that complement is forced to take wider scope than the adjuncts, making scopings like the one mentioned above impossible.

5.4.2.2 Linear order

Kasper and Calcagno (1997) also point out that if adjuncts and complements are indistinguishable, there is no means of explaining why an adverb can sometimes appear preverbally, and sometimes not. Consider the sentences in (27):

- (27) (from Kasper and Calcagno (1997))
a. Sandy harshly criticized her students.

- b. *Sandy harshly treated her students.

When adjuncts and complements were distinct, a ready explanation was that adjuncts could appear preverbally, while complements could not. Thus, since *treat* subcategorizes for an adverbial complement, the adverb *harshly* in (27b) is a complement, and cannot be placed before the verb. That explanation is no longer available.

5.4.2.3 Depth of derivation

A third issue that Kasper and Calcagno (1997) raise is that a lexical rule adding adjuncts to a verb's COMPS list would have to apply as many times to the verb as there are adjuncts in a particular VP. For example, in the VP *love him passionately forever*, the verb *love* would have undergone an adjunct-addition rule twice (once for each adverbial), but still have the same phonology as the ordinary *love* that has not had this rule applied. As a consequence, Kasper and Calcagno say, "The correspondence between signs and overt forms is thus much less direct...."

Not only is such a situation inelegant, it also adds a significant burden of nondeterminism in processing sentences. The reason is that when adjuncts are treated in the traditional way, as selecting a single VP as an argument, there are fewer constituents that are eligible to be that argument, and thus, less checking that needs to happen. In contrast, when it is the VP that selects any number of adjuncts, which could be simple adverbs, or PPs, or even subordinate clauses, many more of the constituents in a sentence will need to be checked.

5.4.2.4 Cataphora

The basic problem with cataphora, or "backwards anaphora," can be summed up in two sentences, and Levine (1997) does so:

- NPs in complement clauses may not corefer with either matrix subjects or matrix objects.
 NPs in adjunct clauses may corefer with [matrix] objects but not [matrix] subjects. (p. 10)

In other words, when entire clauses are being considered, there is a distinct difference between complements and adjuncts. To illustrate, consider the sentences in (28):

- (28) a. *They_i discovered that Robin just can't stand [the twins]_i. (Levine (1997), (26c))
 b. *I told them_i that Robin just can't stand [the twins]_i.

These sentences illustrate the first half of Levine's claim, with the NP in the complement

clause, *the twins*, illegally coreferring to a subject NP, *they*, in (28a), and an object NP, *them*, in (28b). The second half of the claim is borne out below:

- (29) a. *They_i never do anything without [the twins]_j feeling insecure about it.
 (Levine (1997), (26b))
 b. You can't say anything to them_i without [the twins]_j getting offended.
 (Levine (1997), (24))

The NPs in the adjunct clauses (that is, the *without* clauses) can corefer with the matrix object in (29b), *them*, but not with the matrix subject in (29a), *they*. As with the Linear Order issue, it appears that this distinction will be lost if adjuncts and complements are considered to be the same kind of thing.

5.5 Attempts to solve the problems

5.5.1 Przepiorkowski (1997)

Przepiorkowski (1997), building on the work of Pollard and Yoo (1997), has devised a workable solution to the quantifier scoping problem. He proposes a lexical rule that is essentially like that of van Noord and Bouma: it adds an adverbial element to the verb's COMPS list, and the "new" verb's CONT pre-incorporates the meaning of this adverbial. His method succeeds where van Noord and Bouma's failed because he follows Pollard and Yoo in making the QUANTS and QSTORE features appropriate to SYNSEM. Before Pollard and Yoo, the problem was that QSTORE and QUANTS were top-level features, at the same level as PHON and SYNSEM. Therefore, when the MOD feature, by which adjuncts have traditionally selected their arguments, took a *synsem* value, the QSTORE information of the selected constituent was abandoned. To use the *almost saw two unicorns* example from above, *almost* selects *saw* by its MOD feature, and the lexical rule yields a new verb *saw*, which sounds just like the old verb, but now has the meaning of almost-seeing. Under the old system, *almost* selects just the verb and nothing else, which leads to the mandatory wide scoping of the quantified phrase *two unicorns*. Using Pollard and Yoo's feature geometry, however, all the quantifier information is part of the content for *saw*, and thus is available to be combined with *almost* and appear in the output version of *saw*, which can now allow wide or narrow scopings for the quantifier.

Unfortunately, although Przepiorkowski adequately deals with quantifier scope, he fails to address the other issues. Worse, his solution to quantifier scoping does not generalize to other kinds of scoping that will also need to be dealt with, including adjunct/negation scoping, and adjunct/adjunct scoping. Consider the examples in (30):

- (30) a. (Complaint about a television station, heard at halftime during a televised football game)
 They're not going to show the band again!

- b. Kim almost died because of Robin's incompetence.

The first sentence, in its intended reading, has *again* taking wide scope over *not*, i.e., the TV station had a habit of not showing the halftime band performance, and was about to do so again. However, there is an easily imaginable context that would favor *not* taking scope over *again*: one in which the band has been shown at least once already, and will not be shown again. The second sentence has a similar scope ambiguity between *almost* and *because of Robin's incompetence*. Back when adjuncts were distinct from complements, such ambiguities could correspond to two different syntactic structures, as shown in (31):

- (31) a. They're [VP [VP not going to show the band] again] !
 They're [VP not [VP going to show the band again]] !
 b. Kim [VP [VP almost died] because of Robin's incompetence].
 Kim [VP almost [VP died because of Robin's incompetence]].

If all adjuncts are complements, however, then the VPs will have a flat structure, and it will be difficult to get both possible scopes. One way would be to attribute the distinct scopings to the order in which each adjunct/complement contributes its meaning to the VP; another would be to expand the theory to include something like MODIFIER-STORE, or NEG-STORE. Both would significantly increase complications. For these reasons then -- the unresolved problems of linear order and depth-of-derivation, plus the limited utility of his approach to scoping -- I do not favor Przepiorkowski's framework for treating adjuncts as complements.

5.5.2 Bouma, Malouf and Sag (1997)

Przepiorkowski's basic problem arises from calling *all* adjuncts complements. Bouma, Malouf and Sag (1997) lay out a finer-grained (though still problematic) method of distinguishing between complements and adjuncts, and manage to circumnavigate the linear-order issue. Their method is based on carefully defining a word's *argument-structure*, its *valence*, and its *dependents*. They define the argument structure, represented by the feature ARG-ST, as a list of arguments that must be supplied for the word; in the case of verbs, these would be its subject and what I am calling its "true" complements. A verb's valence (VAL) comprises its subject (SUBJ) and its complements (COMPS). An important point is that ARG-ST is **not** the append of SUBJ and COMPS, as is often assumed. In fact, no relation holds between ARG-ST and SUBJ and COMPS. Instead, the DEP(ENDENT)S feature is used to express what the verb's valence will be. A verb's dependents are its arguments plus any adverbs that appear in its VP. A constraint on words identifies the first element in a verb's DEPS list as its SUBJ, and relates the rest of the DEPS list to the COMPS list. The details of this relationship will be given later; for now, the important part is that Bouma *et al.* have established a way to tell a verb's original complements from adjunct-complements: the former are those that appear on ARG-ST, while adjunct-complements are those that appear only on DEPS.

Both kinds will appear on COMPS, allowing the desired treatment of adjuncts as complements.

With these relations in place, Bouma *et al.* draw their distinction between adjuncts and complements in English: adjuncts appear preverbally; complements postverbally (when not extracted). To be sure, this is not a definition; in giving such a rule, Bouma *et al.* finesse the issue of what truly makes an adjunct an adjunct crosslinguistically. However, with this rule, the deviance of **Sandy harshly treated her students* is once again explicable: *harshly* in preverbal position cannot be the complement that *treated* demands; it has to be an adjunct. Furthermore, there does seem to be some independent justification for a preverbal/postverbal adverbial distinction, though the full picture is not complete. For example, McConnell-Ginet (1982) presents evidence suggesting that the preverbal position is a special position where an adverb can contribute a different meaning to a VP than it could postverbally. Consider the contrast in (32), taken from McConnell-Ginet (1982):

- (32) a. Louisa rudely departed.
b. Louisa departed rudely.

For certain adverbs, including *rudely*, a preverbal position imparts more of an "editorial comment" reading than an actual "manner of action" reading; i.e., (32a) could be paraphrased *It was rude of Louisa to leave*, while (32b) could not. Also, it is a fact that certain adverbs, such as *probably*, can appear only preverbally, and such adverbs cannot be extracted -- evidence consistent with the hypothesis that they are not on the verb's DEPS list:

- (33) a. *Louisa departed probably.
b. *Probably, I think Louisa departed.

Even if these justifications are granted, however, Bouma *et al.*'s distinction of adjuncts and complements is not satisfactory. First of all, although Bouma *et al.* don't say so, in order to implement their distinction between adjuncts and complements, there would need to be a new feature, which I will call ADJT. ADJT would be a Boolean feature; pure adjuncts like *probably* would be lexically specified as ADJT:+. Such a feature would allow constraints to be stated that would prevent words like *probably* from being added to the DEPS list; specifically, a constraint stating that all elements in the DEPS list are ADJT:-. Adverbs that could appear pre- or postverbally, like *carefully*, would be unspecified for ADJT, with the value becoming specified as + or - depending on whether it actually appeared before or after the verb. It might be tempting to try to avoid this new feature, relying instead on the previously outlined revision of the MOD feature, perhaps by defining adjuncts as signs that are MOD|ARG:*synsem*, and complements as MOD|ARG:*none*. Such a proposal, however, would work only if there were no adverbial complements. But since there are plenty of adverbial complements (under the new definition of complement), which are all MOD|ARG:*synsem*, this

distinction is insufficient. Worse still, nothing would prevent a BNPA, which would be MOD|ARG:*synsem*, from appearing preverbally, if being MOD|ARG:*synsem* were the same thing as being ADJT:+. Thus, a sentence like **We every place in town stayed* would be licensed, in the same way as *We cautiously stayed*. There would still need to be an ADJT feature to distinguish between constituents that use their MOD in the traditional way (i.e., true preverbal adjuncts), and those that use it in some sort of adjuncts-as-complements lexical rule (i.e., adverbial complements, including BNPA's).

Beyond having to posit an ad hoc feature, there is a deeper problem with distinguishing English adjuncts from complements based on linear order. To do so in good faith, the linguist must believe that the linear ordering facts really do reflect whatever the true distinction between adjuncts and complements is, and that a feature concerning a sign's linear order can eventually be replaced with a more appropriate feature as more knowledge is gained. If a semantic distinction is what will replace ADJT, then there is the obstacle of explaining why so many adverbs (unlike *rudely* in the previous examples) seem to make the same meaning contribution whether they appear pre- or postverbally. A last-ditch effort to save the linear ordering distinction might be to say that adverbial adjuncts have the *potential* to modify a VP in a manner different from adverbial complements, and that whether the potential is realized is an issue of context or world knowledge. But even this attempt crashes when examples like those in (34) are considered:

- (34) a. Kim regularly washes the car.
 b. *Kim with regularity washes the car.
 c. Kim washes the car with regularity.

Regularly is an adjunct by the linear-order definition; *with regularity* is presumably also an adjunct, since it means the same thing. But *with regularity* can only appear after the verb, like all PPs. And of course, the examples involving cataphora pose similar problems. Consequently, we are almost back to where we started, with both complements and adjuncts appearing after the verb, and no certain way of telling them apart.

What can be salvaged of Bouma *et al.*'s approach to adjuncts vs. complements? Preverbal adverbs can certainly be called adjuncts, in keeping with tradition, and avoid Kasper and Calcagno's linear order objection. As for postverbal constituents, the verdict is not in, and it will not be decided here. All that is necessary in order to proceed with an analysis of BNPA relative clauses, is whether BNPA's specifically are adjuncts or complements. It is known that they cannot appear in the preverbal adjunct position, as demonstrated in (35):

- (35) a. *We there stayed.
 b. *We Saturday had a party.

This does not necessarily mean that BNPA's are complements, however. The rule is that if a word can appear preverbally, it is an adjunct. The converse -- if a word is an adjunct, it can appear preverbally -- is not known to be true, and therefore, neither is the converse's contrapositive (if a word cannot appear preverbally, it is not an adjunct). So BNPA's could simply be adjuncts that, for whatever reason, are not allowed to appear in the preverbal slot. Nonetheless, I take the null hypothesis to be that any one-word adjunct can appear in the preverbal position, and thus (35) supports the classification of BNPA's as complements, especially given the data from Hukari and Levine in 5.2. The general template for a BNPA word, then, should be modified to include an ADJT:- specification, though I will reiterate my stance that this feature should eventually be replaced.

We have Bouma *et al.*'s attempt at solving the linear order issue. For the issues of scope (quantificational and otherwise) and depth of derivation, Bouma *et al.* have a single solution: Minimal Recursion Semantics. The basic idea is that the CONTENT of any sign contains an attribute whose value is a list of all relevant scoping relations for the phrase being described. Some of these conditions will be specified lexically, some semantically, and some will only enter the picture when and if sufficient contextual information necessitates them. Thus, all scope interactions, whether they involve quantifiers, negation, adjuncts, adjunct-complements, or any combination, are addressed in one place, and furthermore, underspecified scopes are easily represented.

As for depth-of-derivation, instead of having a lexical rule that can apply any number of times, changing a verb's CONTENT every time, Bouma *et al.* let the DEPS list hold any number of adjunct-complements, each of which is decreed to modify the verb, as seen in (36):

(36) Constraint on adverbs (modified from Bouma *et al.* (1997), (40))

$$\text{verb} \Rightarrow \left[\begin{array}{l} \text{HEAD [3]} \\ \text{ARG-ST [1]} \\ \text{DEPS [1] } \oplus \text{ list } \left(\left(\begin{array}{l} \text{ADJT +} \\ \text{MOD } \left[\begin{array}{l} \text{HEAD [3]} \\ \text{CONT [2]} \end{array} \right] \end{array} \right) \right) \\ \text{CONT [2]} \end{array} \right]$$

The seeming problem is that such a statement would rule out iterative modification. That is, in a VP like *wash the car frequently rather rarely*, *rather rarely* would not modify *wash the car frequently*, but just *wash the car*, as would *frequently*. However, reducing recursion is the name of the game in MRS. To get the scopings right in examples like those above, devices known as handles are used in conjunction with the list of scope conditions.

Of the two approaches to traceless adjunct extraction reviewed here, MRS is the more promising. There are, however, still some bugs to be worked out of the MRS system, and therefore, I will not be using its semantics here. But MRS semantics is the primary reason that Bouma *et al.*'s constraint on adverbs can be stated so as to avoid the depth-of-derivation problem; to use more traditional HPSG semantic features like CONT in the above constraint would convert it to a lexical rule that could apply any number of times. Therefore, I will not be using Bouma *et al.*'s constraint on adverbs in my explanation of adjunct extraction. Though I will make use of their ARG-ST/DEPS/VAL relationships, I will have to resort to a lexical rule similar to that proposed in Przepiorkowski (1997). It is my hope that the MRS system can be improved such that the constraint on adverbs in (36) will be usable instead of the lexical rule I will employ.

5.6 How to extract adjuncts

At this point, I can present the details of my synthesized version of adjunct extraction, as was promised above, but first it should be noted that by Bouma *et al.*'s description of adjuncts and complements, what we have been calling adjunct extraction up until now is really complement extraction. True verbal adjuncts cannot be extracted at all, since they do not appear on a verb's DEPS list. Of course, adjectives and other phrases that modify nouns are also true adjuncts, and cannot be extracted. This prediction is borne out in examples like those below:

- (37) a. *Probably, I think Louisa departed.
b. *Red, I kicked the ball.

I will continue, however, to maintain a distinction between traditional complements and those complements that have previously been known as adjuncts. The latter elements I will call adjunct-complements, continuing the convention begun in the previous section.

I will present my explanation of adjunct-complement extraction by discussing two sample VPs: *saw a unicorn today* (adjunct-complement *in situ*), and *Today, Robin saw a unicorn* (extracted adjunct-complement). First, however, the relevant rules and constraints will be presented, starting with BM&S's rule of Dependent Realization:

- (38) Dependent Realization (DR) (Bouma *et al.*, (1997), (68))

$$\text{word} \Rightarrow \begin{bmatrix} \text{SUBJ} [1] \\ \text{COMPS} [2] \text{list}(\text{canon-ss}) \\ \text{DEPS} [1] \oplus ([2] \circ \text{list}(\text{gap-ss})) \end{bmatrix}$$

The first element of the DEPS list is token-identical with the SUBJ value. The rest of the DEPS list consists of elements on the COMPS list, represented by [2], shuffled with a list

of gap-synsems. The COMPS list, however, contains only canonical-synsems, that is, synsems that are not gap-synsems -- or in other words, non-extracted elements. The DEPS list, not COMPS, keeps track of extracted constituents.

At this point, we can introduce the Adjunct-Complement Addition Lexical Rule, which is modeled on those of van Noord and Bouma and Przepiorkowski, but incorporates Bouma *et al.*'s ideas about DEPS and ARG-ST, plus the features ARG, ICONT, and ECONT from Kasper (1998):

(39) Adjunct-Complement Addition Lexical Rule (ACALR)

$$\begin{array}{c}
 \left[\begin{array}{c} \text{verb} \\ \text{SS} [1] \left[\begin{array}{c} \text{VAL} \left[\begin{array}{c} \text{SUBJ} [3] \\ \text{COMPS} [10] \end{array} \right] \\ \text{ARG-ST} [2] \\ \text{DEPS} [3] \oplus [4] \\ \text{CONT} [5] \end{array} \right] \end{array} \right] \Rightarrow \left[\begin{array}{c} \text{verb} \\ \text{SS} [7] \left[\begin{array}{c} \text{VAL} \left[\begin{array}{c} \text{SUBJ} [3] \\ \text{COMPS} [8] \end{array} \right] \\ \text{ARG-ST} [2] \\ \text{DEPS} [3] \oplus [4] \oplus \left[\begin{array}{c} \text{MOD} \left[\begin{array}{c} \text{ARG} [1] \\ \text{ICONT} [9] \\ \text{ECONT} [6] \end{array} \right] \\ \text{CONT} [9] \end{array} \right] \end{array} \right] \\ \text{CONT} [6] \end{array} \right]
 \end{array}$$

$[4] = [10] \circ \text{list}(\text{gap-ss}) \qquad [4] \oplus [7] = [8] \circ \text{list}(\text{gap-ss})$

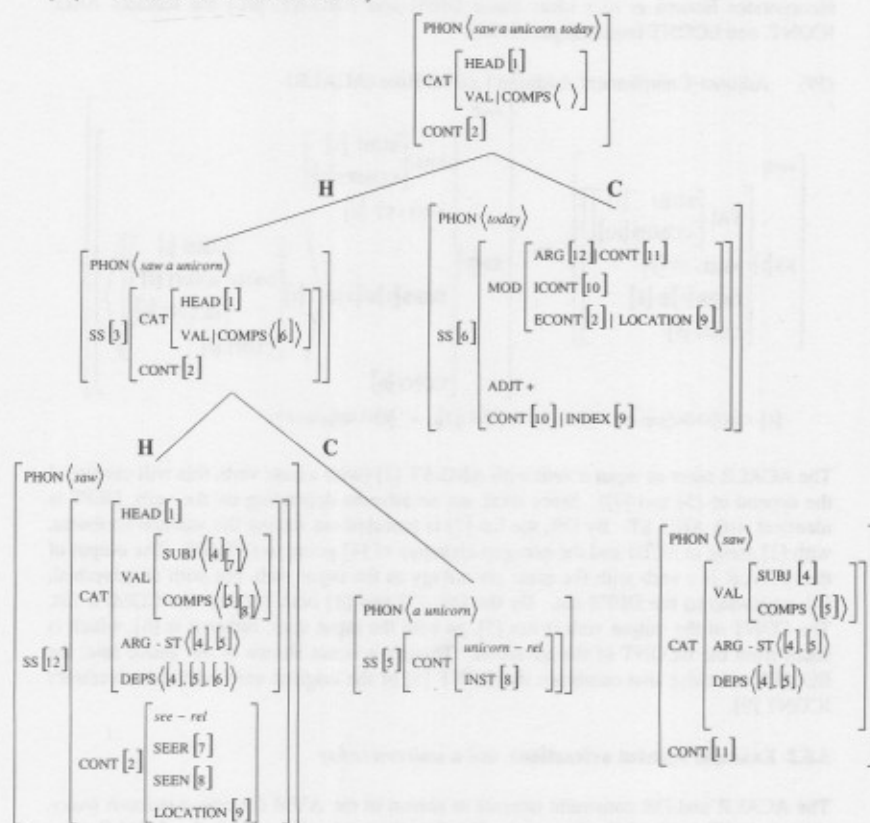
The ACALR takes as input a verb with ARG-ST [2] (with a base verb, this will consist of the append of [3] and [4]). Since there are no adverbs depending on the verb, DEPS is identical with ARG-ST. By DR, the list [2] is parceled out among the valence attributes, with [3] going to SUBJ and the non-gap elements of [4] going to COMPS. The output of the ACALR is a verb with the same phonology as the input verb, but with an adverbial, [7], appended to the DEPS list. By the DR, [7] and [4] both become the COMPS list. The CONT of the output verb is not [5], as with the input verb; rather it is [6], which is taken from the ECONT of the adverbial. Though it is not shown in the above rule, the ECONT is a value that combines the CONT [5] of the original verb with the adverbial's ICONT [9].

5.6.2 Example without extraction: *saw a unicorn today*

The ACALR and DR constraint interact as shown in the AVM for *saw a unicorn today*, shown in (40) on the following page. The first thing to notice is how the ACALR takes the original *saw*, shown at the bottom left, and licenses the one seen at the bottom of the tree. The DEPS list, identical with the ARG-ST in the original verb, has had [6] added to it, and since [6] (*today*) has not been extracted, it also appears on the COMPS list. The

CONT of *saw*, [11] in the original, now is [2], which comes from the ECONT value of *today*. Note that this ECONT is almost the same as CONT [11] in the original *saw*, except that the feature TIME is now specified, as [9]. The AVM for *today* is specified as ADJT: -, since this is an adjunct-complement. The rest of the tree falls into place under the usual assumptions of HPSG, plus those of Kasper (1998), explained in section 2.

(40) AVM for *saw a unicorn today*



5.6.2 Example with extraction: *today Robin saw a unicorn*

Before covering an example with extraction, Bouma *et al.*'s principles concerning SLASH values need to be introduced:

- (41) SLASH Inheritance Principle (SLIP) (Bouma *et al.* (1997), (64,65))

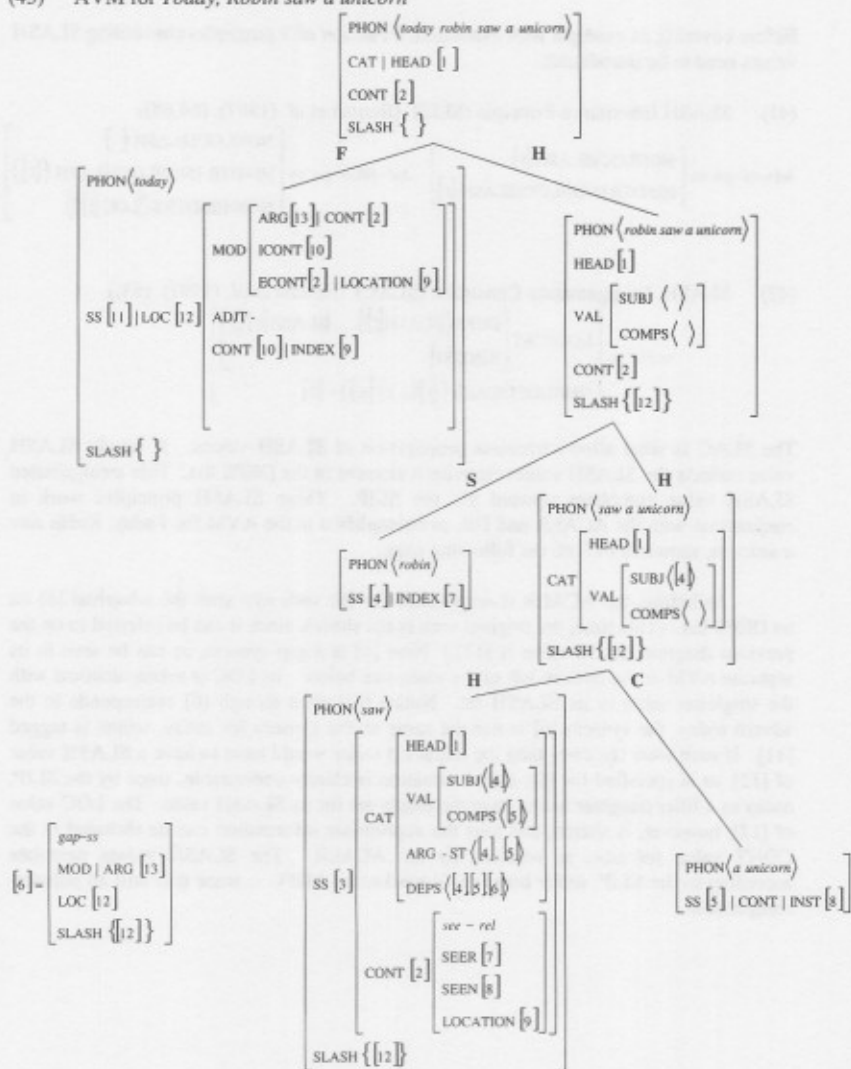
$$hd\text{-}val\text{-}ph \Rightarrow \left[\begin{array}{l} \text{NONLOC|SLASH [i]} \\ \text{HD-DTR|NONLOC|SLASH [i]} \end{array} \right] \quad hd\text{-}filler\text{-}ph \Rightarrow \left[\begin{array}{l} \text{NONLOC|SLASH \{ \}} \\ \text{HD-DTR |NONLOC|SLASH \{ [i] \}} \\ \text{NON-HD-DTRS \{ [LOC [i]] \}} \end{array} \right]$$

- (42) SLASH Amalgamation Constraint (SLAC) (Bouma *et al.* (1997), (63))

$$word \Rightarrow \left[\begin{array}{l} \text{LOC|CAT} \left[\begin{array}{l} \text{DEPS \{ [SLASH [i]], ..., [SLASH [n]] \}} \\ \text{BIND [0]} \end{array} \right] \\ \text{NONLOC|SLASH ([i] \cup ... \cup [n]) - [0]} \end{array} \right]$$

The SLAC is what allows traceless propagation of SLASH values. A word's SLASH value collects the SLASH values from each element in the DEPS list. This amalgamated SLASH value percolates upward via the SLIP. These SLASH principles work in conjunction with the ACALR and DR, as exemplified in the AVM for *Today, Robin saw a unicorn*, shown in (43) on the following page.

As before, the ACALR is responsible for the verb *saw* with the adverbial [6] on its DEPS list. (This time, the original verb is not shown, since it can be referred to on the previous diagram; its SS value is [13].) Now [6] is a gap-synsem, as can be seen in its separate AVM at the bottom left of the main tree below: its LOC is token-identical with the singleton value in its SLASH set. Notice that even though [6] corresponds to the adverb *today*, the synsem [6] is *not* the same as the synsem for *today*, which is tagged [11]. If such were the case, then the extracted *today* would have to have a SLASH value of [12], as is specified for [6]; such a situation is clearly undesirable, since by the SLIP, *today* as a filler daughter has to have the empty set for its SLASH value. The LOC value of [12], however, is shared, and thus the appropriate information can be included in the CONT value for *saw*, as required by the ACALR. The SLASH values percolate according to the SLIP; *today* here is still marked as ADJT: -, since it is still an adjunct-complement.

(43) AVM for *Today, Robin saw a unicorn*

5.7 Overview of "adjunct" extraction

This concludes the explanation of how adjunct extraction will be handled. Before applying the ideas here specifically to BNPAs, a review would be in order. The main points are that:

- 1) Adjunct extraction is a misnomer, since the items we are extracting are in fact (optional) complements.
- 2) Only adjuncts may occur immediately preverbally; both complements and adjuncts can occur postverbally.
- 3) Adjunct-complements appear on a verb's DEPS subject to the Dependent Realization Constraint; those that are not extracted are also on the COMPS list.

Although I have used a lexical rule adapted from Przepiorkowski (1997), I believe that once the semantics of MRS (or a similar system) is ironed out, this lexical rule can be abandoned, eliminating once and for all both the depth-of-derivation problem and the various kinds of scoping problems.

6 How to handle BNPAs

6.1 Non-relative clause BNPAs

The explanations offered by Larson and Kasper, taken in conjunction with BM&S's delineation of adjuncts and complements, are sufficient to describe the behavior of non-relative-clause BNPAs. To review, BNPA heads are lexically marked as such; that is, they are unspecified as to whether their MOD|ARG value is *synsem* or *none*, and they are ADJT:-. Thus, they can never appear in a head-adjunct structure (i.e., preverbally, as in **we Saturday had a party*), and when they appear in a head-complement structure, they will produce the appropriate meaning depending on whether they are on the verb's ARG-ST list (in which case they must be MOD:*none*), or are added to the DEPS list by the ACALR (in which case they must be MOD|ARG:*synsem*).

6.2 BNPA relative clauses

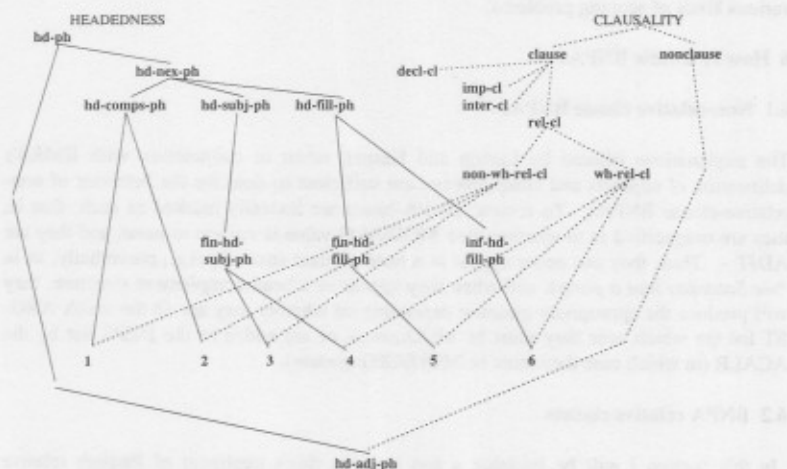
In this section I will be bridging a gap between Sag's treatment of English relative clauses (Sag (1997)) and Kasper's reworking of HPSG-style modification (Kasper (1998)). In his paper, Sag takes on almost every kind of relative clause imaginable, including *wh*-less infinitival relatives. However, he deals only with those involving subjects of the infinitive ("A person to fix the sink") or complements of it ("a book to read"), and bypasses those that involve adjunct-complements, including BNPA infinitival relatives. Kasper, on the other hand, strikes at the heart of the issue in his treatment of BNPAs, but since the focus of his paper is on modification in general, he stops short of

showing how specifically to treat BNPs in infinitival relative constructions.

6.2.1 Sag (1997) on English relative clauses

Sag makes use of a multiple-inheritance hierarchy to classify the different kinds of relative clauses. His starting point is the sort *phrase*, a class which can be partitioned according to HEADEDNESS or CLAUSALITY. At the bottom of the hierarchy, any given species of relative clause will inherit some of its characteristics from the HEADEDNESS hierarchy, and some from the CLAUSALITY hierarchy. This hierarchy is summed up in (44). Each of these sorts in this hierarchy has an associated set of constraints, which is inherited by its subsorts. The individual species occurring at the bottom of this multiple-hierarchy (that is, the ones labeled by number, as well as *hd-adj-ph*) must satisfy all the constraints inherited from the HEADEDNESS side and all the constraints inherited from the CLAUSALITY side. For example, *simple-inf-rel-cl* must satisfy the constraints for: *hd-ph*, *hd-nex-ph*, *hd-comps-ph*, *clause*, *rel-cl*, *non-wh-rel-cl*.

(44) Sag's Multiple Inheritance for Relative Clauses



- 1 = red-rel-cl (Reduced relatives)
- 2 = simple-inf-rel-cl (Infinitival relatives)
- 3 = bare-rel-cl (Relative clauses without a relative pronoun, except for infinitival relatives)
- 4 = wh-subj-rel-cl (wh-relatives, with wh-phrase as subject)
- 5 = fin-wh-fill-rel-cl (wh-relatives, with wh-phrase as a filler)
- 6 = inf-wh-fill-rel-cl (Infinitival relatives with pre-piped preposition)

There are three primary criticisms with a multiple hierarchy such as Sag's. The least serious of them is that computationally, a hierarchy doesn't have any effect. Even though, for instance, the constraints for the general *hd-ph* are only coded once, at compile time they will be copied and recopied for every subtype of *hd-ph*. At best, a hierarchy is only good for the grammar writers, providing convenient abbreviations and shortcuts. The second criticism is the fact that some of the types are based on hazy (though undeniably real) semantic criteria; for example, *inter-cl*, *imp-cl* and *decl-cl*. Sag himself concedes this, "assuming that semantic theory will distinguish among kinds of messages, as indicated." (Sag (1997), p. 14) Third, and most serious, is that in factoring out all the various commonalities among the different types of clauses, some characteristics may not make for natural classes. To use an analogy from biology, grouping together all animals that have eyes with lenses would put most vertebrates plus the squid into one group, but it wouldn't be a group that reflected any kind of natural classification. Therefore, there had better be some strong motivation for using a particular characteristic as a basis for separating out another subtype of clauses.

Despite these criticisms, I will be using and adding to Sag's classification of relative clauses because whether or not the hierarchy he has established proves to be well-founded, the constraints he has posited for the various types of relative clauses do at least seem to capture the majority of facts accurately, and it is the most thorough attempt at a formal description of relative clauses that I am aware of.

6.2.2 Additions and amendments

We now have all the equipment we need in order to handle BNPA relatives: 1) the constraints proposed by Sag; 2) Kasper's constraints for intersective adjectival modifiers and head-adjunct phrases in general; and 3) a method for extracting the adjunct-complements in adverbial relative clauses. I have made a number of additions and changes to Sag (1997) in order to incorporate some of the ideas from Kasper (1998) and to allow the content of adverbial relative clauses to come out right.

One change that I have made to the hierarchy (as suggested by Bob Kasper) is in the sort *hd-adj-ph*. In his paper, Sag divides head-adjunct phrases into two types: *simple-hd-adj-ph* for most head-adjunct phrases, and *hd-rel-ph* for the head-adjunct phrases that are relative clauses. This division becomes unnecessary when Kasper's treatment of modification is incorporated. Relative clauses can be specified in much the same way as Kasper's sort *intersective-adjective*, and can then be treated effectively with all other modifiers in head-adjunct phrases, as shown in (45) on the following page.

Second, I have changed two of the definitions of the infinitival relatives (*simple-inf-rel-cl* and *inf-wh-fill-rel-cl*, items 2 and 6 in the inheritance diagram): whereas Sag lists them as of type *proposition*, I am listing them as *hypothetical*, which is, along with *proposition*, a subtype of a sort that Sag (p.c) calls *propositional*. The name *hypothetical*

is self-explanatory, and I am using it for infinitival relatives because I want to make it explicit that, for example, *a place to stay* is not necessarily a place where someone has stayed or will stay, but is rather just a place that someone can, should or may stay.

(45) Constraints for relative clauses (modeled on Kasper (1998) *intersective-adj*)

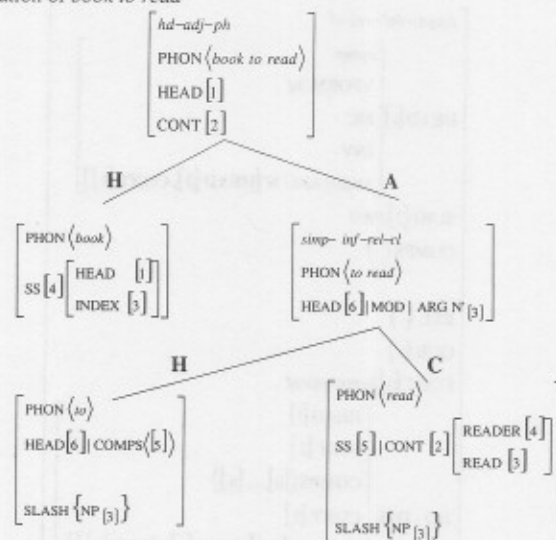
$$rel-cl \Rightarrow \left[\begin{array}{c} \left[\begin{array}{c} ARG|CONT \left[\begin{array}{c} INDEX [1] \\ RESTR [2] \end{array} \right] \\ HEAD|MOD \left[\begin{array}{c} ICONT [3] \\ ECONT \left[\begin{array}{c} INDEX [1] \\ RESTR [[2] \& [3]] \end{array} \right] \end{array} \right] \end{array} \right] \\ CONT [3] \end{array} \right]$$

Another change I have made deserves special attention, and it concerns how SLASH values propagate. Extraction from relative clauses is different from other extractions in one important respect: the LOCAL value of the modified sign cannot be structure-shared with that of the gap. The reason is that the gap will be looking for an NP (a specifier-saturated phrase), while the modified sign will actually be an N' (specifier-unsaturated). To illustrate, the gap in *to read* ___ is looking for an NP, such as *a book*. However, the filler in *book to read* is just *book*, an N'. To be sure, there has been debate about whether relative clauses modify NPs or N's. I am assuming that they modify N's so that I won't have to take on the problem of excluding phrases like **San Francisco to stay in*, or **Moby Dick to read*. To capture this behavior, Sag simply declares that the SLASH value of non-wh relative clauses is an empty set -- in other words, he just binds off the SLASH by fiat, before it ever encounters the modified N'. (In wh-relative clauses, too, the SLASH is bound off before encountering the modified N', but Sag doesn't have to take any special measures to achieve this result, since it falls out from constraints on head-filler phrases.) The N' finds its way into the structure because Sag declares that the relative clause's MOD|ARG value is an N' that is coindexed with the SLASHed NP in the relative clause's head daughter, as seen in the derivation for *book to read* in (46).

This solution works acceptably for the complement-extraction cases Sag considers; for example, the verb *read* in (46) already has a role in its CONT waiting to be filled with an index for the object that is read. For our purposes, though, since an extra role is being specified in the verb's content, coindexing is not enough. Suppose the above phrase were *a place to read* instead of *a book to read*. To get the semantics of *place* as a BNPA correct, the *non-wh-rel-cl* (in this case, a *simple-inf-rel-cl*) needs access to the ECONT of *place*, which specifies how it must modify the CONT of *read*. ECONT, in turn, relies on ICONT, and ICONT gets its value from the CONT of *place*. Thus, the element in the SLASH set must share not just the INDEX, but rather the entire CONT with the MOD|ARG value of the *non-wh-rel-cl*, as well as the SLASHed element's

HEAD, in order to allow access to the ECONT and ICONT values. Only in this way will content of the

(46) Derivation of *book to read*



BNPA make the contribution that it needs to. I have made such a modification in the constraints for the type *non-wh-rel-cl*. An AVM for a general infinitival relative clause is shown in (47), incorporating Sag's constraints for *simple-inf-rel-cl* (that is, the set of constraints for *hd-ph*, *hd-nex-ph*, *hd-comps-ph*, *clause*, *rel-cl*, *non-wh-rel-cl* and *simple-inf-rel-cl*), Kasper's MOD structure, and my own changes as mentioned above.

Also, even though *reason* has been excluded from the class of BNPA words, in the interest of completeness I have also created a subtype of *simple-inf-rel-cl* to handle infinitival relative clauses of *reason*. Unlike the other non-wh-relatives, the verb in an adverbial relative modifying *reason* has an empty SLASH set. Therefore, instead of the coindexing specified above for *simple-inf-rel-cl*, the SLASH set of the verb will have to be explicitly specified as being empty. Since in all other respects, the constraints for *simple-inf-rel-cl* are accurate for *reason* clauses, the most sensible thing to do is to make the SLASH specifications for *simple-inf-rel-cl* a default, which will be overridden in this subtype, which I have named *gapless-inf-rel-cl*. Specifications for *gapless-inf-rel-cl* can be found in the appendix.

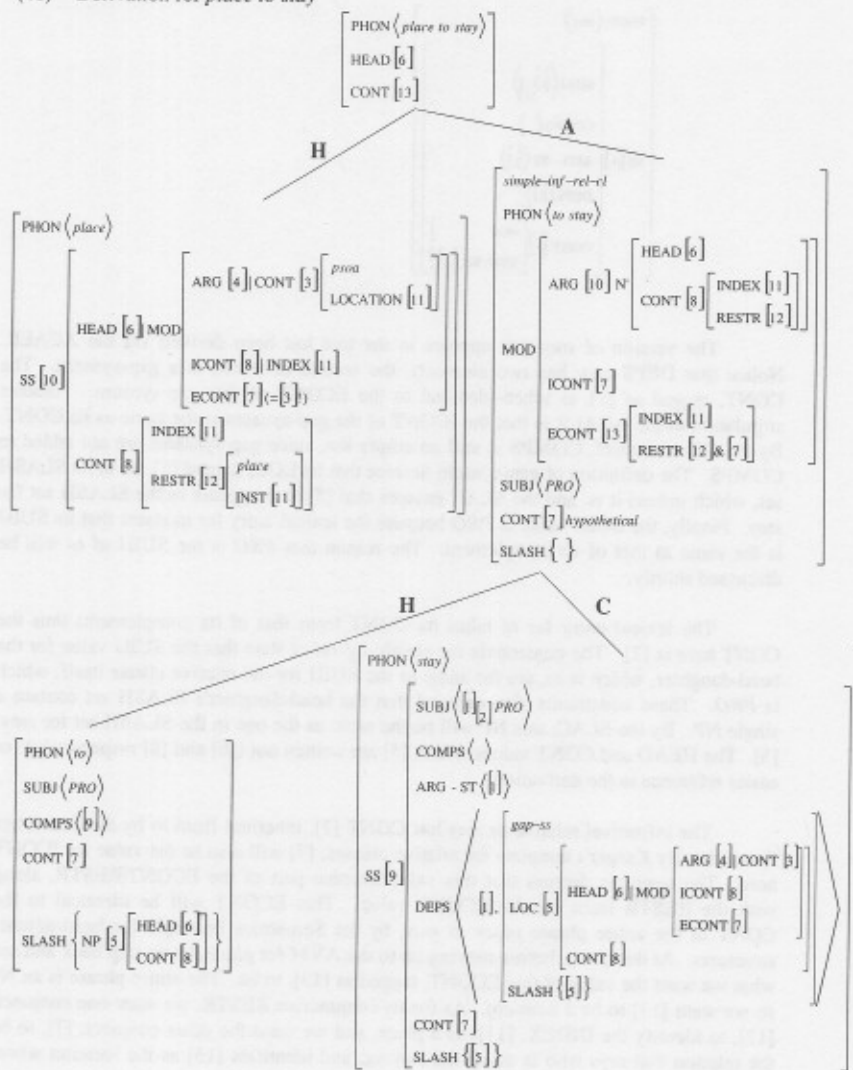
- (47) General form of a simple infinitival relative clause
 (Based on Sag (1997), Kasper (1998); author's additions are in boldface.)

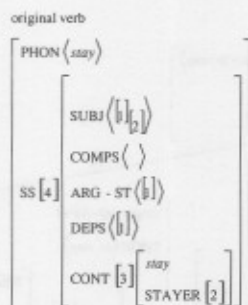
<i>simple-inf-rel-cl</i>	
HEAD [1]	<div style="border-bottom: 1px solid black; padding: 2px 5px;"> <i>comp</i> VFORM <i>inf</i> </div> MC - INV - MOD ARG N' [HEAD [3], CONT [4]]
SUBJ [2] <i>PRO</i>	
COMPS ()	
REL { }	
QUE { }	
CONT [5] <i>hypothetical</i>	
HD - DTR	<div style="border-bottom: 1px solid black; padding: 2px 5px;"> HEAD [1] SUBJ [2] COMPS {[6], ..., [n]} </div> CONT [5] SLASH / {NP [HEAD [3], CONT [4]]} REL { } QUE { }
NON-HD-DTRS ([SYNSEM [6]], ..., [SYNSEM [n]])	

6.2.3 Putting it all together

At this point, my proposed treatment of BNPA's has been presented in its entirety. What remains is to see how it all works. Therefore, (48) on the following page shows the derivation of an N' containing an infinitival adverbial relative: *place to stay*.

The lexical entry for the original verb *stay* is shown at the bottom of the tree. ARG-ST and DEPS are identical, with the single element in DEPS being mapped to SUBJ.

(48) Derivation for *place to stay*



The version of *stay* that appears in the tree has been derived via the ACALR. Notice that DEPS now has two elements, the second of which is a gap-synsem. The CONT, tagged as [7], is token-identical to the ECONT of this gap-synsem. Another stipulation of the ACALR is that the ICONT of the gap-synsem is the same as its CONT. By the DR constraint, COMPS is still an empty list, since gap-synsems are not added to COMPS. The definition of gap-synsem decrees that its LOC, tagged [5], be in its SLASH set, which indeed it is, and the SLAC ensures that [5] also appears in the SLASH set for *stay*. Finally, the SUBJ value is *PRO* because the lexical entry for *to* states that its SUBJ is the same as that of its complement. The reason that *PRO* is the SUBJ of *to* will be discussed shortly.

The lexical entry for *to* takes its CONT from that of its complement; thus the CONT here is [7]. The constraints for *simple-inf-rel-cl* state that the SUBJ value for the head-daughter, which is *to*, are the same as the SUBJ for the relative clause itself, which is *PRO*. These constraints also demand that the head-daughter's SLASH set contain a single NP. By the SLAC, this NP will be the same as the one in the SLASH set for *stay*: [5]. The HEAD and CONT values within [5] are written out ([6] and [8] respectively) for easier reference in the derivation.

The infinitival relative *to stay* has CONT [7], inherited from *to* by the Semantics Principle. By Kasper's template for relative clauses, [7] will also be the value for ICONT here. The template decrees that this value become part of the ECONT|RESTR, along with the RESTR from the ARG|CONT value. This ECONT will be identical to the CONT of the entire phrase *place to stay*, by the Semantics Principle for head-adjunct structures. At this point, before moving on to the AVM for *place*, let us step back and see what we want the value of this ECONT, tagged as [13], to be. The entire phrase is an N', so we want [13] to be a *nom-obj*. As for its conjunctive RESTR, we want one conjunct, [12], to identify the INDEX, [11], as a place, and we want the other conjunct, [7], to be the relation that says who is doing the staying, and identifies [13] as the location where

this staying takes place. Now we can look at *place* and see how this happens.

The SYNSEM value for *place*, [10], is the same as the MOD|ARG value for *to stay*, by the definition of a head-adjunct structure. Therefore, the tags for all the values within it can be copied from those of the MOD|ARG part of *to stay*: HEAD [6], CONT [8], INDEX [11], RESTR [12]. At this point, we have half of the RESTR we want in [13]: We have [12] identifying [11] as a place, since [11] fills the INST value for the *place* relation. Now, more information about HEAD [6] is written out in the AVM for *stay*, so it can be copied over as well: ARG [4], CONT [3], ICONT [8], ECONT [7]. At this point, we have almost what we want to complete the ECONT [13] in *to stay*. Up until now, we haven't said what the actual value of [7] is; we have said only that it is the CONT of the post-ACALR version of *stay*. Meanwhile, in the MOD|ARG|CONT slot for *place*, we have [3], which we know is a *stay* relation with *PRO* for a subject, and it is now additionally specified for LOCATION, with the very INDEX, [11], that we have also identified as a place. The only remaining goal is to identify [7] with [3], since we would have met our goal for the second conjunct in the RESTR for [13]. This is where the lexical entry for *place* comes in and finishes the job, declaring the word's MOD|ECONT, [7], to be token-identical to its ARG|CONT, [3]. This completes the derivation of *place to stay*.

7 Closing thoughts

There is still much to be discussed concerning Bare-NP Adverbials, some of which has been mentioned in previous sections. The issue of what determiners are legal in BNPAs has been greatly clarified, and separated from that of determiners in PP adverbials, but there is a hint that further discoveries are possible. The problem of preposition stranding has been brought closer to a satisfactory explanation here, but not all the way. The means I have used to extract BNPAs in relative clauses -- redrawing the line between complements and adjuncts -- is still quite controversial, and the version used here is admittedly inadequate to handle several kinds of scoping phenomena. However, I reiterate my belief that the adjuncts-as-complements approach is basically correct, and that a system such as MRS shows promise of solving these problems.

Finally, I must report some data that seem to contradict an assumption about BNPA words that has gone unquestioned so far: that they are a distinct set of lexically marked words. Consider the phrases in (49), seen and heard by the author during the course of writing this paper:

- (49) Troublesome data
- a. The hottest Goth club to dance
(from a handbill posted in downtown Columbus, 1996)
 - b. Illinois city rated as best to raise kids
(headline from *Columbus Dispatch*, 8/27/97, 3A)

- c. It was the Fun House [nightclub] that the DJ named Jellybean discovered Madonna.
(Casey Kasem on his Top 40 radio show, November, 1997)
- d. This is one event that I want my darling wife by my side.
(Homer Simpson, from a 1996 episode of *The Simpsons*)
- e. This is the lowest price I've ever sold gold in my life!
(Columbus, Ohio radio commercial, approx. September, 1997)

The first example can perhaps be disregarded if it is assumed that the writers are taking *dance* to be a transitive verb (in the same way as *shop* is often taken, as in *Thank you for shopping K-Mart*), and the second might simply be an example of omitted words in newspaper headlines, but the other examples are not so easily dismissed. What is especially interesting about (49c-e) is the fact that although these various nouns are being used as BNPA's in adverbial relatives, they cannot be used in non-relative BNPA settings, as demonstrated in (50):

- (50) c. *Jellybean discovered Madonna the Fun House.
- d. *I want my darling wife by my side this event.
- e. *I've never sold gold this price in my life!

These last three examples cannot be dismissed as instances of antecedent-contained deletion (as could the often-heard *Your call will be answered in the order it was received [in]*, or parking-lot advice *Pull out at the angle you went in [at]*), since the missing preposition does not appear elsewhere in these sentences. Furthermore, the last example cannot even be placed in the place/time/manner categories of BNPA's that have been examined so far: it talks about price! Examples like these might simply be attributed to speaker error, but there is beginning to be enough of a body of data that further investigation could be warranted.

APPENDIX:
Constraints and sample lexical entries

- (A) Semantics Principle for Head-Adjunct phrases (Kasper [1998])

$$\begin{array}{c} \text{ADJUNCT DAUGHTER} \\ \left[\begin{array}{l} \text{hd-adj-struct} \\ \text{HEAD [1]} \\ \text{CONT [2]} \end{array} \right] \Rightarrow \left[\begin{array}{l} \text{HEAD|MOD} \\ \text{CONT [3]} \end{array} \right] \left[\begin{array}{l} \text{ARG [4]} \\ \text{ICONT [3]} \\ \text{ECONT [2]} \end{array} \right] \left[\begin{array}{l} \text{HEAD [1]} \\ \text{CONT [5]} \end{array} \right] \end{array}$$

- (B) Constraints for relative clauses (modeled on Kasper (1998)
- intersective-adj*
-)

$$\text{rel-cl} \Rightarrow \left[\begin{array}{l} \text{HEAD|MOD} \\ \text{CONT [3]} \end{array} \right] \left[\begin{array}{l} \text{ARG|CONT} \\ \text{ICONT [3]} \\ \text{ECONT} \end{array} \right] \left[\begin{array}{l} \text{INDEX [1]} \\ \text{RESTR [2]} \\ \text{INDEX [1]} \\ \text{RESTR [[2]&[3]]} \end{array} \right]$$

- (C) Adjunct-Complement Addition Lexical Rule (ACALR)

$$\left[\begin{array}{l} \text{verb} \\ \text{SS [1]} \left[\begin{array}{l} \text{VAL} \\ \text{ARG-ST [2]} \\ \text{DEPS [3] } \oplus \text{ [4]} \\ \text{CONT [5]} \end{array} \right] \left[\begin{array}{l} \text{SUBJ [3]} \\ \text{COMPS [10]} \end{array} \right] \end{array} \right] \Rightarrow \left[\begin{array}{l} \text{verb} \\ \text{SS [7]} \left[\begin{array}{l} \text{VAL} \\ \text{ARG-ST [2]} \\ \text{DEPS [3] } \oplus \text{ [4] } \oplus \left[\begin{array}{l} \text{MOD} \\ \text{CONT [9]} \end{array} \right] \left[\begin{array}{l} \text{ARG [1]} \\ \text{ICONT [9]} \\ \text{ECONT [6]} \end{array} \right] \end{array} \right] \left[\begin{array}{l} \text{SUBJ [3]} \\ \text{COMPS [8]} \end{array} \right] \end{array} \right]$$

$$[4] = [10] \circ \text{list}(\text{gap-ss})$$

$$[4] \oplus ([7]) = [8] \circ \text{list}(\text{gap-ss})$$

- (D) Sag's constraints for *simple-inf-rel-cl*, incorporating Kasper's MOD structure. (Unification of constraints for *hd-ph*, *hd-nex-ph*, *hd-comps-ph*, *clause*, *rel-cl*, *non-wh-rel-cl*, *simple-inf-rel-cl*; author's additions in boldface)

<i>simple-inf-rel-cl</i>	
HEAD [1]	<i>comp</i> VFORM <i>inf</i> MC - INV - MOD ARG N [HEAD [3], CONT [4]]
SUBJ [2]	<i>PRO</i>
COMPS	{ }
REL	{ }
QUE	{ }
CONT [5]	<i>hypothetical</i>
HD - DTR	HEAD [1] SUBJ [2] COMPS ([6], ..., [n]) CONT [5] SLASH / {NP [HEAD [3], CONT [4]]} REL { } QUE { }
NON-HD-DTRS	{ [SYNSEM [6]], ..., [SYNSEM [n]] }

- (E) Constraints for *gapless-inf-rel-cl*
This type is to appear in the hierarchy as a subsort of *simple-inf-rel-cl*, and was created here in order to handle infinitival relatives headed by *reason*, which does not create a gap in the modifying infinitive phrase. As a type of *simple-inf-rel-cl*, this type will satisfy all the constraints in (G) except that the default SLASH value in the HD-DTR (denoted by the / in (G)) will be overridden as follows:

<i>gapless-inf-rel-cl</i>
HD - DTR [SLASH { }]

(F) Lexical entries for several BNPA words (following (Kasper 1998))

$\left[\begin{array}{l} \text{PHON} \langle \textit{place} \rangle \\ \text{HEAD} \text{MOD} \left(\left[\begin{array}{l} \text{ARG} \text{CONT} [4] \left[\begin{array}{l} \textit{place} \\ \text{LOCATION} [3] \end{array} \right] \\ \text{ICONT} \text{INDEX} [3] \\ \text{ECONT} [4] \end{array} \right] \right) \vee \textit{none} \\ \text{CONT} \left[\begin{array}{l} \text{INDEX} [1] \\ \text{RESTR} \left[\begin{array}{l} \textit{place} \\ \text{INST} [1] \end{array} \right] \end{array} \right] \\ \text{SPR} \langle \textit{DetP} \rangle \end{array} \right]$	$\left[\begin{array}{l} \text{PHON} \langle \textit{day} \rangle \\ \text{HEAD} \text{MOD} \left(\left[\begin{array}{l} \text{ARG} \text{CONT} [4] \left[\begin{array}{l} \textit{place} \\ \text{LOCATION} [3] \end{array} \right] \\ \text{ICONT} \text{INDEX} [3] \\ \text{ECONT} [4] \end{array} \right] \right) \vee \textit{none} \\ \text{CONT} \left[\begin{array}{l} \text{INDEX} [1] \\ \text{RESTR} \left[\begin{array}{l} \textit{day} \\ \text{INST} [1] \end{array} \right] \end{array} \right] \\ \text{SPR} \langle \textit{DetP} \rangle \end{array} \right]$
--	--

$$\left[\begin{array}{l} \text{PHON} \langle \textit{way} \rangle \\ \text{HEAD} | \text{MOD} \left(\left[\begin{array}{l} \text{ARG} \left[\begin{array}{l} \textit{VP} \\ \text{CONT} [4] \textit{place} \end{array} \right] \\ \text{ICONT} | \text{RESTR} [2] \\ \text{ECONT} [2] \textit{place} \end{array} \right] \right) \vee \textit{none} \\ \text{CONT} \left[\begin{array}{l} \text{INDEX} [1] \\ \text{RESTR} \left[\begin{array}{l} \textit{way} \\ \text{INST} [1] \\ \text{ARG} [4] \end{array} \right] \end{array} \right] \\ \text{SPR} \langle \textit{DetP} \rangle \end{array} \right]$$

(H) Lexical entry for *reason*

PHON	<i>reason</i>
COMPS	$\left(\left(\left[\begin{array}{c} \text{VFORM } \textit{inf} \\ \text{CONT } [2] \textit{psoa} \end{array} \right] \right) \right)$
CONT	$\left[\begin{array}{c} \text{INDEX } [1] \\ \text{RESTR } \left[\begin{array}{c} \textit{reason} \\ \text{INST } [1] \\ \text{ARG } [2] \end{array} \right] \end{array} \right]$
SPR	(DetP)

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