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THE PHONOLOGY AND MORPHOLOGY OF HALFWAY RIVER BEAVER

by

Tiina Kathryn Randoja

A Dissertation

Submitted to the School of Graduate Studies and Research

in Partial Fulfillment of the Requirements

for the Degree of

Doctor of Philosophy

Department of Linguistics

University of Ottawa



Tiina K. Randoja, Ottawa, Canada, 1990



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ABSTRACT

This dissertation is an examination of word formation and the phonological properties of the verb in Halfway River Beaver (HRB), a Northern Athapaskan language of British Columbia.

Due to various types of discontinuous dependencies between verb prefixes, I adopt the traditional analysis of the Athapaskan verb into verb theme, verb base, and verb form (Sapir and Hoijer 1967, among others) to determine the sequence of affixation in the morphology. The resulting representation structures prefixes in a way which is vastly different from their surface ordering; the differences seem bizarre, as they are not encountered in non-Athapaskan languages. I propose a mapping protocol to arrive at the correct surface sequence, whereby affixes are inserted into a thematic template. It is argued that this template is a motivated structure, because it represents both the theme, which is the lexical entry of the verb, and the division of the verb into phonological rule domains.

Two aspects of verb prefix phonology are considered. First, I account for the phonological similarity of two nonadjacent rule domains of the surface verb, the disjunct and the stem domains, in terms of the mapping protocol developed earlier. Secondly, I investigate the very complex and seemingly arbitrary phonological alternations undergone by prefixes in the conjunct domain, which intervenes between the disjunct and stem domains. These alternations are shown to be systematic in an analysis which adopts the notions of syllable template mapping and extraprosodicity. Conjunct prefix vowels are considered to be mostly epenthetic and vowel quality is seen to be largely predictable.

The morphological and phonological analyses are preceded by a chapter which describes the properties of HRB verb prefixes in detail.

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CHAPTER ONE

Introduction

Athapaskan languages are notorious for their complexity at a number of levels. These include (1) verbal morphology, where discontinuous dependencies and unusual surface orderings of inflection and derivation suggest that a more abstract structure underlies the surface ordering of morphemes, and (2) verbal phonology, where tremendous opacity in surface forms of morphemes makes it difficult to determine underlying forms and to account for their seemingly arbitrary surface variants.

Athapaskan researchers throughout this century have recognized and worked on these complexities. In morphology, Li (1946), Sapir and Hoijer (1967), Kari (1979), Rice (1985a), Speas (1984, 1986, 1987) and Saxon (1986) recognize discontinuous dependencies and propose abstract underlying structures. In phonology, insights from early linear accounts of prefix variation (e.g. Kari 1975, 1976) have been developed into interesting approaches using recent autosegmental and syllable theories (e.g. Wright 1983, 1985, 1986; Rice 1985b, 1986, 1987, 1988a,b, 1989a, Hargus 1988). It is imperative to continue this search for systematicity and underlying logic in Athapaskan languages. This dissertation examines these issues of morphological structure and verb prefix phonology in Halfway River Beaver (HRB), a Northern Athapaskan language. I will show that (1) HRB verbs have an abstract underlying structure different from the surface order, (2) the mapping from this structure to surface form is a relatively simple one, and (3) alternations in the surface forms of a certain class of verb prefixes can be explained as syllabification phenomena, where syllable theory is interpreted within the context of Prosodic Phonology.

In the following sections, I introduce the reader to the morphological and phonological issues in Athapaskan which are later examined in HRB, and present an introduction to the specific manifestations of these issues in HRB.

1. Athapaskan Verb Morphology

Early studies of verb morphology in Athapaskan languages recognized the fact of discontinuous dependencies. Whorf (1932) borrows Sapir's term "interrupted synthesis" to characterize verb structure, and describes it as

"[the] trait of split semantemes, of making the expression of an idea depend upon a binary compound that is readily interrupted by the expression of auxiliary ideas or by some of the interrupted parts of auxiliary expressions likewise binomially composed"

Whorf adds:

"The interlocking of a number of interrupted semantemes into a firmly knit structure seems to be a leading principle of coherence in these languages...

Athapaskan languages present the appearance of intricate highly patternized combinations of small elements having independent and discernible meanings, but used largely in formula-like combinations . . . There is, however, much phonetic interaction and contraction between the elements of a combination" (1932:17-19, cited in Kari (1979:3))

Sapir and Hoijer (1967) proposed that different types of these "formula-like combinations" of morphemes in Navajo reflect three different derivational levels: the verb theme, the verb base and the verb form. The verb theme is the underlying form, that is, the verb's lexical entry, consisting of the verb stem and any discontinuous prefixes which are crucial to the verb's meaning and which must co-occur with the stem. The verb base is the result of "productive derivations" of the theme, and in Sapir and Hoijer's usage may also include inflected derived forms. Finally, the verb form is the full phonetic form,

including theme, any derivational prefixes, and inflection. In the next sections I elaborate on these three derivational levels in Athapaskan languages.

1.1 The Verb Theme

The verb theme is the single, potentially discontinuous morpheme which structurally and semantically underlies all verb forms derived from it. There are two aspects of the notion of verb theme which I discuss in this section: (1) the types of prefixes which can be thematic; (2) the organization of verb themes into theme categories.

1.1.1 Thematic prefixes

The sources I draw on in discussing thematic prefixes are Kari (1979) and Rice (1989b); these recent studies of Ahtna and Slave respectively include thorough examinations of verb themes, and are representative of the facts in many Athapaskan languages.

The verb theme is the lexical entry of the verb. It is composed of thematic prefixes + verb stem + a marking for theme category. The latter component, theme category marking, is discussed in 1.1.2. In this section I consider the component of thematic prefixes.

Thematic prefixes are located in two phonologically well-defined parts of the verb: (1) the conjunct prefix complex and (2) the disjunct prefix complex. The conjunct prefix complex is located closest to the verb stem, while the disjunct prefix complex is further from the stem and is phonologically more loosely connected to the stem; this looser connection is indicated by the symbol * in (1), which represents the disjunct boundary. Disjunct and conjunct prefixes are discussed in detail in Section 2.

(1)	Disjunct prefixes	*	Conjunct prefixes	-	Stem
	thematic prefix(es)	(sub)thematic ¹	thematic prefix(es)		
	("adverbial")	("incorporated stem")	("classifier", etc.)		

A theme may have zero to a number of thematic prefixes. One of these must be the classifier, which occupies the rightmost prefix position, immediately before the stem. Simplified examples of Ahtna verb themes are given below. (2a) shows a verb theme consisting only of a classifier and stem; (2b) shows a verb theme with an incorporated stem, which is a disjunct prefix; (2c) shows a verb theme with an adverbial disjunct thematic prefix; (2d) shows a verb theme with a conjunct thematic prefix besides the classifier; finally, (2e) shows a verb theme having both a disjunct and a conjunct thematic prefix besides the classifier.

(2)	Thematic prefixes	classifier	stem	gloss
(a)		∅	(y)a-n	'eat O(bject)'
(b)	ti	∅	de-ti'	'pl. hunt with dogs'
	= incorporated stem			
	'dog'			
	(DISJUNCT)			
(c)	na	D	qoy	'vomit'
	(DISJUNCT)			
(d)	n	∅	zen	'think, intend'
	(CONJUNCT)			

¹ In Kari, "incorporates" can be added to modify a basic theme meaning. The result of incorporation is labelled a "subtheme" rather than a "base" because the modification of meaning is not always predictable and the potential of incorporation of a given theme is not predictable by theme category. Subthemes are also created by other means besides incorporation, e.g. by adding an additional conjunct prefix.

(e) ts'a gh † t'eh 'be bad, evil'
 (DISJUNCT) (CONJUNCT)

A defining feature of thematic prefixes is that they contribute to the abstract meaning unit of the verb theme. That is, a thematic prefix has no independent meaning of its own nor does the stem; one cannot predict the meaning of the theme on the basis of any single thematic prefix or the stem in isolation. It is the combination of all thematic prefixes and the stem which gives the verb its idiosyncratic meaning.

In Kari's study, the following information is indicated in the verb theme in addition to thematic prefixes, stem and indication of theme category: (1) a designation of transitivity, (2) thematized conjugation and/or mode and aspect prefixes (i.e. these prefixes are thematized in a minority of verb themes), and (3) "gender": some verb themes indicate the gender or class of the noun functioning as object of transitive themes or as subject of intransitive themes.

The key idea behind the notion of the verb theme is that the theme is the discontinuous single semantic unit which is the verb's 'lexical entry.

1.1.2 Theme Categories

The idea of theme category originated in Golla (1970); Golla demonstrates that verb themes can be usefully categorized into larger classes in order to capture a number of semantic and morphological generalizations. This work continues in Kari (1979) and Rice (1989b).

Verb themes can be assigned to categories on the basis of both their semantic and structural properties. Each theme category has a general meaning. In addition, each theme category has a "derivational potential", which is a predictable set of derivations that can apply to each verb theme in the category to form verb bases. Categories differ as to the number of possible derivational

strings which can be formed. Within this set of strings there is a particular derivation which is the shortest verb base; this is called the "primary base" or "primary aspectual string" (PAS). A theme category's PAS consists of the theme plus unique conjugation, mode and aspect prefixes (as noted above, these prefixes may already be present as thematized prefixes in a minority of verb themes).

Great simplification of the grammar is achieved by the categorization of verb themes. Discontinuous dependencies run through the surface complex of verb prefixes, including the discontinuous verb theme, composed of thematic prefixes and the stem. Individual themes are elaborated by a vast array of obligatory and optional derivational prefixes. Among the obligatory prefixes, which include conjugation, mode and aspect, there are multiple possibilities to choose from, some of which might at first appear arbitrary. Moreover, there is a wide variety of non-obligatory derivational prefixes, suggesting again an unsystematic, unpredictable set of possible derivations. With verb theme categories, the patterns of derivation are largely predictable and are found to correlate with semantic properties.

1.2 The Verb Base

The term verb base is introduced in Sapir and Hoijer (1967) as part of the sequence of steps for analyzing the verb form: the base is an intermediate stage in verb analysis, in which what Sapir and Hoijer termed "adverbial" prefixes are added to the verb theme, but inflectional prefixes are usually not yet present. In other words, the verb base is a verb theme with various derivational prefixes and which lacks inflection.

The types of derivational prefixes which may be added to a given verb theme depend on the verb's theme category; recall that one type of information defining a theme category is derivational potential. A theme can typically have many verb bases. (3) gives examples of some verb bases built on a verb theme.

(3) Verb theme: $O + \emptyset + (y)a \cdot n$ (operative) 'eat O'

(O = transitivity marker, \emptyset = classifier, (operative) = theme category)

Operative conjugation pattern: (\emptyset gh) i.e. - \emptyset conjugation in imperfective mode, gh conjugation in perfective mode)

<u>Bases:</u>						
	Disjunct derivational	Transitivity	Conjunct derivational	Conjugation	Classifier	Stem
(i)		O		(\emptyset gh) [- durative 'eat O']	\emptyset	(y)a·n
(ii)	na	O		(\emptyset gh) [- durative 'eat O again']	D	(y)a·n
(iii)		$O_2 + O_1$		(\emptyset gh) [- durative 'feed O_1 to O_2 ']	t	(y)a·n
(iv)	kin'	O	d	(\emptyset gh) [- 'pretend to eat O']	l	(y)a·n

Following Kari's terminology, the shortest manifestation of a verb theme is the primary verb base, and its composition is predictable from the verb's theme category. (3 i) is the primary verb base for the theme 'eat O' given in (3). All other bases (e.g. (3 ii-iv)) are called secondary bases, and the range of possible secondary bases is also determined by the verb's theme category.

Resulting bases are marked by prefixes containing modal, aspectual, and adverbial information.

1.3. The Verb Form

The verb form is the label given by Sapir and Hoijer to the surface form of a verb, consisting of the verb base and inflectional prefixes.

The tripartite analysis of verbs posited by Sapir and Hoijer is assumed in the more recent models of Kari (1979), Rice (1989b) and Speas (1986, 1987). The analysis of HRB word formation in Chapter 3 is also based on the theme-base-form distinction. However, while this general model recognizes discontinuous dependencies in surface morphology, and accounts for them by uniting at an abstract level discontinuous constituents such as the verb theme, it does not provide an account of the mapping of abstract morphological structure to surface morpheme order. In Chapter 3 I propose a mapping of morphological representation to phonological form which aims both to achieve the correct linear order of morphemes and to integrate the mapping process with HRB phonological properties.

In the following subsection I review major phonological properties in Athapaskan languages.

2. Athapaskan Verb Phonology

In this section, three important characteristics of verb phonology shared by many Athapaskan languages are laid out.

2.1 Disjunct vs. Conjunct Prefixes

The distinction between disjunct and conjunct prefixes is a central one in all Athapaskan languages. As shown in (4), "disjunct" labels the outermost range of prefixes in the verb, while "conjunct" labels a set of prefixes occurring between disjunct prefixes and the stem.

(4) Athapaskan verb (surface form)

Li (1933) was one of the first to comment on the distinction in prefix types; he divided Chipewyan prefixes into "primary" and "secondary" categories. Primary prefixes consisted of modal, aspectual and pronominal subject prefixes, as well as the classifier. Li noted that these prefixes were closely connected to the verb stem and began with a limited set of consonants. Secondary prefixes consisted of "local and adverbial prefixes" as well as incorporated nouns and postpositions. These prefixes were said to be more loosely connected to the stem than primary prefixes, on the basis of the observation that there is less coalescence when prefixes are combined. Li also commented that secondary prefixes had "as rich a consonantal system as the initials of the stem syllable"; this fact and the looseness of their connection to the stem drove Li to conclude that secondary prefixes were originally independent stems which were later incorporated into the verb.

Li (1946) builds upon these early observations; in this article, Li relabels primary prefixes as "conjunctive" and secondary prefixes as "disjunctive".² Li remarks that the 2sS prefix has different forms depending on whether it follows a disjunct or conjunct prefix.

The terms "conjunct" and "disjunct" were not used substantively in any published descriptions of Athapaskan from 1946 to 1970. In a review of Sapir and Hoijer's (1967) The Phonology and Morphology of the Navajo Language, Krauss (1970) calls for a recognition of the disjunct-conjunct distinction, and

² The terms "conjunct" and "disjunct" are first encountered in Swadesh (1932), where they originated from Sapir's class lectures at Yale University.

specifically of the "disjunct" boundary located between the two prefix types, to help simplify the account of Navajo morphophonology. Kari (1975, 1976) brings together different types of evidence in both Navajo and the distantly related language of Tanaina for the positing of the disjunct boundary in phonological representation. Among other phenomena, the boundary helps to elucidate (a) alternations in 2sS form, (b) the make-up of the modal system and (c) the deletion of certain prefix vowels. Kari accounts for these phenomena in a generative framework, where the disjunct boundary defines one of three distinct rule domains. The first is the [classifier + stem] domain, labelled "zero environment". The second domain is the conjunct domain, ranging from the disjunct boundary (*) to the classifier. The third domain covers the disjunct prefixes.

Rice (1982) and Hargus (1988) reconstitute rule domains as lexical levels within the theory of Lexical Phonology and Morphology (LPM). Thus, disjunct and conjunct prefixes enter the morphology and phonology at different lexical levels

In Chapter 4, the different phonological properties of HRB disjunct and conjunct prefixes are examined, as well as more recent accounts of these properties in the Athapaskan literature (e.g. Wright 1983, 1986). I am particularly interested in the phonological similarities between disjunct prefixes and the verb stem, in contradistinction to conjunct prefixes. Historical reasons for this similarity (i.e. - late incorporation into the verb; see above) have been suggested by Li (1933) among others ; in Chapter 4 I give a synchronic account of these similarities based on the account of word-formation given in Chapter 3.

2.2. Allomorphic Variation in Conjunct Prefixes

Recall from 2.1 that one of the distinctive features of conjunct prefixes is that they exhibit coalescence when they are combined. In other words, a single conjunct prefix may have different allomorphs depending on which prefixes are adjacent to it. Disjunct prefixes are less subject to coalescence than conjunct prefixes.

There are two issues to consider in accounting for conjunct allomorphy: first, why do conjunct prefixes coalesce more than disjunct prefixes? and secondly, what types of variation characterize conjunct allomorphy?

The first issue concerns verb derivation, and can be handled in various ways: for example, coalescence processes, formalized in phonological rules, can be made sensitive to boundary types; the many processes occurring in the conjunct domain are then blocked from applying to disjunct prefixes by the presence of a disjunct boundary. This is the approach followed in Kari (1975, 1976) among others. Alternatively, Hargus (1988) interprets conjunct prefix allomorphy as stemming from the fact that conjunct prefixes are added before disjunct prefixes in verb derivation; there is a set of phonological rules which apply only at early (conjunct) levels of derivation, thus effecting conjunct allomorphy. This interpretation uses an LPM approach to verb derivation.

A different interpretation can be found in Speas (1984, 1986, 1987) and Wright (1983, 1985, 1986); this viewpoint is like LPM in that it adopts the principle that at different stages of verb formation different sets of phonological rules apply. However, in contradistinction to LPM, it holds that (at least some) conjunct prefixes are added last to the verb; again, allomorphy is accounted for by a specific set of rules which apply to late stages of derivation. A version of this interpretation is adopted in this dissertation. The version taken here can

be described as a noncyclic model of LPM, in that I assume that a whole series of morphological processes occur before the first level of phonology begins; then, a second chunk of morphology is added to the word, after which later levels of phonology apply. Some versions of LPM, in contrast, make the assumption that phonological rules of the relevant level apply cyclically, i.e. after each application of a word formation rule.

The second issue to consider in accounting for conjunct allomorphy is the type of allomorphy which occurs. Naturally, some types of allomorphy are specific to particular Athapaskan languages. One type of allomorphy which runs across most languages is the alternation in conjunct prefix shape between [CV] and [C]. In Hargus (1988), this alternation in Sekani is accounted for by positing underlying /CV/ conjunct prefixes which undergo vowel deletion rules; these rules are conditioned by complex phonological and morphological factors. In Wright (1983, 1986) and Speas (1984, 1986, 1987), the opposite approach to the CV ~ C alternation in Navajo is taken: the underlying shape of most conjunct prefixes is assumed to be /C/ and the [V] in [CV] allomorphs is inserted by epenthesis. This is the approach which I adopt in Chapter 4.

Epenthesis is an operation which is tied to syllabification in Wright (1985) and also in this dissertation. Wright proposes that syllabification proceeds right to left, according to two general rules: the first rule forms a rime over segments that are not [-continuant], while the second rule forms an onset over single consonants. The first rule includes a direction to add a vowel whenever a rime segment is not available adjacent to an onset consonant. In contradistinction to Wright's syllabification approach, the syllable theory of Itô (1986) is applied to HRB data in this dissertation. Specifically, I apply the notion of syllable template mapping as a means of syllabification in Chapter 4,

whereby [V] is inserted to the prefix string to fulfill the requirements of a pre-existing HRB syllable template. I argue that this approach has merit in that independent rules of vowel deletion and epenthesis are largely unnecessary as a consequence.

2.3 Tone

Many Athapaskan languages are tonal, including Navajo, Slave, Sekani and HRB. Two phonemic tones are recognized in the literature on these languages: high and low. There are two issues regarding tone which are presented in this section: (a) the split between "high-marked" and "low-marked" languages, which calls into question the designation of HRB as a dialect of the "Beaver" language, and (b) the different behaviours of tone in the conjunct and the disjunct prefix domains.

2.3.1 High-marked and Low-marked Tone Languages

The term "high-marked" originates from Leer (p.c. to Krauss, 1978) as a label for languages which have high tone on vowels which in Proto-Athapaskan (PA) were phonated with glottal constriction and/or were followed by a glottal stop. All other vowels in a high-marked language are low-toned. The high-marked pattern is characteristic of Chipewyan, Hare, and Slave among others. Notably, it is also characteristic of dialects of Beaver spoken at Blueberry reserve and Doig River.

The opposite pattern, "low-marked", is characterized by present low tone on constricted and/or glottalized PA vowels, with high tone otherwise. Low-marked languages include Sekani and HRB. Thus, HRB differs significantly from other dialects of Beaver, which are otherwise unquestionably closely related to HRB, but which are high-marked.

There is intermingling between members of the Halfway River band and other Beaver bands; one of my informants from Halfway River had married a woman from Blueberry. Although her speech is distinctive in that it exhibits a reverse tone pattern from HRB speakers and instances of syllable-final [h] not found in HRB (or Sekani) speech (cf. Section 3), communication between the Blueberry and HRB speakers appears to be unproblematic. In Section 3.1, the linguistic relationship between Beaver, HRB and Sekani is discussed further.

2.3.2 Conjunct vs. Disjunct Tone

The marked tone in an Athapaskan language exhibits different properties depending on whether it surfaces on a conjunct or a disjunct vowel. With one exception, conjunct tone is part of the lexical entry of certain consonantal prefixes, and surfaces on the conjunct vowel to the left of the "toned" consonant.³ The prefix to which the conjunct vowel in this position belongs depends on the verb form; thus, conjunct tone surfaces in a predictable location, but not always on the same prefix.

Disjunct tone is lexically associated with the vowels of certain prefixes. Thus, in many Athapaskan languages, disjunct tone surfaces both in a predictable location and always on the same prefix. The behaviour of disjunct prefixes in a language like Hare is unusual, in that disjunct tone may move one syllable to the left depending on the prefix which follows the toned vowel. HRB disjunct tone follows the more regular pattern described above: it is underlyingly marked on the vowels of certain disjunct prefixes and is completely stable, unaffected by the tones adjacent to it.

³ The exception is the prefix which marks transitional aspect in most Athapaskan languages; this prefix is a vowel which carries its own tone.

In Chapter 4, I discuss two aspects of conjunct tone in HRB. First, I consider the fact that the placement of tone is subject to the same constraints as other conjunct domain processes: it is blocked from applying on disjunct prefixes, meaning that if the vowel to the left of a toned consonant belongs to a disjunct prefix, the tone does not surface. Conjunct tone thus provides another example of how many phonological processes in Athapaskan have limited domains, where these domains include the conjunct and the disjunct domains.

The second aspect of conjunct tone I discuss in Chapter 4 is that conjunct vowels which receive tone may change quality. This has also been noted in Wright (1983) for Navajo. In accounting for the quality of HRB low-toned conjunct vowels, I relate the representation of tone to the mapping of the syllable template, and derive vowel quality ultimately from syllabification.

2.4 Summary and Prospectus

In the above subsections, two central themes of Athapaskan phonology have been presented: the distinct phonological properties of disjunct and conjunct prefixes, and the high degree of allomorphic variation in conjunct prefixes. In this dissertation I attempt to relate these themes to word formation; thus, phonology-morphology interaction is an important consideration in this work. In doing so, I pursue a line of research which has been explored in Hargus (1986, 1988), Speas (1984, 1986, 1987), and Wright (1983, 1986) among others.

The present work is distinct from Hargus in that word formation builds on the potentially discontinuous verb theme and requires an abstract morphological representation which captures important verb-internal dependencies; in Hargus, word formation builds on the verb stem alone, and uses the LPM model in a way which does not take verb-internal dependencies

explicitly into account. In addition, this work takes a different approach to many phonological processes.

The present work is distinct from Speas in its account of mapping from morphological structure to phonological form. Specifically, it is more explicit than Speas both about the relationship of phonological processes to word formation and about the operation of the processes themselves.

The present work is distinct from Wright, as from Speas, in its account of mapping from morphological structure to phonological form. In addition, this dissertation uses different assumptions and mechanisms from Wright in its organization and application of phonological processes.

Thus, this dissertation attempts to make a unique contribution to the exploration of Athapaskan morphological and phonological issues.

3. Sources of Data

All of the HRB data presented in this dissertation were collected over the course of three fieldtrips I made to the Halfway River reserve in northern British Columbia. In total, I spent seven months gathering data from a total of twelve speakers. (An estimate of the total number of fluent HRB speakers ranges from 50 to 100.) Of these twelve, four speakers were consulted most regularly (see Acknowledgements); their ages were approximately 30 to 50 years old. Data were gathered by elicitation, whereby speakers were asked to translate English expressions into HRB, or to confirm HRB forms offered by the elicitor.

In addition to original data, much useful information was gleaned from Hargus (1988, to appear). These references are from studies of Sekani, as spoken at McLeod Lake, British Columbia. As mentioned in 2.3.1, tone facts

suggest that Sekani and HRB are very closely related; indeed, the distinction between separate "languages" and separate "dialects" is blurred in this case. Hargus' (1988) dissertation proved a very useful reference in organizing my fieldwork and in determining the place of HRB in the Northern Athapaskan family. The reader is referred to this work for a discussion of many aspects of the Sekani language which this dissertation shows are also found in HRB.

There are two other "Beaver" speaking reserves near Halfway River: Doig River and Blueberry. Some unpublished material on Doig River Beaver has been done by the Summer Institute of Linguistics (SIL): Story (1989) has done a phonemic analysis, and Holdstock (1984a, b, c) have compiled a small dictionary and reading primer in addition to translations of Bible texts. From these sources and contact with a Blueberry speaker, it is clear that HRB differs significantly from these two Beaver dialects. Most notably, as mentioned in 2.3.1, HRB (like Sekani), chooses low tone as the marked tone, while in Blueberry and Doig River high tone is the marked tone. In addition, Blueberry and Doig River allow [h]'s to surface syllable-finally, while no [h]'s surface in HRB. Finally, Doig River (and probably Blueberry⁴) have an additional series of affricate and fricative phonemes (the postdental series: [tʃ], [tʃʰ], [tʃʰ], [s] and [z]).

In this dissertation, I restrict my attention to HRB, which might more accurately be labelled "Halfway River Sekani" on the basis of its phonological properties. The designation "HRB" is maintained throughout, as speakers refer to themselves as Beaver speakers. Further research into this group of dialects/languages needs to be done.

⁴ Complete data is not available on Blueberry Beaver; however, the data I have from the Blueberry speaker living at Halfway River includes at least dental [s].

4. Layout of Chapters

Chapter 2 has two goals. First, it describes each morpheme in the HRB verb in terms of its semantic, morphological and phonological properties. Within this presentation, this chapter aims also to outline the particular properties which are of significance for arguments in ensuing chapters. These properties involve discontinuous dependencies and syllabic positions occupied by verb prefixes. Since this chapter is primarily a data chapter, it will be of immediate interest to Athapaskanists and others wanting a descriptive presentation of verb forms. For the reader not interested in detailed descriptions, the summaries in each section need to be only skimmed to glean major themes, and the reader may then proceed to Chapters 3 and 4.

Chapters 3 and 4 are more theoretically oriented. Chapter 3 argues that the discontinuous dependency facts presented in the preceding chapter indicate an underlying verbal structure which differs substantially from surface structure. In underlying structure, inflection is outside of derivation and surface discontinuous dependencies are underlyingly adjacent. In maintaining this, I follow long-standing observations and assertions made in the Athapaskan literature throughout this century. The mapping from underlying structure to phonological form involves mapping derivational and inflectional affixes into a structure called the "thematic template", which is a discontinuous structure consisting of the four prefix positions which are potentially thematic in HRB plus the verb stem. Each position in the template, in addition to being thematic, also bounds one of the four phonological rule domains which characterize the surface verb string. I argue that the correlation between thematic positions and phonological domains is significant, and that mapping into a template which is

thus both morphologically and phonologically motivated is a simple operation insofar as only two insertion frames are required.

Chapter 4 analyzes the phonology of HRB conjunct prefixes and examines the organization of phonological rule domains in the verb. Rule domains can be explained with reference to the sequence of mapping prefixes from abstract underlying structure to Phonological Form. In Chapter 4 I also account for phonological alternations in the verb, concentrating on the alternations exhibited by conjunct prefixes. These involve C ~ CV alternations as well as alternations in prefix vowel quality. I claim that the former class of alternations can be accounted for by Stray Epenthesis resulting from mapping a syllable template over the prefix string. This explanation builds on the insight in recent Athapaskan literature that most conjunct vowels are epenthetic and proposes a detailed account of syllabification within the general model of Prosodic Phonology. After showing how syllabification works in the conjunct domain to insert an epenthetic vowel, I address the alternations in quality of the epenthetic vowel. It turns out that all vowels in the conjunct domain besides [u] and [i] can be derived by the process of syllabification or by phonological rule.

Finally, in Chapter 5 I summarize the conclusions reached in the preceding chapters. I claim that the analyses presented of verb morphology and phonology paint a picture of systematicity and underlying logic in HRB, which like its fellow Athapaskan languages first appears to be ominously complex and arbitrary in many of its properties.

5. HRB Underlying and Surface Segments

5.1 Consonants

5.1.1 Phonemic inventory

(4) gives a phonemic inventory of HRB consonants.

(4) Consonant Phonemes

	lab	alv	lat (alv)	(alv-) pal	vei	glot
<u>Obstruents</u>						
<u>Stops</u>						
vl. unasp.	p	t			k	
vl. asp.		t ^h			k ^h	
glottalized		t'			k'	
<u>Affricates</u>						
vl. unasp.		ts	tʃ	tʃ		
vl. asp.		tʃ ^h	tʃ ^h	tʃ ^h		
glottalized		ts'	tʃ'	tʃ'		
<u>Continuants</u>						
vl.		s	ʃ	ʃ	x	
vd.		z	l	j	ɣ	
<u>Sonorants</u>						
Oral	w			j		
Nasal	m	n				
<u>Laryngeals</u>						
					ʔ	
					h	

Notice the (alveo)-palatal continuants. The voiceless member, /ʃ/, like all the other voiceless continuants, is an actual fricative, while its voiced counterpart, /j/, is not technically a fricative. Nevertheless, this pair is to be regarded phonologically as differing only in voicing, since the two members alternate with each other. To distinguish [j] which occurs as the voiced

counterpart of [š] from [j] which is phonetically the same but has a different phonological patterning, [j] is indicated as both a continuant and a sonorant in (4).

There are two differences between the phonemic inventory in (4) and the inventory of surface consonants. First, a labio-velar series of obstruents ([kw], [kw^h], [kw^ʰ]) and continuants ([xw], [ɣw]) appear on the surface (see Hargus (1988) for discussion of how these segments are derived). Secondly, the laryngeal segment /h/ never appears on the surface (see Chapter 4 of this thesis for the motivation for positing this underlying segment).

5.1.2 Orthographic Conventions

Certain orthographic conventions have been established in the Athapaskan literature. For consonants, the conventions result in (5), which orthographically represents the phonemic inventory of HRB consonants.

(5) Consonant Phonemes Orthographically Represented

	lab	alv	lat (alv)	(alv-) vel pal	lab- vel	glot
<u>Obstruents</u>						
<u>Stops</u>						
vi. unasp.	b	d			g	
vi. asp.		t			k	
glottalized		tʰ			kʰ	
<u>Affricates</u>						
vi. unasp.		dz	dl	j		
vi. asp.		ts	tʃ	ch		
glottalized		tsʰ	tʃʰ	chʰ		
<u>Continuants</u>						
vl.		s	ʃ	sh	x	
vd.		z	ʒ	y	gh	
<u>Sonorants</u>						
Oral	w			y		
Nasal	m	n				
<u>Laryngeals</u>						
						ʔ
						h

The main differences between (4) and (5) are that (i) phonetically voiceless aspirated stops and affricates are orthographically represented by symbols for voiceless unaspirated consonants, while (ii) phonetically voiceless unaspirated stops and affricates are orthographically represented by symbols for voiced consonants.

In syllable-final position, only phonetically voiceless unaspirated stops and affricates occur (i.e. [t ts tʃ tʃʰ k]). Many Athapaskan orthographies use phonetic rather than orthographic symbols for these consonants in syllable-final position; Hargus (1988) suggests that this is a result of "the influence of English phonetics and orthography" (Hargus 1988:16). I follow the orthographic

tradition and represent syllable-final consonants phonetically, while consonants in other positions are represented as in (5).

5.2 Vowels

5.2.1 Surface segments

(6) gives a phonetic inventory of the surface vowels in HRB.

(6) Surface vowels

	Front Unrounded Oral Nasal		Central Unrounded Oral Nasal		Back Rounded Oral Nasal	
High	i	ɨ			u	ʉ
Mid	e	ɛ	ə		o	ɔ
Low			a	ɤ		

Notice that [ə] has no nasalized counterpart. [ə] represents a lax vowel which varies phonetically between [ə], [ɛ], [ɨ] and [ʌ].

Any vowel may be either low-toned (V̇) or high-toned (unmarked).

5.2.2 Vowel Phonemes

On the basis of the analysis given in Chapter 4 and analyses of Sekani (Hargus, 1988) and Doig River Beaver (Story, 1989), the inventory of vowel phonemes is assumed to be that in (7).

(7) Underlying Vowels

	Front Unrounded Oral	Central Unrounded Oral	Back Rounded Oral
High	i		u
Mid	e	ə	o
Low		a	

There are no differences between the phonetic and phonemic inventories given above and the orthographic representations of vowels in HRB.

6. Notation and Abbreviations

The symbols and abbreviations used in the dissertation are noted below.

ɔ	-	low tone included in a consonant's lexical entry
ɔ̣	-	glottalized consonant
ɔ̤	-	low-toned vowel
ɔ̃	-	nasalized vowel
VV	-	vowel sequence
6	-	syllable
N	-	syllable nucleus
F	-	feature
○	-	empty tier
pp	-	postpositional phrase
adv	-	adverbial
inc st	-	incorporated stem
dstr	-	distributive

rev	=	customary/reversative
d.o.	=	direct object
refl obj	=	reflexive object
recip	=	reciprocal object
ari obj	=	areal object
unsp obj	=	unspecified object
dc sj	=	deictic subject
der	=	derivational
cnj	=	conjugation
m	=	mode
sj	=	subject
cl	=	classifier
prog	=	progressive
1sS	=	first person singular subject
2sS	=	second person singular subject
3sS	=	third person singular subject
1pS	=	first person plural subject
2pS	=	second person plural subject
3pS	=	third person plural subject
1sO	=	first person singular object
2sO	=	second person singular object
3sO	=	third person singular object
1pO	=	first person plural object
2pO	=	second person plural object
3pO	=	third person plural object

CHAPTER TWO

HRB Verbs

0. Introduction

In this chapter, the HRB verb complex is presented. We begin with the stem and move leftward, discussing each of the twelve prefix positions. One of the major themes of this dissertation is that the underlying structure of HRB verbs differs from their surface structure - i.e. the surface ordering of prefixes does not reflect the underlying structure of verbs. One of the reasons for positing a different underlying structure is the existence of discontinuous dependencies. These dependencies can make a sequential description of prefix positions confusing, since reference must be made in some cases to prefixes not yet discussed. The description of prefix positions can also be confusing because of their opaque phonological manifestations. To alleviate this confusion, discussion of each prefix position will be organized as follows.

Section N.1, the first subsection under each prefix position, focuses on the prefix's function. In this section, we identify the prefix as inflectional, derivational or "thematic". In the case of derivational prefixes, the different functions are exemplified. At this point in the exposition, the functions of many prefixes must be isolated from the glosses alone, since phonological evidence for the presence of a given prefix will not yet have been explained.

Section N.2 lists the discontinuous dependencies or co-occurrence restrictions characterizing non-inflectional prefixes (inflectional prefixes have no co-occurrence restrictions). The existence of these discontinuous

dependencies is an important source of evidence for the abstract morphological structure argued for in Chapter 3.

Section N.3 outlines the phonological properties of each prefix. These include properties relating to syllable structure and timing units, which are important topics in Chapter 4.

Finally, Section N.4 presents summary charts, and a list of properties which are of significance for arguments in later chapters.

The HRB verb complex is divided into its morphological constituents in (1) and (2). (1) lists the twelve position classes in their surface sequence, while (2) gives examples of some of the prefixes found in each position.

(1) HRB verb complex (surface)

Prefix position: 0 - 1 - 2 - 3 - 4 - 5 - 6 - 7 - 8 - 9 - 10 - 11 - stem

0 - oblique object + postposition (pp)	6 - deictic subject (dc sj)
1 - adverbial (adv)	7 - derivational (der)
2 - incorporated stem (inc st)	8 - conjugation (cnj)
3 - customary/reversative (rev)	9 - mode (m)
4 - distributive (dstr)	10 - subject (sj)
5 - (direct) object (obj, d.o.)	11 - classifier/voice (cl)

(2) HRB Verb Prefixes

pp	adv	inc st	cust/rev	dist	DO	dc sj	der	cnj	mode	sj	cl
0			na								
s-	?ânê-	tsi-		yâ-/	s-	ts'-	n-	gh-	n-	s-	h-
n-	k'è-	da-		dò-/	n-	gh-	d-	'n-	w-	n-	d-
y-	da-	.		nò-/	y-		ch-	's-		ə-	l-
m-	che-	.		yâdê-/	nx-		i-				
nax-	na-	.		yânê-/	x-		u-				
x-	son-	.		dânê-	wu-		.				
w-	.	.			w-		.				
?-	.	.			?-		.				
?d-	.	.			?d-		.				
l-	.	.			l-		.				

1. Stems and Affixes

1.1 The Verb Stem

The primary constituent of the HRB verb is the verb stem, which is made up of a root and suffix(es). Sapir (1921-3:141) claimed that the root is inherently nominal; both noun stems and verb stems are then formed by adding null or overt suffixes to this nominal root. Hargus (1988), based on Rice (1982), rejects the claim that roots are nominal, and argues that roots are generally not marked for lexical category. One of the functions of stem formation rules, then, is to assign lexical categories to roots. An example of a root which is found in both verb and noun stems is /tan/, which appears in the verb [səstan] '1sS is freezing' and in the noun [tan] 'ice'. Another example is the root /tʰun/ which appears in the verb [daghestʰu] '3sS ties up O' and in the noun [tʰuʔ] 'rope'. A third example is the root /tas/ which appears as the noun [tas] 'arrow' as well as in the verb [ustas] '1sS shoots arrow'.

Stem-forming suffixes form verbs or nouns from roots. In the case of verb-forming suffixes, aspect information may also be provided. Examples of aspectual suffixes are given in (3) and (4).

- (3) -t (a) (i) compare pencil dāsasʔa '1sS holds
 'progressive = 'pencil' də - s - s - ʔa up pencil'
 1 ʃ 10 stem
 adv cnj 1sS 'handle 3 D O'
- (ii) vs. daghasʔat '1sS is holding
 = da - gh - s - ʔa + t up pencil
 1 ʃ 10 stem prog. (now)
 adv cnj 1sS 'handle 3 D O'

	(b) (i) compare	ʔadadlò = ʔ - d - dlò 5 7 stem unsp. O der 'laugh'	'3sS laughs'
	(ii) vs.	ghedlòt = gh - dlò + t 8 stem prog. cnj. 'laugh'	'3sS is laughing'
(4) - ch 'customary'	(a) (i) compare	nen ʔichut = 'ground' i - chut 7 stem der 'handle O'	'1sS touched the ground'
	(ii) vs.	ts'odze naischuch = 'flies' na - i - s - chut + ch 3 7 10 stem cust. cust der 1sS 'handle O'	'1sS always catches flies'

Aspectual information, besides being provided by verbal suffixes, may also be provided in position 8 conjugation (eg. 3a_{ii}, 3b_{ii}, where the combination of position 8 /gh/ + position 9 /Ø/ denotes progressive aspect), position 1 adverbial, position 4 distributive, position 3 reversative/customary (eg. 4a_{ii}, where position 3 /na/ contributes customary aspect to the verb), and position 7 aspectual (eg. 4a, where position 7 /i/ contributes transitional aspect to the verb). Aspectual suffixes are numerous in shape ranging from /Ø/ stem formatives to those given in the examples above.¹

¹ See Kari (1979) for an in-depth discussion on aspect and verb theme in Ahtna. See Leer (1979) for a discussion of historical developments in aspectual stem variation.

The phonological shapes of suffixes vary according to the mode prefix in position 9 and according to the ending of the verb root. In the stem sets below, notice the variations in the shape of the future suffix.

(5)	MODE: Imp	Pf	Fut	Op	GLOSS
A.	kwen	kwen	kwené	kwené	'be hot'
	men	men	mené	mené	'fill up'
	tsəgh	tsəgh	tsəghé	tsəghé	'sew'
	ze	ze	zehé	zehé	'yell'
	zat	zst	zedzé	zidé	'wake up'
	zats	zats	zedzé	zedzé	'dance'
	ts'ès	ts'è	ts'èsé	ts'èsé	'cook O'
	gwòtl	gwòtl	gwòtè	gwòdle	'hit O'
B.	da	da	datè	das daè	'sit'
	gu	gu	gulé		'vomit'
	lé	lé?	lètè	lee lezi	'make O'
	t'è	t'è	t'ètè	t'à? ²	'run'
	ze	ze	zet zelé	zeze zee	'chase O'
	jè	jè	jít	jèhè	'talk'
	dlò	dlò	dlòtè	dlòè	'laugh'
	ghı	ghı	ghıtè	ghı(?)	'melt/thaw'

² Final glottal stop is only heard following a low-toned vowel. However, glottal stop is not consistently heard in this position in HRB, so I do not believe that its occurrence here is predictable.

ts'et	ts'et	ts'ilè		'fall'
zit	zit	zelè	zidi	'stop'

In the (A) examples, the future suffix surfaces as [-è] following stems which are underlyingly consonant-final. In the (B) examples, the future suffix surfaces as [-tè], [-lè], or simply [r] (there is variation in voicing and in the presence of final [-è]). These examples show how suffix shape may vary, at least on the surface. I do not make any claims here about the underlying form of the future suffix.

Once a stem is formed, other non-stem-forming suffixes may be added to it. For example, the verb stems in (i) occur independently of the suffixed forms in (ii).³

(6) (a) (i) dene dakw'q '3sS is midget-sized'

= 'man' d - kw'q
 7 stem
 der 'be small'

(ii) dakw'qazi '3sS is extremely midget-sized'

= d - kw'q + azi
 7 stem diminutive
 der 'be small'

(b) (i) medaasdia '1sS buys O'

= m - da - s - dia
 0 0 10 stem
 3sO pp 1sS 'buy O'

³ In morpheme-by-morpheme representations of verb forms I do not include [ə], which I argue in Chapter 4 is an epenthetic vowel. Therefore the underlying representation of [Ca] prefixes is /C/. The conditions for epenthesis are discussed in Chapter 4.

(ii) ?əjukè madaesdloyò?ə '1sS cannot buy O'
 = neg m - da - s - die + yò?ə
 0 0 10 stem + negative
 3sO pp 1sS 'buy O'

A very productive non-stem-forming suffix is the nominalizer /-i/.

Examples of this suffix are given below.

(7) (a) (i) verb: ?ədèstl'ès '3sS writes'
 = ? - d - 's - t'ès
 5 7 8 stem
 unsp. O der cnj 'write'

(ii) noun: nazata ?ədèstl'əsi 'Bible'
 = naz - ta ? - d - 's - t'ès + i
 'our' 'father' 5 7 8 stem + nominalizer
 unsp. O der cnj 'write'

(b) (i) verb: ?əstsits '1sS eats'
 = ? - s - tsits
 5 10 stem
 unsp. O 1sS 'eat'

(ii) noun: ?əstsidzi 'Corn Flakes (cereal)'
 = ? - s - tsits + i
 5 10 stem + nominalizer
 unsp. O 1sS 'eat'

(c) (i) verb: ?ət'òt '3sS smokes'
 = ? - t'òt
 5 stem
 unsp. O 'smoke'

(ii) noun: ?ət'òdi 'cigarettes'
 = ? - t'òt + i
 5 stem + nominalizer
 unsp. O 'smoke'

1.2 Classifier (position 11)

"Classifier" is the name traditionally given to the prefix slot closest to the stem. Four classifiers have been identified in Athapaskan languages. In HRB, these four are identified as /θ/, /h/, /d/ and /l/. In Section 1.2.3, the phonological evidence for positing these four classifiers is presented. First, we describe the functions of the classifiers.

1.2.1 Function

1.2.1.1 Description

Krauss (1969) calls the term "classifier" a misnomer, as the function of classifiers in HRB is not the function typically ascribed to morphemes known as classifiers.

In HRB, a classifier is either thematic (i.e. - lexically specified) or derivational. A thematic classifier must occur with the verb theme in which it appears. Examples of thematic classifiers are given in (8) - (10) in 1.2.1.2. These forms all describe colours; however, they are marked by three different classifiers. Since no distinct function is performed by these classifiers, they are lexically specified.

In addition to thematic use, the /d/ and /h/ classifiers have derivational functions. The functions of /d/ classifier can be grouped together under the label "self-circumpletion" (see, for instance, Tenenbaum 1978). A "self-circumpleting" action is that which "returns upon itself"; in other words, the action's direction of predication points to its primary participant, usually the subject performing the role of agent. The specific constructions which show this property are reflexives (cf. 1.2.1.2 (11)-(14)), reciprocals (cf. 1.2.1.2 (16)), "reversatives" (cf. 1.2.1.2 (16)-(19)) and agentless passives (cf. 1.2.1.2 (20)-(21)). "Reversatives" are generally glossed as performing an action "back" (e.g.

'S went back' vs. 'S went') or "again" (e.g. 'S went again' vs. 'S went'). When /d/ classifier is derivationally added to a thematic /h/ classifier, a [d+h] combination results, as in (12), (13), (14) and (21) below.

/h/ classifier functions to indicate causativity and transitivity. These /h/ classifier functions contrast with those of /d/ classifier in that the latter have a reversative quality to them, whereas /h/ classifier functions have a direction of predication which proceeds from the subject (/agent) of the action to a distinct object. Causative examples are given in 1.2.1.2 (22)-(26) and transitive examples are given in 1.2.1.2 (27)-(28). When /h/ classifier is derivationally added to a thematic /d/ classifier, a [d+h] combination results, as in (28) below.

As mentioned previously, classifiers can be phonetically opaque, so attention should be focussed on the glosses which indicate the functioning of the classifiers.

1.2.1.2 Examples of Functions

In the following examples, classifiers are indicated in boldface.

Thematic Classifiers

(8) Ø-classifier: 'Ø has white spots' dak'al

= d - Ø - k'al + i

7 11 stem nominalizer

der cl 'be white'

(9) h-classifier: (a) '3sS is black' degàsh

= d - h - gàsh

7 11 stem

der cl 'be black'

(b) 'Ø is yellow' danétl'edzi

= d - n - 's - h - tl'edz + i

7 7 8 11 stem + nominalizer

der der cnj cl 'be yellow'

(c) '3sS killed O' yazèxi
 = y - z - 's - h - ghi
 5 7 8 11 stem
 4 O der cnj cl 'kill O'

(10) d-classifier: 'sky is red' kw'es dādali
 = 'sky' d - d - dal + i
 7 11 stem + nominalizer
 der cl 'be red'

/d/ classifier functions: "Self-Circumpleting" Actions

- *Reflexives*

(11) compare (a) '3sS kicks 1sO' sek'ènaʔàs
 = s - k'è - n - ʔàs
 0 0 7 stem
 1sO pp der 'kick'

(b) '3sS kicks himself' ʔəchek'ènat'às
 = ʔəche⁴ - k'è - n - d - ʔàs
 0 0 7 11 stem
 refl O pp der cl 'kick'

(12) compare (a) '2sS dried (e.g. hides)' nanegwen
 = na - n - h - gwen
 1 10 11 stem
 adv 2sS cl 'dry O'

(b) '2sS dried yourself' naʔədīgwen
 = na - ʔd - n - d+h - gwen
 1 5 10 11 stem
 adv refl O 2sS cl 'dry O'

⁴ The usual form of the reflexive object is [ʔəda] (-/ʔd/) (see Section 1.8 for discussion). [ʔəche] is a less common form for reflexive object.

(13) compare (a) '3sS killed O'

yazèxi
 = y - z - `s - h - ghi
 5 7 8 11 stem
 4 O der cnj cl 'kill O'

(b) '3sS killed **himself**'

?adazègi
 = ?d - z - `s - d+h - gi
 5 7 8 11 stem
 refl O der cnj cl 'kill O'

(14) compare (a) '3sS wants to scratch 3sO'

yawexwàse
 = y - w - h - ghwàse
 5 9 11 stem
 4 O mode cl 'scratch O'

(b) '3sS wants to scratch **himself**' ?adugwàs

= ?d - w - d+h - gwàs
 5 9 11 stem
 refl O mode cl 'scratch O'

- Reciprocals

(15) compare (a) '3pS dance'

dawaghsets
 = da - w - gh - h - zats
 1 5 6 11 stem
 adv arl O 3pS cl 'dance'

(b) '3pS dance with **each other**'

te dawaghadzats
 = reciprocal da - w - gh - d - zats
 1 5 6 11 stem
 adv arl O 3pS cl 'dance'

- Reversatives

- (16) compare (a) '3sS went uphill' *tasaya*
 = ta - `s - ya
 1 8 stem
 adv cnj 'sg. go'
- (b) '3sS went **back** uphill' *tɔnasja*
 = ta - na - `s - d - ya
 1 3 8 11 stem
 adv rev cnj cl 'sg. go'
- (17) compare (a) '1sS went outside' *kàdèeya*
 = kà - d - `s - s - ya
 1 7 8 10 stem
 adv der cnj 1sS 'sg. go'
- (b) '1sS went outside **again**' *kòdèeshja*
 = kà - na - d - `s - s - d - ya
 1 3 7 8 10 11 stem
 adv rev der cnj 1sS cl 'sg. go'
- (18) compare (a) '3sS put hat on his head' *ts'at t'atsiʔɔ*
 = 'hat' t'à - tsi - ʔɔ
 0 2 stem
 pp inc. stem 'handle 3D 0'
- (b) '3sS put hat on his head **again**' *ts'at t'òtsiʔɔ*
 = 'hat' t'à - na - tsi - d - ʔɔ
 0 3 2 11 stem
 pp rev inc. stem cl 'handle 3D 0'
- (19) compare (a) '1sS cashed check' *sədèstl'esè ʔɛdadéeʔɔ*
 = s - dèstl'esè ʔɛda - d - `s - s - ʔɔ
 'my' 'check' 1 7 8 10 stem
 adv der cnj 1sS 'handle 3D 0'

(b) '1sS cashed 3pO's check again'

k'aju ʔɛdananàdèest'a

= 'again' ʔɛda - na - nà - d - `s - s - d - ʔa

1 3 4 7 8 10 11 stem

adv rev distr der cnj 1sS cl 'handle 3D O'

- Agentless Passives

(20) compare (a) '3sS coiled rope' t'ut ʔesat'ù

= 'rope' ʔe - `s - t'ù

1 8 stem

adv cnj 'tie'

vs. (b) 'rope is coiled' t'ut ast'ù

= 'rope' `s - d - t'ù

8 11 stem

cnj cl 'tie'

(21) compare (a) '3sS loses dishes' dets'à tadèfa

= d - ts'à ta - d - `s - h - la

refl 'dishes' 1 7 8 11 stem

adv der cnj cl 'handle pl. O'

vs. (b) '3sS is lost'

tadèfa

= ta - d - `s - d+h - la

1 7 8 11 stem

adv der cnj cl 'handle O'

/h/ classifier functions

- Causatives

(22) compare (a) 'water is boiling' chu abets

= 'water' bets

stem

'boil'

- vs. (b) '3sS boils water' chu ebets
 = 'water' h - bets
 1 1 stem
 cl 'boil'
- (23) compare (a) 'ice melted' tan nasəghe
 = 'ice' na - `s - ghe
 1 8 stem
 adv cnj 'melt'
- vs. (b) '3sS melted ice' tan naxə̀ezə
 = 'ice' na - h - ghe + ezə
 1 1 1 stem + durative
 adv cl 'melt'
- (24) compare (a) 'meat will thaw' ?atsən nawəghij
 = 'meat' na - w - ghij
 1 9 stem
 adv mode 'melt'
- vs. (b) '3sS will thaw meat' ?atsən nawəxij
 = 'meat' na - w - h - ghij
 1 9 1 1 stem
 adv mode cl 'melt'
- (25) compare (a) 'bucket is full' usà tàdèsman
 = 'bucket' tà - d - `s - man
 1 7 8 stem
 adv der cnj 'be full'
- vs. (b) '3sS fills up bucket' usà tàdèman
 = 'bucket' tà - d - `s - h - man
 1 7 8 1 1 stem
 adv der cnj cl 'be full'

(26) compare (a) 'water splashed on me' chu sak'enadèst'et
 = 'water' s - k'e - na - d - `s - t'et
 1s0 0 1 7 8 stem
 inc. pp. adv der cnj 'spill'

vs. (b) '3sS spilled water' chu nadèt'et
 = 'water' na - d - `s - h - t'et
 1 7 8 11 stem
 adv der cnj cl 'spill'

- Transitives

(27) compare (a) '3sS woke up' ts'enizət
 = ts'e - `n - n - zət
 1 8 9 stem
 adv cnj mode 'wake up'

vs. (b) '3sS woke up 1s0' ts'esənizət
 = ts'e - s - `n - n - h - zət
 1 5 8 9 11 stem
 adv 1s0 cnj mode cl 'wake up'

(28) compare (a) '1pS stink' dānàts'atsən
 = dānà - ts' - d - tsən
 4 6 11 stem
 distr 1pS cl 'smell'

vs. (b) '1pS sniff around' dānàts'etsən
 = dānà - ts' - d+h - tsən
 4 6 11 stem
 distr 1pS cl 'smell'

1.2.2 Discontinuous dependencies

In this section we list the co-occurrence restrictions of the classifiers, of which there are three. First, forms having position 5 /ʔd/, glossed as a reflexive

object, must have /d/ classifier. This is seen in (12b-14b) in 1.2.1.2. In addition to its clearly reflexive function, /ʔd/ may also function as a benefactive marker, as in the example below.

- (29) compare (a) ʔets'ès '3sS cooks'
 = h - ts'ès
 11 stem
 cl 'cook'
- vs. (b) ʔadats'ès '3sS cooks for himself' ('to
 = ʔd - d+h - ts'ès benefit himself')
 5 11 stem
 refl 0 cl 'cook'

Notice that whatever function /ʔd/ performs, /d/ classifier co-occurs with it.

The second co-occurrence restriction is that intransitive forms having position 3 /na/ must have /d/ classifier. Examples of these forms are given in (16b-19b) in 1.2.1.2, where /na/ has a reversative function. Position 3 /na/ may also function to show customary aspect, as in the examples below.

- (30) compare (a) ts'èzat '3sS wakes up'
 = ts'e - zat
 1 stem
 adv 'wake up'
- vs. (b) ts'enadzadzizə '3sS wakes up repeatedly'
 = ts'e -na - d - zadz + izə
 1 3 11 stem dur.
 adv cust cl 'wake up'
- (31) compare (a) yàsiya '1sS swims across'
 = yà - `s - n - s - ya
 1 8 9 10 stem
 adv cnj mode 1sS 'sg. go'

vs.	(b)	yànasasja	'1sS always swims across'
		= yà - na - 's - s - d - ya	
		1 3 8 10 11 stem	
		adv cust cnj 1sS cl 'sg. go'	

Again, note that whatever function is performed by /na/, /d/ classifier must co-occur with it.

The third co-occurrence restriction involves position 9 perfective mode. The perfective mode marker /n/ co-occurs with /Ø/ and /h/ classifier forms; however, in perfective forms having /d/ or /l/ classifier, the perfective morpheme is absent. The presence of /n/ perfective mode is itself rather opaque; therefore, forms showing this contrast between /Ø/, /h/ vs. /d/, /l/ are not presented until Section 1.4 Mode (position 9).

1.2.3 Phonological Manifestations

1.2.3.1 /d/ classifier

The most transparent classifier is /d/, although it is not consistently so. /d/ has both rightward and leftward effects. Its rightward effect is called the "d-effect" (cf., for instance, Howren (1971), Rice (1986, 1989b), Hargus (1988)). The phonetic manifestation of the d-effect is limited to stems which begin with fricatives or glottal stop. Compare the following stem pairs. In column 1A the stem is shown without /d/ classifier. Column 1B gives an example of a form with /d/ classifier. The d-effect is clear upon comparing the underlined portions of the 1A and 1B forms.

(32)	1A	Form	Gloss	1B	Gloss
	'q	ts'at'atsi'q	'3sS put hat his head'	ts'at'òtsi'q	'3sS put hat on his head again'
	zat	ts'e ^z at	'3sS wakes up'	ts'enad ^z at	'3sS wakes up again'
	ghì	yezègì	'3sS killed 3sO'	ʔedsezègì	'3sS killed him- self'

ya tasaya '3sS went uphill' tonasja '3sS went back uphill'

The chart in (33) summarizes the changes resulting from the combination of /d/ classifier and stem.

(33)		Stem-initial	=	Examples
d	+	ʔ	=	t' (11), (18), (19)
d	+	z	=	dz (15)
d	+	gh	=	g (13), (14)
d	+	y ⁵	=	j (16), (17)
d	+	ʔ	=	dl
d	+	any other	=	any other (i.e. /d/ is deleted) (10), (20)

The leftward effect of /d/ classifier affects the syllabic position of position 8 /s/ conjugation. In the unmarked case, /s/ conjugation in conjunct-domain-initial position in 3sS forms takes the form [sV...], where [s] is a syllable onset. In /d/ classifier forms, the [s] of /s/ conjugation in 3sS forms is a syllable coda. This is seen in comparing (16) (a) and (b) as well as (20) (a) and (b) in 1.2.1.2.

If /s/ conjugation is preceded by a disjunct prefix in 3sS perfective forms having /d/ classifier, /s/ surfaces either as a syllable coda to the disjunct prefix syllable, or as a syllable onset (i.e. [sa]). There does not appear to be any pattern as to which surface form /s/ conjugation will take in this case. Examples are given below. In (34) /s/ conjugation is syllable-final; in (35) /s/ conjugation is syllable-initial.

⁵ [y] takes the place of [ʔ] in the HRB consonant system.

(34) *tonasja* '3sS went back uphill'
 = ta - na - 's - d - ya
 1 3 8 11 stem
 adv rev cnj cl 'sg. go'

(35) *nasakwi* '3sS vomited'
 = na - 's - d - kwi
 3 8 11 stem
 rev cnj cl 'vomit'

1.2.3.2 /h/ classifier

The most transparent effect of /h/ classifier is its rightward devoicing of stem-initial continuants. An example is given below.

(36) *yà - w - h - zets* 'jump'
 = 1 5 11 stem
 adv ar1 0 cl 'jump'

Impf: 1p *yàwets'esets*
 2p *yàwasets*
 3p *yàwaghesets*

Clearer examples of the same phenomena are given in (23) (cf. (a) vs. (b)), (24) ((a) vs. (b)), and (27) ((a) vs. (b)).

/h/ classifier also has three less transparent leftward effects. First, epenthetic vowels to the left of /h/ classifier surface as [e] rather than their usual [ə]. In the examples below, /Ø/ classifier forms in (a) are contrasted with /h/ classifier forms in (b).

(37) a. *ts'atsal* '1pS cry'
 = ts' - tsal
 6 stem
 1pS 'cry'

b. *dawets'esats* '1pS dance'
 = da - w - ts' - h - sets
 1 5 6 11 stem
 adv ar1 0 1pS cl 'dance'

- (38) a. tusakwòn '3sS has a fever'
 = tu - `s - kwòn
 1 8 stem
 adv cnj 'be hot'
- b. dagwonè jesezal '3sS bangs elbow'
 = d - gwonè je - `s - h - zal
 refl 'elbow' 1 8 11 stem
 adv cnj cl 'hit O'
- (39) a. třeza kadadzus '3sS whips dog'
 = 'dog' ka - d - dzus
 1 7 stem
 adv der 'whip O'
- b. nichuts'edexal '1pS wash up'
 = ni - chu - ts' - d - h - zal
 1 2 6 7 11 stem
 adv inc stem 1pS der cl 'wash'
- (40) a. ʔangʔi '3sS steals O'
 = ʔ - n - ʔi
 5 7 stem
 unsp. O der 'steal O'
- b. dakudè nadanech'il '3sS tears coat'
 = d - kudè na - d - n - h - ch'il
 refl 'coat' 1 7 7 11 stem
 adv der der cl 'break O'
- (41) a. chu abets 'water boils'
 = 'water' bets
 stem
 'boil'
- b. chenebèts '2sS boils water'
 = che - n - h - bèts
 1 10 11 stem
 adv 2sS cl 'boil O'
- (42) a. ʔadadiò '3sS laughs'
 = ʔ - d - diò
 5 7 stem
 unsp. O der 'laugh'
- b. ga dech'il '3sS skins rabbits'
 = 'rabbit' d - h - ch'il
 7 11 stem
 der cl 'break O'
- (43) a. tsènechi cheghesaʔo 'there's a big rock in the water'
 = tsè - nechi cheghe - `s - ʔo
 'rock' 'big' 1? 8 stem
 adv? cnj 'handle 3D O'
- b. cheghesetsùs 'cloth-like O is in water'
 = cheghe - `s - h - tsùs
 1? 8 11 stem
 adv? cnj cl 'handle cloth-like O'

- (44) a. yàdànáṣak'wɔts '3sS kisses everyone' b. dàṣetsùs '3sS hangs up O'
 = yàdàná - ṣ - k'wɔts = dà - ṣ - h - tsùs
 4 8 stem 1 8 11 stem
 distr cnj 'kiss O' adv cnj cl 'handle
 cloth-like O'

- (45) a. wɔtsəgh '3sS cries' (Opt) b. ʔəstl'ɥ màwəch'e '3sS builds fence' (Opt)
 = w - tsəgh = 'fence' mà - w - h - ch'e
 9 stem 1 9 11 stem
 mode 'cry' adv mode cl 'build'

A second indicator of /h/ classifier is the absence of the coda [s] of position 8 /s/ conjugation. In the following examples 3sS imperfective forms having /Ø/ classifier ((a) forms) and /h/ classifier ((b) forms) are compared.

- (46) a. mèsdanèṣtɔ '3sS stretches hide' b. ʔusà tàdèman '3sS fills bucket'
 = mèṣ - d - n - ṣ - tɔ = 'bucket' tà - d - ṣ - h - man
 ? 7 7 8 stem 1 7 8 11 stem
 der der cnj 'stretch O' adv der cnj cl 'be full'

- (47) a. nàʔadadèṣʔes '3sS kicks himself' b. k'eyanèch'èʔ '3sS counts O'
 = nà - ʔd - d - ṣ - ʔes = k'e - y - n - ṣ - h - ch'èʔ
 1 5 7 8 stem 1 5 7 8 11 stem
 adv refl. O der cnj 'kick' adv 40 der cnj cl 'count'

A third indicator of /h/ classifier is the absence of coda-position 1sS [s] in /s/-conjugation perfective forms. Although this effect is identical to the second indicator, in that an adjacent coda is deleted, we isolate it because in this respect it patterns with /Ø/ classifier; /Ø/ classifier, however, does not show the second effect. Examples of this third effect are given below; /Ø/ classifier examples are given in the (a) forms and /h/ classifier examples are given in the (b) forms.

it can be thematic as well as the result of derivationally adding either /d/ classifier to /h/ classifier or /h/ classifier to /d/ classifier.

/l/ classifier has both rightward and leftward effects. Its rightward effect is described relative to the rightward effect of /h/ classifier: in /h/ classifier and /Ø/ classifier contexts where the stem-initial continuant is devoiced, /l/ classifier blocks devoicing. An example is given below where the (a) form has /h/ classifier and a stem-initial voiceless continuant, and the (b) form has /l/ classifier and a stem-initial voiced continuant.

- (53) (a) dats'à tadèfa '3sS loses dishes' (b) tadèla '3sS is lost'
 = d - ts'à ta - d - `s - h - la = ta - d - `s - l - la
 refl 'dishes' 1 7 8 11 stem 1 7 8 11 stem
 adv der cnj cl 'handle O' adv der cnj cl 'handle O'

In some respects, the leftward effects of /l/ classifier derive partially from both the /d/ and /h/ classifiers; in other respects, /l/ can be distinguished from both, or shows hybrid effects. We consider first forms where /s/-conjugation is the only conjunct prefix. In /d/ classifier forms [s] surfaces as either onset [se] or coda. In /h/ classifier forms [s] surfaces as onset, with the following vowel [e]: [se]. In /l/ classifier forms, [s] always surfaces as onset, but the following vowel is either [e] or [ə]. [se...] surfaces when /s/-conjugation is word-initial, as seen from the examples below.

- (54) setswas '3sS springs (mousetrap)'
 = `s - d+h - tswas
 8 11 stem
 cnj cl 'spring O'

- (55) setsal '3sS is/was wet' (Imperfective and Perfective)
 = `s - d+h - tsal
 8 11 stem

[...sə...] surfaces when /s/-conjugation is preceded by a disjunct prefix, as seen from the examples below.

- (56) tàsətí'a '3sS ran uphill'
 = tà - `s - d+h - tí'a
 1 8 11 stem
 adv cnj cl 'motion'

- (57) [behind] dàsətí'a '3sS got on (to back of truck)'
 = dà - `s - d+h - tí'a
 1 8 11 stem
 adv cnj cl 'motion'

- (58) nasəgwon '3sS dries/dried himself' (Impf. and Perf.)
 = na - `s - d+h - gwon
 3 8 11 stem
 rev cnj cl 'dry 0'

One phonological effect of /l/ classifier is completely identical to /h/ classifier: in perfective forms having the underlying sequence /...conjunct-prefix + `s-conjugation + classifier.../, the [s] expected in coda position does not surface (cf. (46b)-(47b) for the identical effect with /h/-classifier). Examples are given below.

- (59) t'anèts'ət '3sS died'
 = t'a - n - `s - d+h - ts'ət
 1 7 8 11 stem
 adv der cnj cl 'die'

- (60) nadanèttí'a '3sS turned around'
 = na - d - n - `s - d+h - tí'a
 3 7 7 8 11 stem
 rev der der cnj cl 'motion'

(61) tadèt'l'a '3sS ran away'
 = ta - d - `s - d+h - t'l'a
 1 7 8 11 stem
 adv der cnj cl 'motion'

(62) wɔli dèdagh '3sS swallowed something'
 = 'something' d - `s - d+h - dagh
 7 8 11 stem
 der cnj cl 'swallow O'

1.2.4 Summary charts

Co-occurrence restrictions

Position	3	4	5	6	7	8	9	10	11
	na								d
			?d						d
							n		Ø
									h

Indications of d-classifier

-Rightward: d-effect

-Leftward: in 3sS forms where /s/-conjugation is word-initial, [s] of /s/ conjugation is a syllable coda

: in 3sS forms where /s/-conjugation is preceded by a disjunct prefix, [s] of /s/ conjugation is either an onset or coda

Indications of h-classifier

-Rightward: devoicing of stem-initial continuants

-Leftward: adjacent epenthetic vowels [e] (not [a])

: adjacent /s/-conjugation [s] coda absent

: adjacent 1sS [s] coda absent in perfective forms

1.3 Subject (Position 10)

1.3.1 Function

Subject markers in HRB have two distinct positions in the verb complex. In position 10, to the left of the classifier + stem, 1 singular Subject (1sS), 2 singular Subject (2sS) and 2 plural Subject (2pS) are marked. In contradistinction to McLeod Lake Sekani, HRB does not mark 1 dual Subject (1dS) at all. (In Sekani, 1dS is marked by the discontinuous morpheme /s...id/). Two of the three other subject possibilities, 1 plural Subject (1pS) and 3 plural Subject (3pS) are indicated in position 6 (cf. Section 1.7). 3 singular Subject (3sS) is a null morpheme; if both the position 10 and 6 slots are empty, the subject of the verb is understood to be 3sS.

Like all Athapaskan languages, HRB has inflectional affixes interspersed among derivational affixes in the surface forms of verbs. This is unusual positioning for inflectional affixes; in many, if not most, languages, inflectional affixes are positioned only on the outer edges of verbs. I argue in Chapter 3 that the surface positioning of inflectional affixes differs from their underlying position in the verb structure.

1.3.2 Discontinuous dependencies

-none

1.3.3 Phonological Properties

1.3.3.1 1sS

In most verb paradigms, 1sS takes the form of [s]. Whenever 1sS surfaces as [s] it is always syllable-final. It is the only prefix which appears consistently in a coda position. Examples are given below.

(63) daghes^ʔaʔ '1sS holds up O' (progressive)

= da - gh - s - ʔaʔ

1 8 10 stem

adv cnj 1sS 'handle 3D O'

(64) əəxwəs '1sS itches'

= s - xwəs

10 stem

1sS 'itch'

(65) ʔatsən wəsts'èsè '1sS wants to cook meat'

= 'meat' w - s - h - ts'èsè

9 10 11 stem

mode 1sS cl 'cook O'

(66) mədzə wəkàt '1sS pats his back'

= m - dzə w - s - d - kàt

'his' 'back' 5 10 11 stem

ar1 O 1sS cl 'pat O'

There are two sets of forms in which 1sS does not surface as syllable-final [s]. First, in /Ø/ and /h/ classifier perfective forms having at least one (non-perfective) conjunct prefix to the left of 1sS, [i] surfaces in the place of 1sS. This can be seen in the example below. In (67a) the imperfective 1sS form is given, having /Ø/ classifier and one other conjunct prefix, /s/ conjugation, to the left of the subject. In (67b) the perfective counterpart is given.

(67) a. dasəs^ʔa '1sS holds up O' b. dasi^ʔə '1sS hung up O'

= da - `s - s - ʔa

= da - `s - n - s - ʔə

1 8 10 stem

1 8 9 10 stem

adv cnj 1sS 'handle 3D O'

adv cnj mode 1sS 'handle 3D O'

In perfective forms where there are no other conjunct prefixes, 1sS remains [s]
Coda.

There is a second context in which 1sS is not Coda [s]. As mentioned in 1.2.3, one of the phonological effects of /h/ classifier is that it causes 1sS /s/ not to surface in perfective forms having /s/ conjugation and at least one other conjunct prefix (cf. (48)-(52)). The chart in 1.2.4 shows that the absence of 1sS /s/ is also characteristic of /Ø/ classifier.

1.3.3.2 2sS

The 2sS morpheme is underlyingly represented as /n/. It has two phonological manifestations, depending on the position of the prefix slot which precedes it. If 2sS is word-initial or preceded by a prefix from slots 0 to 4 inclusive, it surfaces as [nV], where V is an epenthetic vowel. This vowel is [a] in the unmarked case; preceding /h/ classifier, this vowel is [e] (cf.(37)-(45)).

Examples are given below.

- (68) ʔatsàn danale '2sS hang up meat'
 = 'meat' da - n - le
 1 10 stem
 adv 2sS 'handle pl. 0'

- (69) dəjin fènexal '2sS break stick'
 = 'stick' fè - n - h - xal
 1 10 11 stem
 adv 2sS cl 'break 0'

If the prefix preceding 2sS is from positions 5 - 9 inclusive (i.e. a conjunct prefix), and is not a high, round vowel from position 7, then 2sS is manifested as a nasalized vowel. Compare the following pairs.

- | | |
|-------------------------------------|--|
| (70) a. tusakwàn '3sS has fever' | b. tusikwàn '2sS has fever' |
| = tu - `s - kwàn | = tu - `s - n - kwàn |
| 1 8 stem | 1 8 10 stem |
| adv cnj 'be hot' | adv cnj 2sS 'be hot' |

- (71) a. ʔənəʔi '3sS steals O'
 = ʔ - n - ʔi
 5 7 stem
 unsp O der 'steal'
- b. ʔənɪʔi '2sS steals O'
 = ʔ - n - n - ʔi
 5 7 10 stem
 unsp O der 2sS 'steal'
- (72) a. ɪchut '3sS catches O'
 = ɪ - chut
 7 stem
 der 'catch O'
- b. ɪchnut '2sS catches O'
 = ɪ - n - chut
 7 10 stem
 der 2sS 'catch O'

In the (a) forms the 3sS member of a verb paradigm is given. The 3sS is a null morpheme; thus the 3sS form shows how the prefix preceding the subject surfaces in isolation. Notice that a conjunct prefix having the shape [Cə] in isolation surfaces as [Cɪ] in 2sS form. A prefix having the shape [ɪ] in isolation surfaces as [ɪ] in 2sS form. Exceptionally, if the conjunct prefix is a high, round vowel, 2sS surfaces as [nV]. This is shown in (73).

- (73) a. uɔ̀ '3sS is good'
 = u - d - yò
 7 11 stem
 der cl 'be good'
- b. unəɔ̀ '2sS is good'
 = u - n - d - yò
 7 10 11 stem
 der 2sS cl 'be good'

It thus appears that 2sS /n/ alternates between syllabification as an onset and as a coda. Notice that it is generally an onset when it is not preceded by other conjunct prefixes, i.e., when it is the first prefix in the conjunct domain. The importance of conjunct prefixes to syllabification and phonological rules is explored further in Chapter 4.

1.3.3.3 3sS

The 3sS form of a paradigm has an empty position 10 slot. Thus, 3sS is a \emptyset -morpheme. This is clear in the following paradigms where 1sS can be

identified as [s]; the 3sS form is the same as the 1sS form except that [s] is missing.

(74) che - `n - 1 - ts'at
 1 8 11 stem
 adv cnj cl fall

1s chenests'at '1sS drowns'
 2s chenests'at '3sS drowns'

(75) da(h?)⁶ - 1 - tie
 1 11 stem
 adv cl 'motion'

1s da^hestie '1sS dances'
 3s da^hatie '3sS dances'

1.3.3.4 2pS

2pS has two phonological properties: (1) in the position 10 slot, [a] surfaces; (2) if [a] is followed by a stem-initial continuant, the continuant is always voiceless. These two characteristics are seen in the following examples. In (a), the 3sS form is given, where the position 10 slot is empty. This is contrasted with (b), where the 2pS form is given.

(76) a.	atsagh	'3sS cries'	b.	atsagh	'2pS cries'
	- tsagh			- ah - tsagh	
	stem			10 stem	
	'cry'			2pS 'cry'	

⁶ It appears that the position 1 prefix in (75) may have a CVC shape because of the second syllable of verb forms in the paradigm. If position 1 were CV, then the 1s and 3s forms would surface as [dastie] and [datie] respectively. The fact that an epenthetic shwa occurs between the first and last syllables suggests that an underlying consonant is present. The epenthetic consonant /ʔ/ surfaces in the C timing slot.

- (77) a. nawatsale '3sS gets wet' (Opt) b. nawatsale '2pS get wet' (Opt)
 = na - w - l - tsal + e = na - w - ah - l - tsal + e
 1 8 11 stem Opt 1 8 10 11 stem Opt
 adv mode cl 'be wet' adv mode 2sS cl 'be wet'
- (78) a. ùya aḷi '3sS is shy' b. ùya aḷi '2pS are shy'
 -'shy' ḷi -'shy' ah - ḷi
 stem 10 stem
 'be' 2pS 'be'
- (79) a. ʔədədazit '3sS stops, quits' b. ʔədədasit '2pS stops, quits'
 = ʔ - d - d - zit = ʔ - d - d - ah - zit
 5 7 7 stem 5 7 7 10 stem
 unsp 0 der der 'stop' unsp 0 der der 2pS 'stop'

The vocalic quality of 2pS makes it the only low vowel in the conjunct domain. In Chapter 4, the apparent exceptionality of this property is accounted for.

1.3.4 Summary Charts

<u>Subject</u>	<u>Surface form</u>	<u>Syllable position</u>
1sS	(1) [Ø] / `s - n - ____ {Ø, n} pos 8 pos 9 pos 11	
	(2) [l] / conjunct - n - ____ prefix pos 9	(2) i = Nucleus
	(3) [s] elsewhere	(3) s = Coda
2sS	(1) nasalization on / conjunct - ____ preceding V prefix condition: conjunct prefix NOT [u]	(1) n = Coda (-> nasalization on V)
	(2) [nV] elsewhere	(2) n = Onset
3sS	Ø	

2pS

[a] + devolving of stem-initial
continuant

a = Nucleus

1.4 Mode (position 9)

1.4.1 Function

The term "mode" has been used inconsistently in the Athapaskan literature. I am following the usage adopted in Hoijer (1946) and used since in Kari (1979) and Rice (1985b, 1989b), among others. According to this usage, HRB indicates one of four modes in position 9: imperfective, perfective, optative and future. Imperfective and perfective are strictly speaking aspectual notions. The future "mode" can also be considered aspectual on the basis of its morphological make-up (cf. 1.4.2, 1.4.3). The optative mode is used to express notions like 'S(subject) wants to do X', 'S tries to do X' and 'S will do X', where there is some degree of volition involved in the performance of an action or the occurrence of an event.

1.4.2 Discontinuous Dependencies

There are two types of co-occurrence restrictions involving modal prefixes. First, as discussed in 1.2.2, the perfective mode is only phonetically present in forms having /Ø/ or /h/ classifier; perfective forms having /d/ or /l/ classifier show no traces of the perfective morpheme. This is seen in the /d/ and /l/ classifier paradigms below, where the imperfective and perfective forms are identical (except for possible differences in stem form, as in (02), where there is a tone difference between imperfective and perfective. Variations in stem form may mark aspectual and modal information; analysis of these variations is beyond the scope of this thesis).

(80)	d - yin	'sings'	
	= 11 stem		
	cl 'sing'		
	Impf		Perf
	1s əʃin		əʃin
	3s əjin		əjin

(81)	ʃ - 1 - tsal	'be wet'	
	= 8 11 stem		
	cnj cl 'be wet'		
	1s sətsal		sətsal
	3s setsal		setsal

(82)	nà - n - 1 - ʔiʔ	'sneak around'	
	1 7 11 stem		
	adv thm cl 'hide'		
	1s nànesʔiʔ		nànesʔiʔ
	3s nàneʔiʔ		nàneʔiʔ

Secondly, the future mode is a discontinuous morpheme, where position 8/9 prefix, /gh/ co-occurs with position 7 /d/ to constitute future mode. Since I have no examples of a position 8 prefix occurring between /d/ and /gh/, /gh/ may itself be a position 8 prefix. In any case, the point to note here is that the future marker must include both /d/ and /gh/. Examples are given in the next section.

1.4.3. Phonological Manifestations

1.4.3.1. Imperfective

Like 3sS, the imperfective mode is a Ø-morpheme.

1.4.3.2 Perfective

The perfective morpheme only has phonological substance in /Ø/ or /h/ classifier forms having a prefix from positions 7 or 8 (provided the position 8 prefix is not /s/). In (83) an imperfective and perfective paradigm is compared. Notice the following characteristics of the perfective paradigms: (1) In 1sS form, the combination of perfective mode and 1sS surfaces as [l]; (2) In 3sS forms, the syllable preceding the stem, which is [Cə] in isolation, surfaces as [Cj]; (3) 2sS forms appear unchanged between the imperfective and perfective paradigms.

(83)	ts'e - 'n - zat	'wake up'
	1 8 stem	
	adv cnj 'wake up'	
		Impf Perf
	1s ts'enessat	ts'enizat
	2s ts'enizat	ts'enizat
	3s ts'enezat	ts'enizat

The above paradigms can be given the traditional labels of "n-imperfective" and "n-perfective", where \underline{n} refers to the conjugation prefix in position 8 (see Section 1.5.3.3 for discussion of /n/-conjugation). In \underline{n} -perfectives, \underline{gh} -perfectives and \emptyset -perfectives having a prefix from position 7, the above three characteristics of perfective are found. It is clear from these paradigms that the features [+high] and [+nasal] must be included in the feature complex of the perfective morpheme.

There is one case in /Ø/ and /h/ classifier forms where perfective does not surface; in this case, therefore, imperfective and perfective forms are identical. Whenever the mode slot is preceded by a word-boundary or disjunct prefix, there is no perfective (cf. (84) and (85)).

(84) a. *əstsegh* '1sS cry' (Impf and Perf)

= s - *tsəgh*

i0 stem

1sS 'cry'

b. *ətsəgh* '3sS cry' (Impf and Perf)

= *tsəgh*

stem

'cry'

(85) a. *samawo nəsche* '1sS dream about mother' (Impf and Perf)

= s - ma - *wəna* - s - che

mother' pp i 10 stem

adv 1sS 'dream'

b. *xədawo nəche* '3sS dream about moose' (Impf and Perf)

= *xəda* - *wə* *nə* - che

'moose' pp i stem

adv 'dream'

In 2pS forms, it may appear that there is no perfective. For example, the perfective form in (86a) does not differ from its imperfective counterpart except in stem tone. However, (86b) shows that perfective does have an effect in 2pS forms where the stem-initial is a continuant. Notice in (86b) that the stem-initial is [y]. We would expect this consonant to be [sh] in 2pS forms, since 2pS causes the devoicing of stem-initial continuants. I assume that the failure of [y] to devoice is due to the presence of the perfective morpheme.

(Comparison of (86b) with its imperfective counterpart would help to verify this assumption; unfortunately, I do not have the imperfective form in my data.)

The [w] variant only and always occurs in 2pS forms. For example,

- (90) [O] nswaʔi '2pS steals O' (Optative)
 = n - w - a - ʔi
 7 9 10 stem
 der mode 2pS 'steal O'

The [wɔ] and [ɔ] variants occur only in 2sS forms. Examples:

- (91) ʔanswɔʔi '2sS steals O' (Optative)
 = ʔ - n - w - n - ʔi
 5 7 9 10 stem
 unsp O der mode 2sS 'steal O'

- (92) mebet kàdɔleèʔ '2sS removes guts' (Optative)
 = m - bet kà - d - w - n - le + è
 'its' 'guts' 1 7 9 10 stem optative
 adv der mode 2sS 'handle pl. O'

The [u] variant occurs in all other environments. Specifically, [u] occurs in all but 2sS and 2pS forms following a prefix from positions 5, 6 or 7, provided this prefix is not a high, round vowel. An example is given below.

- (93) ʔenusʔiè '1sS steals O' (Optative)
 = ʔ - n - w - ʔi + è
 5 7 9 stem optative
 unsp O der mode 'steal O'

The basic variation in form in optative is between a [+high, +round] onset (= [wV]) and a [+high, +round] nucleus (= [u]) (the exception being 2sS forms). We can formulate a preliminary analysis in which optative is an onset if it is initial in the conjunct domain, or followed by a non-epenthetic vowel, and is a nucleus

ʔ (92) is sometimes pronounced with a long vowel in the penultimate syllable, i.e. [kàdɔleè].

otherwise. In Chapter 4, an approach to syllabification is adopted in which this patterning of syllable position falls out automatically.

1.4.3.4 Future

Future mode consists of two prefixes: position 7 /d/ + position 8/9 /gh/. In many cases the [daghe] sequence expected by the juxtaposition of these two morphemes (completed by epenthesis of [ə]) does surface phonetically.

Examples are given below of 1sS forms ([...daghas]), 2sS forms ([...dagh|...]) and 2pS forms ([...dagha...]).

-1sS forms

- (94) ?anadaghasdièfè 'I'm going to fix it'
 = ? - a - na - d - gh - s - d - lè - fè
 0 1 3 7 9 10 11 stem future
 unsp 0 adv rev der mode 1sS cl 'make 0'

- (95) nadaghasatsalè 'I'm going to get wet'
 = na - d - gh - s - l - tsal + è
 3 7 9 10 11 stem future
 rev der mode 1sS cl 'be wet'

- (96) tàdaghesti'etè 'I shall run'
 = tà - d - gh - s - l - ti'e + fè
 1 7 9 10 11 stem future
 adv der mode 1sS cl 'run'

-2sS forms

- (97) daghiyòt 'you're gonna swell up'
 = d - gh - n - yò - t
 7 9 10 stem future
 der mode 2sS 'grow'

- (98) tàdaghiti'etè 'you shall run'
 = tà - d - gh - n - l - ti'e + tètè
 1 7 9 10 11 stem future
 adv der mode 2sS cl 'run'

-2pS forms

- (99) tàdaghati'etè 'you pl. shall run uphill'
 = tà - d - gh - a - l - ti'e + tètè
 1 7 9 10 11 stem future
 adv der mode 2pS cl 'run'

3sS forms show a general process in Athapaskan languages: when a conjunct consonant is followed by /gh/ the expected [Cagh] yields [Ca].

Examples are given below.

- (100) tusadakwanè 'it's going to be hot'
 = tu - s - d - gh - kwan + è
 1 ? 7 9 stem future
 adv der mode 'be hot'

- (101) ts'edazets 's/he is going to wake up'
 = ts'e - d - 'n - gh - zets
 1 7 8 9 stem
 adv der cnj mode 'wake up'

- (102) sats'inàdajitè 'he will help me'
 = s - ts'l - nà - d - gh - ji + tètè
 0 0 1 7 9 stem future
 1s0 pp adv der mode 'help'

- (103) sèda?ètètè 'she is going to see me'
 = s - d - gh - l - ?ètè - tètè
 5 7 9 11 stem future
 1s0 der mode cl 'see 0'

(104) tàdati'e'fè 'he shall run uphill'

= tà - d - gh - 1 - ti'e + fè
 1 7 9 11 stem future
 adv der mode cl 'run'

(105) wedadajjè '[baby's] going to talk soon'

= w - d - d - gh - ji - fè
 5 7 7 9 stem future
 arl 0 der der mode 'talk'

(106) ts'adats'èsè 'we shall cook fish'

= ts' - d - s - gh - ts'ès - è
 6 7 8 9 stem future
 1pS der cnj mode 'cook 0'

(107) nadànàghedagutè 'they're going to vomit separately'

= na - dànà - gh - d - s - gh - gu - fè
 3 4 6 7 8 9 stem future
 rev distr 3pS der cnj mode 'vomit'

There are two types of alternation in futures. First, 1sS [daghas] has an alternant [des] as shown in the examples below.⁸

(108) desʔi 'I will see (doctor)'

= d - gh - s - 1 - ʔi
 7 9 10 11 stem
 der mode 1sS cl 'see 0'

(109) ʔatsàn nàdesxi'fè 'I'll thaw meat out'

= 'meat' nà - d - gh - s - ghi + fè
 1 7 9 10 stem future
 adv der mode 1sS 'melt'

⁸ Loss of [gh] between vowels is very common; in this case, loss of [gh] yields [daes], i.e. a long vowel results. In Chapter 4, I equate vowel length with tenseness, thus offering an explanation for tense [e] as a variant of the sequence [egha].

(110) *dests'èsè* 'I'm going to cook meat'

= d - gh - s - ts'ès + è

7 9 10 stem future

der mode 1sS 'cook O'

Second, 2pS [dagha] has an alternant [daa] as shown in the example below.

(111) *dànàdaajinè* 'you pl. shall each sing'

= dànà - d - gh - a - d - yin + è

4 7 9 10 11 stem future

distr der mode 2pS cl 'sing'

One phonological consequence of the discontinuity of the future mode is that position 7 morphemes besides /d/ may intervene between /d/ and /gh/. Two examples of intervening position 7 are given below (note: in (112), [nd] is a variant of /n/ occurring before an oral vowel; in (113) [...dena...] derives from /d/+/n/+/gh/ → [danaghə] → [dena]).

(112) { *daneschelè* } 'I'm going to fall asleep'

{ *dandeeschitè* }

= d - n - gh - s - chel + tèt

7 7 9 10 stem future

der der mode 1sS 'lie'

(113) *t'adanats'etè* 'he's going to die soon'

= t'a - d - n - s - gh - ts'e - tèt

1 7 7 8 9 stem future

adv der der cnj mode 'die'

1.4.4 Summary Charts

<u>Modes</u>	<u>Position:</u>	7	8	9	11
Imperfective				/Ø/	
Perfective a.				/n/	{/Ø/}
					{/h/}
	b.			/Ø/	{/d/}
					{/l/}
Optative				/w/	
Future		/d/	/gh/		

Perfective Mode

	Conjunct domain [5	6	7	8	9	10]
a. [i]:					n	s
					\	/
						i
						at least one C slot occupied
b. [j]:					n	{ n }
						{ Ø }
						/
					ci	
						at least one C slot occupied

Optative Mode

	Conjunct domain [5	6	7]
a. [u]:			
			at least one C slot occupied
b. [wV]:	Ø	Ø	Ø

<u>Future Mode</u>	
<u>Future</u>	<u>Subject</u>
{[dæ(Cæ)ghə]}	[s] (= 1sS)
[de]	
[dæ(Cæ)ghə]	[n] (=2sS)
	---> [dæghɪ]
[dæ(Cæ)ghə]	[Ø] (=3sS)
	---> [d(æC)a]
{[dæ(Cæ)gh]}	[a] (=2pS)
[da]	

1.5 Conjugation (position 8)⁹

1.5.1 Function

The function of the conjugation prefix is not obvious. Krauss (1969:82) discusses some general aspectual meanings possessed by the three Athapaskan conjugation markers with phonological substance: /s/-conjugation is given the unmarked meaning of 'static aspect', while /n/-conjugation has "the marked meaning 'to a point, completive'" and /gh/-conjugation has "the marked meaning 'from a point, inceptive'".

⁹ The term "conjugation" is a relatively recent one in the Athapaskan literature, and represents a reanalysis of the prefix position originally called "mode" in Sapir and Hoijer (1967) and Hoijer (1971). Kari (1975) divided this single position, mode, into two positions in Navajo, called "mode" and "perfective". Kari (1979) further subdivides the first of these two positions into "mode" and "s-perfective/negative". Rice (1983, 1985b) was the next to reanalyze these data, and was the first to use the term "conjugation"; in her framework, conjugation replaces Kari's mode, and mode replaces Kari's perfective. In describing HRB verbs, I follow Rice's use of the terms conjugation and mode.

1.5.2 Discontinuous Dependencies

The conjugation marker is the most "dependent" of all verbal prefixes, as choice of conjugation is determined by the co-occurrence of a variety of different prefix types, called "conjugation-choosers".

Every verb theme chooses a "conjugation set". "Conjugation set" refers to the pairing of conjugation and mode morphemes. A complete listing of possible pairings is given in (114). Conjugation sets choose one pair from each of the three mode possibilities.

(114) Conjugation - Mode pairings

	<u>cnj</u>	<u>mode</u>	<u>traditional label</u>
<u>Imperfective:</u>	Ø	Ø	Ø-imperfective
	\n	Ø	n-imperfective
	`s	Ø	s-imperfective
	gh	Ø	progressive
<u>Perfective:</u>	Ø	n	Ø-perfective
	\n	n	n-perfective
	`s	n	s-perfective
	gh	Ø	gh-perfective
<u>Optative:</u>	Ø	w	Ø-optative
	\n	w	n-optative
	`s	w	s-optative

A verb theme chooses conjugation sets like /Ø, Ø, Ø/ (= Ø-imperfective, Ø-perfective, Ø-optative), /Ø, gh, Ø/ (= Ø-imperfective, gh-perfective, Ø-optative), /n, \n, `n/ (= n-imperfective, n-perfective, n-optative), /`s, `s, `s/ (= s-imperfective, s-perfective, s-optative), etc. However, in verb themes having no thematic prefixes, other prefixes may "choose" conjugation prefixes in particular modes. These prefixes are: position 4 distributive, position 7 derivational and position 1 adverbial. More will be said about conjugation choice in Chapter 3; at this point, note that the facts of conjugation choice are compatible with an

abstract underlying verbal structure where conjugation is outside of all possible conjugation choosers; moreover, the internal structuring of conjugation choosers should reflect their order of priority in choosing conjugation.

1.5.3 Phonological Manifestations

1.5.3.1 /Ø/ Conjugation

/Ø/ Conjugation is a null morpheme. Examples of verbs having the conjugation set /Ø, Ø, Ø/ are given below (/Ø, Ø, Ø/ = /Ø/ conjugation in the imperfective, perfective and optative modes). In these examples, any variation in verb form across modes is due solely to the mode morphemes, since the conjugation prefix is /Ø/.

(115) a. tsəgh 'cry'
 stem
 'cry'

	Impf.	Perf.	Opt.
1s	ətsəgh	ətsəgh	wətsəghè
3s	ətsəgh	ətsəgh	wətsəgh

b. ?a - h - ?ə 'have O'
 1 11 stem
 adv cl 'have O'

1s	?as?ə	?as?ə	?awas?ə
2s	?ane?ə	?ane?ə	?awə?ə
3s	?a?ə	?a?ə	?awe?ə

c. d - yin 'sing'
 11 stem
 cl 'sing'

1s	əsjin ¹⁰	əsjin	wəsjinə
3s	əjin	əjin	wəjinə
1p	ts'əjin	ts'əjin	ts'ujinə
2p	əjin	əjin	wəjin
3p	ghəjin	ghəjin	ghujinə

d. w - d - kät 'pat area'
 5 11 stem
 ar10 cl 'pat'

1s	wəskät	wəskät	wəskädé
3s	wəkät	wəkät	wəkädé

e. w - d - d - ch'i 'work'
 5 7 11 stem
 ar10 der cl 'work'

1s	wədasch'i	wədasch'i	wədusch'i
2s	wədich'i	wədich'i	wədawoch'i
3s	wədach'i	wədach'i	wəduch'hi

1.5.3.2 /gh/ conjugation

/gh/ conjugation occurs in imperfective, perfective and future modes (recall from 1.4 that future is position 7 /d/ + /gh/). When /gh/ conjugation is paired with /Ø/ imperfective it conveys the meaning of progressive aspect.

¹⁰ Recall from (34) that when /d/ classifier combines with stem-initial /y/, the result is stem-initial /j/.

Examples are given below. Notice the progressive suffix /-t/ which co-occurs with /gh/ conjugation.

(116) ghədlòt '3sS smiles' (progressive)

= gh - dlò + t

Ø stem progressive

cnj 'laugh'

(117) kwàn tsighat'et '3sS (bird) flies into fire' (progressive)

= 'fire' tsi - gh - l - t'e + t

1 Ø 11 stem progressive

adv cnj cl 'motion'

(118) ghijət '2sS walks' (progressive)

= gh - n - ya + t

Ø 10 stem progressive

cnj 2sS 'sg. go'

/gh/ conjugation also occurs in the conjugation set /Ø, gh, Ø/ (i.e. /gh/ conjugation is paired only with the perfective mode form of a verb). Examples are given below.

(119) ? - d - tsits 'eat'

5 11 stem

unsp. 0 cl 'eat'

	Impf	Perf	Opt
1s	?əstsits	?əghəstsits	?əustsidzè
2s	?ənətsits	?əghjtsits	?əwətsidzè
3s	?ətsits	?ətsits	?əustsidzè

(120) d - tsən 'smell'

11 stem

cl 'smell'

1s	ətsən	ghətsən	wətsən
----	-------	---------	--------

(121) yà - tì'e 'jump'
 1 stem
 adv 'motion'

Is yàstì'e yàghitì'e

Notice the phonetic shapes of /gh/ conjugation. In (116) and (120), /gh/ is word-initial and it surfaces as [gha] ([a] is an epenthetic vowel which breaks up consonant clusters). In the 3sS form in (119), where /gh/ is preceded by the consonant [ʔ], it surfaces as [a].

1.5.3.3 /n/ conjugation

There are two phonological properties which characterize /n/-conjugation: a [+nasal] element and a low tone element. Depending on what precedes /n/-conjugation, these elements manifest themselves in different ways.

We first consider the manifestation of /n/-conjugation's [+nasal] element. In this respect, /n/-conjugation is similar to 2sS /n/ in position 10.

In conformity with 2sS /n/, if /n/-conjugation is the final prefix before the stem and preceded by a conjunct prefix, it surfaces as nasalization of the preceding vowel. Recall that 2sS /n/ behaves identically in this context.

Examples are given in (122) - (123).

(122) a. yachòʔìle '3sS takes guts out of O'
 = y - chò - ʔ - `n - le
 40 2 5 8 stem
 inc stm unsp 0 cnj 'handle pl. O'

- b. ts'esiʔàʔ '3sS wake up 1s0'
 = ts'e - s - `n - ʔàʔ
 1 5 8 stem
 adv 1s0 cnj 'wake up'

- (123) a. machodànàts'ila '1pS remove guts separately'
 = m - chọ - dānà - ʔ - ts' - `n - la
 3s0 2 4 5 6 8 stem
 inc stm distr unsp 0 1pS cnj 'handle pl. 0'

- b. ts'esaghiʔàʔ '3pS wakes up 1s0'
 = ts'e - s - gh - `n - ʔàʔ
 1 5 6 8 stem
 adv 1s0 3pS cnj 'wake up'

In (122-123), the vowel preceding /n/-conjugation is both nasalized and high (i.e. [i]); this vowel surfaces whenever /n/-conjugation follows a conjunct prefix from positions 5 (122 a, b) or 6 (123 a, b). The quality of the nasalized vowel is mid front (i.e. [e]) when /n/-conjugation follows a conjunct prefix from position 7, as (124) shows.

- (124) nàñexal '3sS hammers 0 (e.g. nail)'
 = nà - n - `n - h - xal
 1 7 8 11 stem
 adv der cnj cl 'hit 0'

In most all other contexts, /n/-conjugation is a syllable onset. These contexts include whenever a prefix intervenes between /n/-conjugation and the stem. Examples of this context are specified in the examples below.

- (125) Intervening prefix: position 10 1sS /s/

- ts'ewùnasʔàʔ '1sS wakes up 3p0'
 = ts'e - wu - `n - s - ʔàʔ
 1 5 8 10 stem
 adv 3p0 cnj 1sS 'wake up'

(126) Intervening prefix: position 10 2sS /n/

maghadàniḷa '2sS blames 3sO'

= m - gha - d - `n - n - la

0 0 7 8 10 stem

3sO inc pp der cnj 2sS 'blame?'

(127) Intervening prefix: position 10 2pS /a/

ts'esànaʔàʔ '2pS wakes up 1sO'

= ts'e - s - `n - a - ʔàʔ

1 5 8 10 stem

adv 1sO cnj 2pS 'wake up'

(128) Intervening prefix: position 9 perfective mode /n/

a. yachəʔaniḷa '3sS removed guts'

= y - chə - ʔ - `n - n - la

4 0 2 5 8 9 stem

inc stm unsp 0 cnj mode 'handle pl. 0'

b. ts'esàniʔàʔ '3sS woke up 1sO'

= ts'e - s - `n - n - ʔàʔ

1 5 8 9 stem

adv 1sO cnj mode 'wake up 0'

c. səghadàniḷà '3sS blamed 1sO'

= s - gha - d - `n - n - là

0 0 7 8 9 stem

1sO inc pp der cnj mode 'blame? 0'

(129) Intervening prefixes: position 9 /n/ + position 10 /s/

chenànichi '1sS threw 2sO into the water'

= che - n - `n - n - s - h - chi

1 5 8 9 10 11 stem

adv 2sO cnj mode 1sS cl 'handle 0'

The other context in which one would expect /n/-conjugation to be a syllable onset, assuming /n/-conjugation parallels the behaviour of 2sS /n/, is when /n/ is preceded by a disjunct prefix. The examples below show that /n/ is always an onset in 1sS and 2sS forms in this context; however, in 3sS

imperfective forms (i.e. in forms where /n/-conjugation is the only conjunct prefix), /n/ varies between onset (130) and coda position (131); when in coda position, /n/ surfaces as nasalization on the preceding vowel.¹¹

(130) ts'e - `n - zat `wake up'
 = 1 ɔ stem
 adv cnj `wake up'

	Impf	Perf
1s	ts'ɛnassats	ts'ɛnizat
2s	ts'ɛnizat	ts'ɛnizat
3s	ts'ɛnezat	ts'ɛnjzat

(131) edzodze nè - `n - ?à `set traps'
 = `trap' 1 ɔ stem
 adv cnj `handle 3D O'

	Impf	Perf
1s	nènes?à	nèni?ò
2s	nèni?à	nèni?ɔ
3s	nè?à	

¹¹ Rice (p.c.) offers a possible explanation for why /n/-conjugation is sometimes an onset and sometimes nasalization: if the preceding disjunct prefix is underlyingly consonant-final, this consonant serves as a syllable onset, and therefore /n/-conjugation is syllable coda, surfacing as nasalization on the vowel. At some level in the derivation, the disjunct prefix final consonant is deleted or prohibited by a constraint from surfacing. By way of contrast, if the disjunct prefix is underlyingly vowel-final, /n/-conjugation is syllable onset (cf. (75) and the accompanying note 6 for another form apparently exhibiting a consonant-final disjunct prefix. In contrast to the /n/-conjugation forms, the final consonant in the disjunct prefix in (75) triggers epenthesis and is not deleted.)

(132) che - `n - ?a 'put O in water'
 = 1 8 stem
 adv cnj 'handle 3D O'

1s cheməs[?]à chemi[?]ò
 2s chemi[?]à chemi[?]ç

(133) na - `n - h - tsus 'return cloth-like O'
 = 3 8 11 stem
 rev cnj cl 'handle cloth-like O'

1s nanəstsus nanitsus
 2s nənɪtsus

In the above examples, we have considered the surfacing of /n/-conjugation [n] in imperfective and perfective modes. /n/-conjugation optative forms are considered in tandem with /s/-conjugation forms at the end of this section.

We next consider the surfacing of low tone which is associated with /n/-conjugation. There are a number of contexts to consider. The first context is when /n/ is the final prefix and is preceded by a conjunct prefix. Recall from above that /n/ in this context is a coda and surfaces as nasalization on the preceding vowel. Low tone always appears on this nasalized vowel if preceded by a position 7 prefix. Tone also always appears on this nasalized vowel if preceded by a position 5 or position 6 prefix other than position 5 /ʔ/, position 6 /tsʰ/ or position 6 /gh/. An example is given below.

(134) ts'esɪ[?]à[?] '3sS wake up 1sO'
 = ts'e - s - `n - ?a[?]
 1 5 8 stem
 adv 1sO cnj 'wake up'

In a form where the conjunct prefixes consist entirely of position 5 /ʔ/, position 6 /ts'/ and/or position 6 /gh/, tone does not appear on the nasalized vowel. Examples are given below.

(135) *yechəʔile* '3sS takes guts out of O'
 = y - chə - ʔ - ʔn - le
 4 0 2 5 8 stem
 inc stm unsp 0 cnj 'handle pl. O'

(136) *məchədànts'ila* '1pS remove guts separately'
 = m - chə - dà - ts' - ʔn - la
 3s0 2 4 6 8 stem
 inc stm distr 1pS cnj 'handle pl. O'

However, if there are any conjunct prefixes in addition to position 5 /ʔ/, position 6 /ts'/ and/or position 6 /gh/, tone does appear on the nasalized vowel.¹² An example is given below.

(137) *ts'esaghiʔàʔ* '3pS wakes up 1s0'
 = ts'e - s - gh - ʔn - ʔàʔ
 1 5 6 8 stem
 adv 1s0 3pS cnj 'wake up'

In summary, tone appears on the nasalized vowel in all cases except where position 5 /ʔ/, position 6 /ts'/ and/or position 6 /gh/ are the only conjunct prefixes besides /n/-conjugation.

The second context we consider for tonal manifestations is when /n/-conjugation is a syllable onset (cf. (125) - (133)). The first generalization is that tone always appears on the [ə] following a position 7 prefix, as exemplified in (138) and (139).

(138) *məghadənila* '2sS blames 3s0'
 = m - gha - d - ʔn - n - la
 0 0 7 8 10 stem
 3s0 inc pp der cnj 2sS 'blame?'

¹² See Hargus (1988) for a detailed discussion of these facts in Sekani.

- (139) sǎghadànià '3sS blamed 1s0'
 = s - gha - d - `n - n - là
 0 0 7 8 9 stem
 1s0 inc pp der cnj mode 'blame? 0'

If the prefix preceding /n/-conjugation onset is a position 5 or 6 conjunct prefix, the surfacing of tone is conditioned in exactly the same way as discussed above for /n/-conjugation coda. Thus, there is no tone when conjunct prefixes consist only of /ʔ/, /ts'/ and/or /gh/, as shown below.

- (140) yachòʔanià '3sS removed guts'
 = y - chò - ʔ - `n - n - là
 4 0 2 5 8 9 stem
 inc stm unsp 0 cnj mode 'handle pl. 0'

- (141) wuwàʔetsʻanià '1pS gave pl. 0 to 3p0'
 = wu - wà - ʔ - ts' - `n - n - là
 0 0 5 6 8 9 stem
 3p0 inc pp unsp 0 1pS cnj mode 'handle pl. 0'

If other conjunct prefixes are present, then tone does surface on the V preceding /n/-conjugation, as shown in (142) - (146).

- (142) tsʻewùnasʔà '1sS wakes up 3p0'
 = tsʻe - wu - `n - s - ʔà
 1 5 8 10 stem
 adv 3p0 cnj 1sS 'wake up'

- (143) tsʻesànaʔà '2pS wakes up 1s0'
 = tsʻe - s - `n - a - ʔà
 1 5 8 10 stem
 adv 1s0 cnj 2pS 'wake up'

- (144) chenànichì '1sS threw 2s0 into the water'
 = che - n - `n - n - s - h - chì
 1 5 8 9 10 11 stem
 adv 2s0 cnj mode 1sS cl 'handle 0'

- (145) ts'esaniʔàʔ '3sS woke up 1s0'
 = ts'e - s - `n - n - ʔàʔ
 1 5 8 9 stem
 adv 1s0 cnj mode 'wake up 0'
- (146) ts'ewuts'eniʔàʔ '1pS woke up 3p0'
 = ts'e - wu - ts' - `n - n - ʔàʔ
 1 5 6 8 9 stem
 adv 3p0 1pS cnj mode 'wake up 0'

If /`n/-conjugation onset is preceded by a disjunct prefix, low tone is never transferred on to the preceding vowel, as shown earlier in (130), (132) and (133).

The apparently complicated facts of conjugation tone can be simplified if we make the following assumption: positions 7 - 11 define a phonological domain within conjunct prefixes; let us call this "domain 2". Positions 5 - 11 define a larger phonological domain, equivalent to the entire conjunct prefix domain; we call this "domain 3".¹³ The entire word, including disjunct and conjunct prefixes, constitutes a third phonological domain. In domain 2, conjugation tone is always associated to a preceding vowel; in domain 3, conjugation tone is sometimes associated to a preceding vowel, conditioned by the type of domain 3 prefixes present; in the word domain (i.e. when conjugation is preceded by a disjunct prefix), tone is never associated to a preceding vowel.

¹³ See Li (1946) for a discussion of the equivalent facts in Chipewyan; Li was one of the first to notice the odd patterning of the pronominal object and deictic subject prefixes in relation to the other conjunct prefixes located to their right. The uniqueness of the object and deictic subject prefixes is noted in many other Athapaskan languages: cf. Rice (1982, 1985b, 1989b), Hargus (1988), Kari (1975, 1976).

1.5.3.3 /s/ Conjugation

I discuss the phonology of /s/-conjugation in the same fashion as /n/-conjugation, considering first the manifestation of the [s] element of /s/-conjugation and secondly the manifestation of low tone.

If /s/-conjugation were exactly like /n/-conjugation, it too would surface as a syllable coda whenever (a) it is the final prefix before the stem and (b) it is preceded by a conjunct prefix. In fact, /s/-conjugation is a syllable coda in a subset of forms characterized by properties (a) and (b). This subset is further characterized by the following property: (c) the classifier is either /d/ or /θ/. Examples are given below.

- (147) sònawədèskat '3sS yawns'
 = sòna - w - d - `s - kal `yawn`
 1 5 7 8 stem
 adv ar1 0 der cnj `yawn`
- (148) fènè nè sdiò '3sS stops laughing'
 = fè - nè - n - `s - d - diò
 1 1 7 8 11 stem
 adv adv der cnj cl `laugh`
- (149) daghasla '3pS hangs up pl. 0'
 = da - gh - `s - la
 1 6 8 stem
 adv 3pS cnj `handle pl. 0`
- (150) nadànàts'askwi '1pS vomited separately'
 = na - d à n à - ts' - `s - d - kwi
 3 4 6 8 11 stem
 rev distr 1pS cnj cl `vomit`
- (151) ?èdàdès?ò '3sS cashes 0' (e.g. a cheque)
 = ?èda - d - `s - ?ò
 1 7 8 stem
 adv der cnj `handle 3D 0`

(152) suneyà nèsʔi '3sS steals money'

= 'money' n - 's - ʔi

7 8 stem

der cnj 'steal O'

(153) nòdèsja '3sS goes back again'

= na - na - d - 's - d - ya

3 3 7 8 11 stem

rev rev der cnj cl 'sg. go'

In forms having properties (a) and (b), but which have /h/ classifier, [s] does not surface at all. Examples are given below.

(154) a. dasəghèchi '3pS lifts up 1sO'

= da - s - gh - 's - h - chi

1 5 6 8 11 stem

adv 1sO 3pS cnj cl 'handle animate O'

b. i. tàwuts'èchi '1pS carries up 3pO'

ii. tàwuts'aschi¹⁴

= tà - wu - ts' - 's - h - chi

1 5 6 8 11 stem

adv 3pO 1pS cnj cl 'handle animate O'

(155) k'eghanèch'èʔ '3pS counts O'

= k'e - gh - n - 's - h - ch'èʔ

1 6 7 8 11 stem

adv 3pS der cnj cl 'count O'

(156) yanəghèch'il '3sS tears out pl. O' (e.g. pages)

= ya - nà - gh - 's - h - ch'il

1 4 7 8 11 stem

adv distr der cnj cl 'break O'

¹⁴ (154 b ii) is an exceptional form which occurs in free variation with (154 b i). I have no explanation for the occurrence of this form.

- (157) *tàsaghèchi* '3pS carried 1sO uphill'
 = *tà - s - gh - `s - n - h - chi*
 1 5 6 8 9 11 stem
 adv 1sO 3pS cnj mode cl 'handle animate O'
- (158) *zèxi* '3sS kills O'
 = *z - `s - h - xi*
 7 8 11 stem
 der cnj cl 'kill O'
- (159) *yak'eghedèchi* '3sS rolls animate O off of 3sO'
 = *y - k'e - gh - d - `s - h - chi*
 0 0 7 7 8 11 stem
 40 pp der der cnj cl 'handle animate O'

In forms having properties (a) and (b), but which have /l/ classifier, [s] surfaces as coda if the preceding conjunct prefix is in positions 5 or 6 (cf. (160)); if the preceding conjunct prefix is in position 7, [s] does not surface at all, as with /h/ classifier (cf. (161) - (163)).

- (160) *tàts'esti'e* '1pS runs uphill'
 = *tà - ts' - `s - l - ti'e*
 1 6 8 11 stem
 adv 1pS cnj cl 'motion'
- (161) *?èdadèla* '3sS is lazy'
 = *?èda - d - `s - l - la*
 1 7 8 11 stem
 adv der cnj cl '?'
- (162) *?ats'anèdagh* '1pS chokes'
 = *? - ts' - n - `s - l - dagh*
 5 6 7 8 11 stem
 unsp O 1pS der cnj cl 'choke'

- (163) kadèt'l'a '3sS runs out'
 = ka - d - `s - l - t'l'a
 1 7 8 11 stem
 adv der cnj cl 'motion'

In forms having property (b) only, i.e. where /s/ is preceded by a conjunct prefix but /s/ is not the last prefix before the stem, the surfacing of [s] is quite complicated. If the intervening prefix is 1sS /s/, then conjugation [s] does not surface at all; however, the presence of a long vowel in these forms between positions 7 and 10 suggests that [s] was possibly in onset position (i.e. in a position between two vowels), and then deleted. Examples are given below.

(164) Intervening prefix: position 10 1sS /s/

- a. sònawədèeskaʔ '1sS yawns'
 = sòna - w - d - `s - s - kaʔ
 1 5 7 8 10 stem
 adv arl 0 der cnj 1sS 'yawn'
- b. fènènèesdiò '1sS stops laughing'
 = fènè - n - `s - s - d - diò
 1 7 8 10 11 stem
 adv der cnj 1sS cl 'laugh'
- c. k'enèesch'èʔ '1sS counts 0'
 = k'e - n - `s - s - h - ch'èʔ
 1 7 8 10 11 stem
 adv der cnj 1sS cl 'count 0'
- d. yanàghèesch'il '1sS tears out pl. 0' (e.g. pages)
 = ya - nà - gh - `s - s - h - ch'il
 1 4 7 8 10 i1 stem
 adv dictr der cnj 1sS cl 'break 0'
- e. ʔanèesdagh '1sS chokes'
 = ʔ - n - `s - s - l - dagh
 5 7 8 10 11 stem
 unsp 0 der cnj 1sS cl 'choke'

- f. mak'eghadèechi '1sS rolled animate O of of 3sO'
 = m - k'e - gh - d - `s - s - h - chi
 0 0 7 7 8 10 11 stem
 3sO pp der der cnj 1sS cl 'handle animate O'
- g. nadéesjà '1sS went back'
 = na - d - `s - s - d - ya
 3 7 8 10 11 stem
 rev der cnj 1sS cl 'sg. go'
- h. kadèestl'a '1sS runs out'
 = ka - d - `s - s - l - t'a
 1 7 8 10 11 stem
 adv der cnj 1sS cl 'motion'

(Note in (164f) that both /s/-conjugation and 1sS /s/ are absent; the absence of 1sS /s/ is an effect of /h/ classifier in perfective forms (cf. 1.2.4)).

If the intervening prefix is 2sS /n/, then /n/ usually surfaces as nasalization on the preceding [i] vowel and the [s] element of /s/-conjugation does not surface at all. As the form in (165e) shows, sometimes there is a long nasalized [èè] between position 7 and the stem. This suggests again that [s] was underlyingly a syllable onset (i.e. surrounded by vowels on both sides).

(165) Intervening prefix: position 10 2sS /n/

- a. k'enich'è? '2sS counts O'
 = k'e - n - `s - n - h - ch'è?
 1 7 8 10 11 stem
 adv der cnj 2sS cl 'count O'
- b. ?èdadi?ò '2sS cashes O' (e.g. a cheque)
 = ?èda - d - `s - n - ?ò
 1 7 8 10 stem
 adv der cnj 2sS 'handle 3D O'

- c. suneyà niʔi '2sS steals money'
 = 'money' n - `s - n - ʔi
 7 8 10 stem
 der cnj 2sS 'steal O'
- d. mak'eghədichj '2sS rolled animate O off of 3sO'
 = m - k'e - gh - d - `s - n - h - chj
 0 0 7 7 8 10 11 stem
 3sO pp der der cnj 2sS cl 'handle animate O'
- e. yanàghèch'il '2sS tears out pl. O' (e.g. pages)
 = ya - nà - gh - `s - n - h - ch'il
 1 4 7 8 10 11 stem
 adv distr der cuj 2sS cl 'break O'

If the conjunct prefix before /s/ is in positions 5 or 6, and both position 9 perfective mode and position 10 1sS /s/ intervene between /s/ and the stem, positions 9 and 10 merge to form [i], and [s] of /s/ surfaces as a syllable onset, as shown in (166).

(166) Intervening prefixes: position 9 /n/ + position 10 /s/

danəsiʔo '1sS held up 2sO'
 da - n - `s - n - s - ʔo
 1 5 8 9 10 stem
 adv 2sO cnj mode 1sS 'handle O'

We have considered how [s] surfaces when (i) it is the final conjunct prefix preceded by other conjunct prefixes and (ii) it is not the final conjunct prefix but is preceded by other conjunct prefixes. The surfacing of [s] in these two contexts varies in a seemingly arbitrary fashion; in Chapter 4 I show that the syllable position of [s] is determined by two simple devices which operate systematically: the syllable template and extraprosodicity. The same devices determine the syllable position of [s] when (iii) it is the only conjunct prefix

(besides the classifier). In this case, [s] is usually a syllable onset, as shown in (167) - (172).

- (167) sɔdà '3sS sits'
 = `s - dà
 8 stem
 cnj 'sit'
- (168) tɔwe sɔch'e '3sS cooks fish'
 = 'fish' `s - h - ch'e
 8 11 stem
 cnj cl 'cook'
- (169) sɛtswas '3sS springs O' (e.g. mousetrap)
 = `s - l - tswas
 8 11 stem
 cnj cl 'spring O'
- (170) tusakwən '3sS has a fever'
 = tu - `s - kwən
 1 8 stem
 adv cnj 'be hot'
- (171) tàsət'l'a '3sS runs uphill'
 = tà - `s - l - t'l'a
 1 8 11 stem
 adv cnj cl 'motion'
- (172) dàsetsus '3sS hangs up cloth-like O'
 = dà - `s - h - tsus
 1 8 11 stem
 adv cnj cl 'handle cloth-like O'

When /s/-conjugation is the only conjunct prefix in /d/-classifier forms, [s] may be a syllable coda, as shown in the form below.

- (173) dɔgwòtk'è nasda '3sS is squatting again'
 = d - gwòt - k'è na - `s - d - da
 refl 'knees' pp 3 8 11 stem
 rev cnj cl 'sit'

Taking the /d/-classifier form in (173) to be exceptional, [s] manifests itself as a syllable onset when it is initial in the conjunct domain, in the same way as any prefix in this conjunct-initial position is a syllable onset.

The second manifestation of /s/-conjugation, (the first being [s]), is low tone. The /s/ tone facts parallel the /n/ tone facts. Thus, if /s/ is preceded by a position 7 prefix, tone always surfaces on the left adjacent vowel. This is illustrated in the partial paradigms in (174) - (179).

(174) sòna - w - d - 's - kal 'yawn'

1 5 7 8 stem
adv arl O der cnj 'yawn'

1s sònawadéeskaʔ

3s sònawadèskaʔ

(175) tèn - nè - n - 's - d - dlò 'stop laughing'

1 1 7 8 11 stem
adv adv der cnj cl 'laugh'

1s tènènèesdlò

3s tènènèesdlò

(176) k'e - n - 's - h - ch'è? 'count O'

1 7 8 11 stem
adv tder cnj cl 'count O'

1s k'enèesch'è?

2s k'enìch'è?

3s k'eyanèch'è?

1p k'ets'anèch'è?

3p k'eghanèch'è?

(177) ya - nà - gh - `s - h - ch'il 'tear out pl. O' (e.g. pages)
 1 4 7 8 11 stem
 adv distr der cnj cl 'break O'

1s yanàghéesch'il
 2s yanàghèèch'il
 3s yanàghèch'il

(178) ?əda - d - `s - l - la 'be lazy'
 1 7 8 11 stem
 adv der cnj cl '?'

1s ?ədadèsla
 3s ?ədadèla

(179) ? - n - `s - l - dagh 'to choke'
 5 7 8 11 stem
 unsp O der cnj cl 'choke'

1s ?anéesdagh
 1p ?ats'anédagh

If /s/ is preceded by a prefix from positions 5 or 6, tone may surface depending on which prefixes are present in these positions. If the preceding position 5/6 prefix is not position 5 /ʔ/, position 6 /tsʔ/ or position 6 /gh/, tone surfaces, as in (180).

(180) danəsiʔə '1sS held up 2sO'
 da - n - `s - n - s - ʔə
 1 5 8 9 10 stem
 adv 2sO cnj mode 1sS 'handle O'

If any of the aforementioned prefixes precede /s/-conjugation and are accompanied by another position 5/6 prefix, tone also surfaces.

(181) *tàsaghèchi* '3pS carried 1sO uphill'

= *tà - s - gh - `s - n - h - chi*

1 5 6 8 9 11 stem

adv 1sO 3pS cnj mode cl 'handle animate O'

If the only prefix(es) in positions 5 and 6 are /ʔ/, /tsʔ/ and/or /gh/, then tone does not surface, as shown in the following examples.

(182) *dats'asla* '1pS hangs up pl. O'

= *da - ts' - `s - la*

1 6 8 stem

adv 1pS cnj 'handle pl. O'

(183) *ʔuwe ghesch'e* '3pS cooked fish'

= 'fish' *gh - `s - h - ch'e*

6 8 11 stem

3pS cnj cl 'cook O'

(184) *nadànàts'askwi* '1pS vomited separately'

= *na - d`anà - ts' - `s - d - kwi*

3 4 6 8 11 stem

rev distr 1pS cnj cl 'vomit'

Finally, if /s/ is preceded by a disjunct prefix, the low tone of /s/ never surfaces on the leftward vowel (if tone is present on this vowel, it is lexically marked, and does not originate from /s/). This is seen in the partial paradigm given below.

(185) *tu - `s - kwàn* 'have a fever'

! 8 stem

adv cnj 'be hot'

1s *tusaskwàn*

2s *tusikwàn*

3s *tusakwàn*

As already mentioned, the surfacing of /s/-conjugation low tone exactly parallels that of /n/-conjugation low tone.

In optative and future modes, distinctions between conjugations are lost as far as I can tell. There is no consistent tonal indication of the presence of /s/ or /n/ conjugations in optatives and futures; neither is there any segmental trace of position 8 conjugation. HRB differs in this respect from related languages like Sekani and Slave, where /s/ and /n/ conjugations can be differentiated in optative and future modes.

1.5.4 Summary Charts

- cf. (113): Conjugation-Mode Pairings

The chart in (186) lists the contexts for when [n] of /n/-conjugation is an onset and when it is a coda. [n] is an onset whenever (a) it is the first prefix in the conjunct domain or (b) position 10 is filled by a consonant. [n] is a coda whenever (c) it is the last prefix in the conjunct domain and preceded by other conjunct consonants. (Note: in (186), [.....] indicates that the positions so marked are optionally filled.)

(186) [n] of /n/-conjugation

Position	<u>0</u> <u>1</u> <u>2</u> <u>3</u> <u>4</u>	<u>5</u> <u>6</u>	<u>7</u>	8	<u>9</u> <u>10</u>	11
n = Onset:	(a) .....	∅	∅	∅	∅	.....
	(b)	1 or more Cs		∅	.....<u>10</u>	
					C	
Coda:	(c)	1 or more Cs		∅	∅	∅

The chart in (187) lists the contexts for when [s] of /s/-conjugation is an onset, when it is a coda, and when it is deleted. [s] is an onset whenever (a) it is the first prefix in the conjunct domain or (b) it is immediately preceded by a position 5 or 6 prefix and is immediately followed by /l/ classifier. [s] may be a

coda when it is immediately preceded by a disjunct prefix and immediately followed by /d/ classifier (environment (c)); this is the context in which [s] varies between onset and coda, so [s] may also be an onset in this environment. Otherwise, [s] is a coda (d) in /Ø/ and /d/ classifier forms when it is the last prefix in the conjunct domain and preceded by a conjunct prefix. [s] is deleted (e) between a position 7 C and position 10 /s/, (f) between a position 7 C and position 10 /n/, (g) between any conjunct prefix and /h/ classifier, and (h) between a position 7 C and /l/ classifier.

(187) [s] of /s/-conjugation

	Position	<u>0</u> <u>1</u> <u>2</u> <u>3</u> <u>4</u>	<u>5</u> <u>6</u>	<u>7</u>	8	<u>9</u> <u>10</u>	11
s = Onset:	(a)	.....	Ø Ø	Ø	`s	.....
	(b)	.....	1/more Cs	Ø	`s	Ø	l
Coda:	(c)	1 or more CVs (- not always)	Ø	Ø	`s	Ø	d
	(d)	.....	1 or more Cs		`s	Ø	Ø d
s = Deleted:	(e)			<u>7</u> C		<u>10</u> s	
	(f)			<u>7</u> C		<u>10</u> n	
	(g)		1 or more Cs			Ø	h
	(h)			<u>7</u> C		Ø	l

The chart in (188) lists the environments in which the tone of /n/- and /s/-conjugations surfaces. Tone is manifested (a) on the vowel between a position 7 C and conjugation, (b) on the vowel between the string of position 5 /ʔ/ and position 6 /tsʔ/ or /gh/, and conjugation, and (c) on the vowel between a string consisting of any combination of position 5 and 6 prefixes provided that

the string does not consist only of position 5 /ʔ/ or position 6 /tsʰ/ or position 6 /gh/, and conjugation. Tone does not surface (d) whenever conjugation is the first prefix in the conjunct domain.

(188) Tonal manifestations of /n/- and /s/-conjugations

Position	| 0 | 1 | 2 | 3 | 4 |	| 5 | 6 |	| 7 |	8	| 9 | 10 |	11
(a)	c	ṽ{n,s}	.....
(b)	{ ʔ{tsʰ} gh}	∅	ṽ{n,s}	.....
(c)	{ ʔ{tsʰ} gh}	∅	ṽ{n,s}	.....
		AND				
		any other				
		prefix				
(d)	∅	∅	{n,s}	.....
		-no tone transfer				

1.6 Derivational/Aspectual/Thematic (position 7)

1.6.1 Function

1.6.1.1 Description

To this point, prefixes in position 7 have been labelled simply as derivational; in actual fact, prefixes in this position are either derivational or thematic. In this respect, they are like the classifiers, which also divide into these two groups (cf. 1.2.1). Thematic position 7 prefixes occur as part of the verb's lexical entry and have no isolable meaning. In 1.6.1.2, (189) - (192) show examples of verbs built on the same theme, where the theme includes a thematic position 7. Other thematic position 7 prefixes are given in (193) - (197); again, the position 7 prefix in these forms has no meaning of its own.

Position 7 prefixes can also be used derivationally. Derivational position 7 forms verb bases having certain meanings. In (198) - (206) the various derivational uses of three prefixes are illustrated. Compare the derivational use of each prefix given in (a) forms with the same or similar verb themes not having derivational position 7 in the (b) forms.

In (207) - (225) in 1.6.1.2 other derivational prefixes are illustrated. In these examples, no forms without derivational position 7 could be found for comparison. However, the derivational uses of these prefixes are fairly common in many Athapaskan languages (cf. Golla 1970, Hargus 1988, Rice 1989b).

1.6.1.2 Examples

(189) Theme: n - ta 'look/search'
 7 stem

a. ?adək'ànustahe 'I will look at myself'

= ?d - k'à - n - w - s - ta

0 0 7 9 10 stem

refl 0 pp thm mode 1sS 'look'

b. yatses k'ènànata 'he's searching his pockets'

= y - tses k'è - nà - n - ta

4 0 'pockets' 0 1 7 stem

pp adv thm 'look'

c. yikànutahe 'he will find her'

= y - nkà - n - w - ta

0 0 7 9 stem

4 0 pp thm mode 'look'

(190) Theme: u - z - h - ts'o 'hear O'
7 7 11 stem

a. suzèts'o 'he heard me'
= s - u - z - `s - h - ts'o
5 7 7 8 11 stem
1sO thm thm cnj cl 'hear O'

b. tàʔuzeests'o 'I misheard you'
= tà - u - z - gh - s - h - ts'o
1 7 7 8 10 11 stem
adv thm thm cnj 1sS cl 'hear O'

(191) Theme: z - h - ghi 'kill O'
7 11 stem

a. xada zèxj 'he shot the moose'
= 'moose' z - `s - n - h - ghi
7 8 9 11 stem
thm cnj mode cl 'kill O'

b. ʔadazègi 'he killed himself'
= ʔd - z - `s - n - d - ghi
5 7 8 9 11 stem
refl O thm cnj mode cl 'kill O'

c. chu nàzuxihèsè 'he will drown (3sO?)'
= 'water' nà - z - w - h - ghi
1 7 9 11 stem
adv thm mode cl 'kill O'

d. biʔ sazèexj 'I was sleepy' ('sleep killed me')
= 'sleep' s - z - `s - n - h - ghi
5 7 8 9 11 stem
1sO thm cnj mode cl 'kill O'

e. dlòwèwuzexel 'they are laughing' ('laughter is killing them')
 = dlòwè - wu - z - h - ghel
 2 5 7 11 stem
 inc stm 3pO thm cl 'kill O'
 'laugh'

(192) Theme: ts' - h - dane 'be aloof'
 7 11 stem

a. wats'asdane 'I am lonesome'
 = w - ts' - s - h - dane
 5 7 10 11 stem
 arl O thm 1sS cl 'be aloof'

b. dane ts'asdane 'I hate people'
 = 'people' ts' - s - h - dane
 7 10 11 stem
 thm 1sS cl 'be aloof'

(193) Thematic /u/:

a. ughabè '3pS pick berries'
 = u - gh - bè
 7 6 stem
 thm 3pS 'pick berries'

(Notice metathesis in (193a) between position 6 /gh/ and position 7 /u/).

b. usjo '1sS is good'
 = u - s - d - yo
 7 10 11 stem
 thm 1sS cl 'be good'

c. udessùs '1sS whistles/whispers'
 = u - d - sùs
 7 7 stem
 thm der 'whistle/whisper'

d. uzèets'ò '1sS listened' (cf. (190))
 = u - z - `s - s - h - ts'ò
 7 7 8 10 11 stem
 thm thm cnj 1sS cl 'listen'

e. utwèn '3sS holds O'
 = u - twèn
 7 stem
 thm 'hold O'

(194) Thematic /t/

fəji '3sS is sweet'
 = t - ji
 7 stem
 thm 'be sweet'

(195) Thematic /z/:

uzèets'ò '1sS listens to O' (cf. (190))
 = u - z - `s - s - h - ts'ò
 7 7 8 10 11 stem
 thm thm cnj 1sS cl 'listen to O'

(196) Thematic /d/:

a. dədətsas '1sS was shaking'
 = d - d - s - d - tsas
 7 7 10 11 stem
 thm thm 1sS cl 'shake'

b. dəji '3sS is sick'
 = d - ji
 7 stem
 thm 'be sick'

(197) Thematic /n/:

- a. k'ets'anèch'è? '1pS counts O'
 = k'e - ts' - n - 's - h - ch'è?
 1 6 7 8 11 stem
 adv 1pS thm cnj cl 'count O'
- b. wunasʔà '1sS fools 3pO'
 = wu - n - s - ʔà
 5 7 10 stem
 3pO thm 1sS fool O'
- c. ʔədèstl'èsk'à nàsta '1sS look at paper'
 = ʔədèstl'ès - k'à n - s - h - ta
 'paper' pp 7 10 11 stem
 thm 1sS cl 'look at O'

Derivational position 7

- *Derivational uses of /gh/*

(198) "stagger" (only with certain "motion" verb stems)

- (a) i = k'èghenedà '3sS staggers around' (compare with (b) i)
 = k'è(na) - gh - n - dà
 1 7 7 stem
 adv der der 'motion'
- ii = k'èghanatl'e '3sS staggers around' (compare with (b) ii)
 = k'è(na) - gh - n - tl'e
 1 7 7 stem
 adv der der 'motion'
- (b) i = k'àdà '3sS is walking around'
 = k'è(na) - dà
 1 stem
 adv 'motion'

(b) `s - dà 'sg. sit'
 8 stem
 cnj 'sit'

1s səsà
 2s sɪà
 3s sàà

(201) "for oneself"

(a) sàdàné jida ʔəghədəts'ès 'my brothers cook
for themselves'

= s - dənè 'themselves' ? - gh - d - ts'ès
 'my' 'brothers' 5 6 7 stem
 unsp 0 3pS der 'cook 0'

(b) ghəts'ès 'they cook 0'
 = gh - ts'ès
 6 stem
 3pS 'cook 0'

(202) inceptive aspect

(a) ts'èda dəsjin 'child started to sing'

= 'child' d - `s - d - yin
 7 8 11 stem
 der cnj cl 'sing'

(b) əjin 'he sings'
 = d - shin
 11 stem
 cl 'sing'

(203) "mouth", "oral activity"

(a) i = k'èchuedəda 'he walks around **drinking**'

= k'è(na) - chue - d - da
 1 2 7 stem
 adv inc stm der 'motion'

ii = k'ètsəghədəda 'he walks around **crying**'

= k'è(na) - tsəghe - d - da

1 2 7 stem

adv inc stm der 'motion'

iii = k'èsələdəda 'he walks around **yelling**'

= k'è(na) - sale - d - da

1 2 7 stem

adv inc stm der 'motion'

iv = k'èshinedəda 'he walks around **singing**'

= k'è(na) - shine - d - da

1 2 7 stem

adv inc stm der 'motion'

(b) k'àda 'he walks around'

= k'è(na) - da

1 stem

adv 'motion'

-Derivational uses of /n/

(204) "completion"

(a) i = tənènèesdlò 'I stop laughing' (cf. (b) i)

= tɛ - nè - n - `s - s - d - dlò

1 1 7 8 10 11 stem

adv adv der cnj 1sS cl 'laugh'

ii = danèesdɔ 'I get full' (cf. (b) ii)

= da - n - `s - s - d - dɔ

1 7 8 10 11 stem

adv der cnj 1sS cl 'be full'

(b) i = ʔədesdlò 'I laugh'

= ʔ - d - s - dlò

5 7 10 stem

unsp 0 der 1sS 'laugh'

(206) ùnich'u '2sS shoot at O'

= u - ù - n - n - ch'u

7 8 10 stem

der cnj 2sS 'shoot O'

(207) ùnit'ow '1sS shot at O'

= u - ù - n - n - s - t'ow

7 8 9 10 stem

der cnj mode 1sS 'shoot O'

(b) "motion towards a goal"

- "motion towards a goal" is indicated by position 7 /u/ and position 8 /s/

(208) tse ghà ʔùsesbi '1sS swam past rock'

= tse - ghà u - s - s - bi

'rock' past 7 8 10 stem

'rock' 'past' der cnj 1sS 'swim'

(c) "mouth", "oral activity"

- "mouth" or "oral activity" is indicated by position 7 /d/

(209) daskwas '1sS coughs'

= d - s - d - kwas

7 10 11 stem

der 1sS cl 'cough'

(210) danets'è wəɗajè '2pS talk to the man'

= dane - ts'è w - d - a - jè

'man' pp 5 7 10 stem

ar1 O der 2pS 'talk to O'

(211) ʔatsən k'adasʔaʔ '1sS chews up meat'

= 'meat' k'a - d - s - ʔaʔ

0 7 10 stem

pp der 1sS 'chew O'

(212) ʔats'adèdàgh '1pS swallowed O'

= ʔ - ts' - d - `s - h - dàgh

5 6 7 8 11 stem

unsp O 1pS der cnj cl 'swallow O'

(213) dasbèt '1sS is hungry'

= d - s - bèt

7 10 stem

der 1sS 'be hungry'

(d) water

- "water" is indicated by position 7 /d/

(214) nèchuduszale '1sS washes O' (Optative)

= nè - chu - d - w - s - xal + e

1 2 7 9 10 stem optative

adv inc stm der mode 1sS 'wash O'

(e) fire

- "fire" is indicated by position 7 /d/

(215) kwàn nadèek'ò '1sS made fire'

= 'fire' na - d - `s - s - k'ò

1 7 8 10 stem

adv der cnj 1sS 'make fire'

(216) ʔəch'ile k'editət '1sS burned rags'

= 'rags' k'e - d - n - s - tət

0 7 9 10 stem

pp der mode 1sS 'burn O'

(f) description of an attribute

- when a verb describes an attribute, position 7 /ñ/ is present. This is probably the same as the position 9 perfective mode /n/ historically. /ñ/ is chosen to represent the prefix in contrast to /n/ because this prefix exhibits different phonological properties from /n/. See 1.6.3 (230) - (232) for discussion.

- (217) matsàn nɔ̀jùè '3sS is thin'
 = m - tsàn ñ̃ - jùè
 'his' 'meat' 7 stem
 adj 'be lacking'
- (218) nakɪ̯t '3sS is heavy'
 = ñ̃ - kɪ̯t
 7¹⁵ stem
 adj 'be heavy'
- (219) nak'asa '3sS is short'
 = ñ̃ - k'asa
 7 stem
 adj 'be short'
- (220) nɛ̀tsàn '3sS is fat'
 = ñ̃ - `s - l - tsàn
 7 8 11 stem
 adj cnj cl 'meat'
- (221) wutsàn dà̀nà̀yɛ̀jue 'each of them is thin'
 = wu - tsàn dà̀nà̀ - y - ñ̃ - jue
 'their' 'meat' 4 ? 7 stem
 distr pl adj 'be lacking'
- (222) ghayɛ̀kay̯t '3pS are heavy'
 = gh - y - ñ̃ - kay̯t
 6 ? 7 stem
 3pS pl adj 'be heavy'
- (g) transitional aspect
 - transitional aspect is indicated by position 7 /i/

¹⁵ It is possible that the position 7 prefix in this form is /n/ and not /ñ̃/.

(223) dema ne⁷i⁷ʔàʔ '3sS woke mother up'
 = d - ma ne - i - n - ʔàʔ
 refl 'mother' 1 7 9 stem
 adv der mode 'wake up O'

(h) "talking"

- "talking" is indicated by position 7 /ch/. Notice that there is possible metathesis between position 6 /ts'/ and position 7 /ch/ (i.e. metathesis occurs in (224) but not in (225)). The only prefixes which may metathesize are /ts'/, /gh/ and /ch/; any other position 6 or position 7 prefixes never interchange. Metathesis thus seems to be phonologically determined.

(224) ʔesachats'at'às '1pS talked to each other'
 = ʔ - e - sa - ch - ts' - d - ʔàs
 0 0 2 7 6 11 stem
 recip pp inc stm der 1pS cl 'talk'

(225) dlòwets'echedi '1pS told a joke'
 = dlòwe - ts' - ch - d - di
 2 6 7 11 stem
 inc stm 1pS der cl 'talk'

1.6.2 Discontinuous dependencies

There are two discontinuous dependencies to mention involving position 7. First, certain position 7 derivational prefixes choose the conjugation prefix in position 8 in forms lacking both thematic prefixes and prefixes in positions 4 or 1. This very specific dependency is one of the facts in support of the underlying verb structure proposed in Chapter 3.

The second dependency is that position 4 distributive may choose the presence of position 7 /l/. An example is given below; (226) and (227) show that non-distributive forms of the verb 'to smoke' do not require /l/. (228) shows that /l/ is required in the distributive form.

- (226) ?ət'òt '3sS smokes'
 = ? - t'òt
 5 stem
 unsp 0 'smoke'
- (227) ?əghət'òt '3pS smoke'
 = ? - gh - t'òt
 5 6 stem
 unsp 0 3pS 'smoke'
- (228) dene dā?ət'òdizò 'each of the men always smokes'
 = 'men' dā - i - t'òt + izò
 4 7 stem customary
 distr der 'smoke'

One analysis which this dependency suggests is that position 4 distributive is added to the verb before position 7; that is, the "chooser" prefix is added before the "chosen" prefix. (See Chapter 3 for further discussion of prefix choosing.)

1.6.3 Phonological Manifestations

There are ten prefixes which may occur in position 7. They are listed in (229).

- (229) /ts'/ /gh/ /u/ /t/ /z/ /d/ /n/ /ñ/ /l//ch/

In this section, three aspects of the phonology of the prefixes in (229) are discussed. First, the phonological properties distinguishing /n/ and /ñ/ are presented. Secondly, the occurrence of metathesis affecting three of the prefixes is discussed. Thirdly, the syllable position of all ten prefixes is specified.

The prefix /ñ/ is distinguished from /n/ by the diacritic ~ to indicate that /ñ/ exhibits a different phonological patterning from /n/. /ñ/ is a syllable coda which surfaces as nasalization whenever it is preceded by any prefix; in contrast, /n/ never surfaces as nasalization. This difference is exemplified in

(230) - (232). In (230) and (231), /ñ/ is preceded by a prefix and surfaces as nasalization (cf. (218) - (220) where /ñ/ is word-initial and surfaces as a syllable onset. In (232), /n/ is a syllable onset following position 6.

(230) wutsèn dànyəjue 'each of them is thin'
 = wu - tsèn dàná - y - ñ - jue
 'their' 'meat' 4 ? 7 stem
 distr pl adj 'be lacking'

(231) gheyəkəyɿ '3pS are heavy'
 = gh - y - ñ - kəyɿ
 6 ? 7 stem
 3pS pl adj 'be heavy'

(232) k'èghats'emets'ets '1pS stagger around'
 = k'è - gh - ts' - n - ts'ets
 1 7 6 7 stem
 adv der 1pS der 'fall'

The second aspect of position 7 phonology discussed here is metathesis. Position 7 /ch/, /ts'/ and /gh/ are prefixes which metathesize with prefixes in position 6. Metathesis involving position 7 /ch/ is exemplified in (224) and (225). To see metathesis of position 7 /ts'/ and position 6, consider first (192) (a) and (b) in 1.6.1.2. In these forms /ts'/ is a thematic position 7 prefix. Now consider (233).

(233) wats'eghedane '3ps are lonesome'
 = w - ts' - gh - h - dane
 5 7 6 11 stem
 arl 0 thm 3pS cl 'be aloof'

Here, position 6 3pS occurs after position 7 /ts'/. This ordering justifies the breakdown of prefixes in (234).

(234) wats'ts'edane '1pS are lonesome'
 = w - ts' - ts' - h - dane
 5 7 6 11 stem
 ar1 0 thm 1pS cl 'be aloof'

An example of metathesis involving position 7 /gh/ can be seen in the partial paradigm in (197) in 1.6.1.2. In the 1p form, position 6 1pS occurs after position 7 /gh/.

Thus, whenever a pair of prefixes comprising /ts'/, /gh/ and/or /ch/ are juxtaposed, metathesis may occur.

A third aspect of position 7 phonology which needs to be addressed is the ordering of prefixes when more than one prefix occupies position 7 (cf. 193 (c), 195, 196 (a), 198 (a)) for examples of forms where more than one prefix occupies position 7). Hargus (1988) describes the predictable ordering within the position as that given below (these restrictions are also true of HRB).

(235) gh n
 > d > i
 u z

Since ordering of prefixes is predictable on phonological grounds, only one position needs to be posited. (Generally, prefixes are grouped into positions based on function; a prefix sequence is allowed in one position if the sequence is predictable.)

The final phonological property of position 7 which I discuss is syllable position. We can divide the prefixes up in (229) into the following categories. The first category comprises prefixes always surfacing as nuclei; these are /u/ and /i/. The second category comprises prefixes always surfacing as onsets: these are /ts'/, gh/, /t/, /z/, /d/, /n/ and /ch/. The third category is the one prefix which varies between surfacing as onset and coda: /^hn/.

To generalize, we can state that most position 7 consonantal prefixes surface only as onsets. By way of contrast, we have seen that prefixes in positions 8, 9 and 10 may be codas as well as onsets, depending on their environment. In Chapter 4, the differing behaviour of position 7 vs. other conjunct prefixes is explored. The varying syllabification is accounted for using three simple mechanisms: a syllable template, extraprosodicity, and prelinked syllable positions.

1.6.4 Summary charts

Position 7 prefixes

<u>Always onset(O)</u>	<u>Always nucleus</u>	<u>Sometimes O, sometimes coda</u>
/ts'/	/u/	/ñ/
/gh/	/ʌ/	
/ʔ/		
/z/		
/d/		
/ch/		
/n/		

1.7 Deictic Subject (position 6)

1.7.1 Function

Position 6 marks subjects in 1st person plural 'we' (1pS) and 3rd person plural 'they' (3pS). There are two types of 1pS pronoun: an inclusive use where the hearer is included in the reference of "we", and an exclusive use where the hearer is not included in the reference of "we".

1.7.2 Discontinuous dependencies

-none

1.7.3 Phonological Manifestations

1.7.3.1 1pS exclusive

1pS exclusive is /ts'/, always surfacing as [ts'V] (i.e. /ts'/ is always a syllable onset). Examples of /ts'/ can be seen in many of the forms given above, for example (225), (232) and (234).

Recall that position 6 /ts'/ may metathesize with position 7 /gh/, /ch/ and /ts'/ (cf. (197), (234)). (Metathesizing prefixes are placed in different positions because their functions are different.)

1.7.3.2 1pS inclusive

1pS inclusive is /s/, which always surfaces as [sV] (again, /s/ is always an onset). I have few examples of this prefix; one is given below.

(236) nanesenach'i '1pS inclusive customarily sees 2sO'

= na - n - s - n - d - ch'i
 3 5 6 7 11 stem
 cust 2sO 1pS der¹⁶ cl 'see O'

1.7.3.3 3pS

3pS is /gh/. As with all other position 6 prefixes, /gh/ is always a syllable onset. See (231) for an example of /gh/.

As with /ts'/, position 6 /gh/ may metathesize with position 7 /gh/ and /ts'/ (cf. (233)).

1.7.4 Summary charts

<u>Prefix type</u>	<u>Surface form</u>
1pS exclusive	[ts'V]
1pS inclusive	[sV]
3pS	[ghV]

¹⁶ From this point on, I revert to "der" as a general gloss for position 7; "der" was the gloss first used, prior to the distinction discussed in 1.6 between derivational, thematic and adjectival position 7.

Metathesis¹⁷: $\left. \begin{matrix} \{ts'\} \\ \{gh\} \end{matrix} \right\} \left. \begin{matrix} \{ts'\} \\ \{gh\} \\ \{ch\} \\ \{v\} \end{matrix} \right\}$
 position 6 7 \Rightarrow 7 6

1.8 Object (position 5)

1.8.1 Function

1.8.1.1 Description

In this position, six personal direct object morphemes may be marked, as well as areal object, unspecified object, reflexive and reciprocal prefixes. Each of these is discussed in turn.

Personal direct objects are exemplified in 1.8.1.2 (237) - (242).

The areal object prefix is thematic in some verbs, while in other verbs it is used productively to mark an object which is relatively large (i.e. covers a widespread area in space) or an event described in the verb which occurs over a relatively large area. Examples are given in (243) - (246). (243) has (a) and (b) forms; in (a), the object is 'shoes', and position 5 areal is absent, whereas in (b) the object is 'a house' and position 5 areal is present.

The unspecified object is thematic in some verbs. An unspecified object must be marked on all transitive verbs which do not have a specified object within the sentence. An example is given in (247)

The reflexive object is used to indicate objects which refer to the same person as the subject. An example is given in (248).

The reciprocal object prefix indicates an object meaning "each other". Examples are given in (249) and (250).

¹⁷ See Hargus (1988) for discussion of metathesis in Sekani; the Sekani facts parallel the HRB facts.

1.8.1.2 Examples

- Personal Direct Objects

(237) '2sS wants to see 1sO'	sawo [?] èe
(238) '3sS saw 2sO again'	nanach [?] ì
(239) '3sS killed 3sO'	yazèxì
(240) '3pS wants to rub 1pO with medicine'	xaghawutiaghè yù [?] e
(241) '1sS carries 2pO uphill'	tanaxas [?] te
(242) '1pS sees 3pO customarily'	nawuts [?] ach [?] ì

-Areal Objects

(243) a. '2sS gave shoes to 1sO'	ke sànj [?]
b. 2sS gave a house to 1sO'	kwò sàwànj [?] ò
(244) '1sS rubs back against large O' (e.g. chair)	sədzo jewas [?] a
(245) 'dog digs a hole'	tìeza kàwats [?] ets
(246) '3sS wants to rub area'	wawetfaghè wawutfaghè wutfaghè

- Unspecified Object

(247) '1sS steals O'	[?] enas [?] ì
----------------------	----------------------------------

- Reflexive Object

(248) '3sS licks himself'	[?] edats [?] e
---------------------------	-----------------------------------

- Reciprocal Object

(249) '1pS scratched each other'	kàfats [?] ats [?] et
----------------------------------	---

1.8.2 Discontinuous dependencies

The only discontinuous dependency involving position 5 is that the reflexive and reciprocal prefixes must co-occur with /d/ classifier.

1.8.3 Phonological Manifestations

The 1sO prefix is /s/, which always surfaces as syllable onset. If preceding a vocalic prefix, 1sO is [s], as shown in (250) - (251).

(250) nesìʔàʔ '3sS wakes up 1sO'
 = ne - s - i - ʔàʔ
 1 5 7 stem
 adv 1sO der 'wake up O'

(251) suʔes '3sS kicked 1sO'
 = s - u - ʔes
 5 7 stem
 1sO der 'kick O'

In all other cases, /s/ surfaces as [sV] where V is epenthetic. Examples are given below.

(252) kanàsetsʔat '3sS pinched 1sO'
 = ka - nà - s - i - tsʔat
 1 1 5 11 stem
 adv adv 1sO cl 'pinch O'

(253) səwəʔə̀e '2sS see 1sO' (Optative)
 = s - w - n - ʔə̀ + e
 5 9 10 stem optative
 1sO mode 2sS 'see O'

(254) ʔònèsadéchi '3sO sent away 1sO'
 = ʔònè - s - d - `s - n - h - chi
 1 5 7 8 9 11 stem
 adv 1sO der cnj mode cl 'handle animate O'

(255) kàràsəghats'ət '3pS pinched 1s0'
 = kà - nà - s - gh - 1 - ts'ət
 1 1 5 6 11 stem
 adv adv 1s0 3p0 cl 'pinch 0'

(256) dənə seʔa '3sS hires 1s0'
 = 'man' s - h - ʔa
 5 11 stem
 1s0 cl 'hire?'

(257) tàsəsichì '2sS carries up 1s0'
 = tà - s - `s - n - h - chì
 1 5 8 10 11 stem
 adv 1s0 cnj 2sS cl 'handle animate 0'

Notice especially (256) and (257). (256) shows that 1s0 /s/ surfaces as [se] before /h/ classifier, just as other conjunct prefixes have the vowel [e] before /h/ classifier. (257) shows that the low tone of conjugation prefixes such as [s] spreads to the 1s0 syllable. However, notice that the vowel is [ə] and not [e].

The 2s0 prefix is /n/, which always surfaces as a syllable onset. If preceding a vocalic prefix, 2s0 is [n] as shown in (258).

(258) tanuschee '1sS carries up 2s0' (Optative)
 = ta - n - w - s - h - che + e
 1 5 9 10 11 stem optative
 adv 2s0 mode 1sS cl 'handle animate 0'

In all other cases, /n/ surfaces as a syllable onset, as seen below.

(259) nanəch'ì '3sS saw 2s0 again'
 = na - n - d - ch'ì
 3 5 11 stem
 rev 2s0 cl 'see 0'

(260) nanəsch'i '1sS sees 2sO again'

= na - n - s - d - ch'i
 3 5 10 11 stem
 rev 2sO 1sS cl 'see O'

(261) tanəsəsch'i '1sS carries up 2sO

= ta - n - `s - s - h - ch'i
 1 5 8 10 11 stem
 adv 2sO cnj 1sS cl 'handle animate O'

(262) nanəesch'i '1sS saw 3sO again'

= na - n - `s - s - d - ch'i
 3 5 8 10 11 stem
 rev 2sO cnj 1sS cl 'see O'

(263) chenənich'i '1sS threw 2sO into water'

= che - n - `n - n - s - h - ch'i
 1 5 8 9 10 11 stem
 adv 2sO cnj mode 1sS cl 'handle animate O'

(264) nanats'əch'i '1pS sees 2sO customarily'

= na - n - ts' - d - ch'i
 3 5 6 11 stem
 cust 2sO 1pS cl 'see O'

Notice especially (261), (262) and (263). (261) and (263) show that the tone of conjugation prefixes spreads on to the position 5 syllable. (262) is unusual in that position 5 /n/ behaves as if it were a position 7 prefix, in that the [s] of the conjugation prefix is lost and tone placement co-occurs with the raising of [a] to [e]. Excepting (262), the pattern of position 5 prefixes seems to be the retention of conjugation and [s/n] and low tone on [a], not [e].

When the subject of a verb having 3sO is 1s, 2s, 1p or 2p, 3sO is a /Ø/ morpheme. Examples are given below.

- (265) usʔes '1sS kicked 3sO'
 = u - s - ʔes
 7 10 stem
 der 1sS 'kick O'
- (266) nàdèechì '1sS puts down 3sO'
 = nà - d - `s - n - s - h - chì
 1 7 8 9 10 11 stem
 adv der cnj mode 1sS cl 'handle animate O'

When 3sS or 3pS forms have a 3sO or a 3pO, then /y/ is found in position 5. This prefix has traditional labels like "4th person Object" and "3rd person obviative". In Saxon (1986), this prefix is called a "disjoint anaphor", meaning that it is syntactically like a reflexive anaphor with respect to c-command properties, but it is semantically unlike other anaphors because it cannot be coreferential with its c-commanding NP; its reference must be disjoint from its c-commander/binder (see Saxon 1986 for a detailed discussion).

Examples are given below.

- (267) yezèxì '3sS killed 3sO'
 = y - z - `s - n - h - xì
 5 7 8 9 11 stem
 4 O der cnj mode cl 'kill O'
- (268) tàyèdacheʔe '3sS carries up 3sO' (Future)
 = tà - y - d - gh - h - che + ʔe
 1 5 7 9 11 stem future
 adv 4 O mode mode cl 'handle animate O'

The 1pO prefix is /x/. An example is given in (269).

- (269) xəghewutleghè yù?e '3pS rubs 1pO with medecine' (Optative)
 = x - gh - w - w - h - tlegh + è yù - ?e
 5 6 5 9 11 stem opt.
 1pO 3pS arl mode cl 'rub O' 'medecine' - pp

The 2pO prefix is /nx/. The vowel which surfaces between /n/ and /x/ is always [a]. See Chapter 4 for a discussion of the derivation of 2pO forms.

Examples of 2pO are given below.

- (270) tanaxastè '1sS carries 2pO uphill'
 = ta - nx - gh - s - le
 1 5 8 10 stem
 adv 2pO cnj 1sS 'handle pl. O'

- (271) tanaxale '3sS carries 2pO uphill'
 = ta - nx - gh - le
 1 5 8 stem
 adv 2pO cnj 'handle pl. O'

- (272) naxədesdli '1sS fights 2pO'
 = nx - d - s - dli
 5 7 10 stem
 2pO der 1sS 'fight O'

The 3pO prefix is /wu/.¹⁸ It differs from a similar prefix, /w/ (position 9 mode, position 5 areal object) in the following way: /wu/ invariably surfaces as [wu], while /w/ may surface as either [wV] or [u] depending on its environment; when /w/ surfaces as [wV], the vowel is [ə], [e] or [a], but not [u].¹⁹ Compare

¹⁸ The underlying representation for 3pO is more accurately /w + empty timing unit/; the rounding of the vowel nucleus can be derived by spreading from the onset /w/. I represent this prefix as /wu/ in the text to distinguish it from /w/ (position 9 mode, position 5 areal object); the vowel in [wV] forms originating from /w/ is derived by epenthesis (see Chapter 4 for discussion).

¹⁹ An exceptional case is that in (277), where an optional variant of the given form includes surface [wu] from underlying /w/, following another /w/ prefix.

(243 b) with (273) to see the different surface forms of /w/ and /wu/ in the same environment (between a disjunct prefix and /n/ conjugation): /w/ surfaces as [wə] and /wu/ surfaces as [wù].

Two examples of 3p0 are given below.

(273) ts'ewùnasʔàʔ '1sS wakes up 3p0'
 = ts'e - wu - 'n - s - ʔàʔ
 1 5 8 10 stem
 adv 3p0 cnj 1sS 'wake up 0'

(274) nawuts'əch'i '1pS sees 3p0 customarily'
 = na - wu - ts' - d - ch'i
 3 5 6 11 stem
 cust 3p0 1pS cl 'see 0'

The areal object prefix surfaces as [w(V)] immediately before a consonantal prefix. Examples are given below.

(275) sádzə jewasʔa '1sS rubs back against large 0' (e.g. chair)
 = s - dzə je - w - s - ʔa
 'my' 'back' 1 5 10 stem
 adv arl 0 1sS 'handle 3D 0'

(276) tʔəza kàwəts'ets 'dog digs a hole'
 = 'dog' kà - w - ts'ets
 1 5 stem
 adv arl 0 '?'

Before optative mode, which itself varies between surfacing as consonantal onset [w] and vocalic nucleus [u], areal object surfaces as either [wV] (before [w] optative) or [w] (before [u] optative). An example is given below.

- (277) $\left. \begin{array}{l} \text{wawetʰaghè} \\ \text{wawutʰaghè} \\ \text{wutʰaghè} \end{array} \right\}$ '3sS rubs area' (Optative)
- = w - w - h - tʰagh + è
 5 9 11 stem optative
 arl mode cl 'rub O'

The unspecified object prefix is [ʔ]. An example is given below.

- (278) ʔanesʔi '1sS steals O'
- = ʔ - n - s - ʔi
 5 7 10 stem
 unsp O der 1sS 'steal O'

The reflexive prefix is /ʔd/, with epenthesis operating to complete syllable structure (as explained in Chapter 4), it surfaces as [ʔəd(V)]. Examples of reflexive are given in (279)–(280). As pointed out in 1.8.2, reflexive co-occurs with /d/ classifier; therefore, reflexive forms show the /d/-effect (cf. 1.2.3.1, (33)). An example where /ʔd/ clearly takes /d/ classifier is given in (279).

- (279) nàʔədədatʰets '3sS kicks himself'
- = nà - ʔd - d - d - ʰets
 1 5 7 11 stem
 adv refl O der cl 'kick O'
- (280) ʔadatsʰe '3sS licks himself'
- = ʔd - d - tsʰe
 5 11 stem
 refl O cl 'lick O'

Finally, the reciprocal prefix is /t/, which always surfaces as a syllable onset. Examples are given below.

(281) kàtəts'ats'at '1pS scratched each other'
 = kà - t - ts' - gh - d - ts'at
 1 5 6 8 11 stem
 adv recip 1pS cnj cl 'scratch O'

(282) təghakw'əts '3pS kiss each other'
 = t - gh - kw'əts
 5 6 stem
 recip 3pS 'kiss O'

1.8.4 Summary charts

Position 5 Prefix types

(1) Personal pronouns: 1sO = /s/ -> [s V]

∇
6

2sO = /n/ -> [n V]

∇
6

3sO = /Ø/

4O = /y/ -> [y V]

∇
6

1pO = /x/ -> [x V]

∇
6

2pO = /nɤ/ -> [n a x V]

∇ ∇
6 6

3pO = /wV/ -> [w u]

∇
6

(2) Areal object = /w/ -> [w V]

∇
6

- (3) Unspecified object = /ʔ/ → [ʔ V]
 ∨
 6
- (4) Reflexive object = /ʔd/ → [ʔ ə d V]
 ∨ ∨
 6 6
- (5) Reciprocal object = /t/ → [t V]
 ∨
 6

The main property to note about these prefixes which is of significance in Chapter 4 is that the initial consonant of these prefixes always occupies an onset position. This property is significant with regards to the prefixes 1s0 /s/ and 2s0 /n/, since other prefixes having the same or similar phonological shape (e.g. position 8 /s/-conjugation, position 8 /n/-conjugation, position 10 /s/, position 10 /n/) are not always syllable onsets; in most cases they vary between syllable onset and coda. The consistency of onset assignment to a position 5 prefix relates to the fact that prefix position 5 defines the left edge of the conjunct domain. In Chapter 4 I propose that one of the levels of syllabification is restricted to the conjunct domain; it is therefore expected that prefixes at the beginning of this domain will also constitute the beginning of syllables.

1.9 Distributive

1.9.1 Function

The distributive morpheme expresses a variety of plural modifications to verb meaning. The table in (283) gives examples of the different functions of the distributive morpheme.

(283) Distributive meanings

- (i) marks actions performed separately or sequentially
- | | |
|-------------|----------------------------|
| nàdànatrich | '(planes) land separately' |
| dàdaze | '3sS yelled over and over' |
- (ii) marks events occurring in a number of locations
- | | |
|--------------|----------------------------------|
| yadàghastwan | '1sS put objects here and there' |
| dàʔanaʔe | '3sS steals all over' |
- (iii) marks action performed by a number of agents (as individuals)
- | | |
|-----------|------------------|
| dàghedize | '3pS each shout' |
| dàghedijè | '3pS each talk' |
- (iv) marks action performed on a number of objects
- | | |
|-------------------------|----------------------------|
| ga dānādēech'il | '1sS skinned many rabbits' |
| tɛzayadza chedàghaghale | '3pS sank many puppies' |

1.9.2 Discontinuous dependencies

Depending on the verb theme, distributive may choose two other prefix types, both of which are more internal to the verb than position 4 (cf. Kari 1976, Young & Morgan 1980, Rice 1989b). First, distributive may alter the conjugation prefix otherwise chosen by certain verb themes. The exact conditions under which conjugation marker is altered are described in Chapter 3. Examples of conjugation shift are given in (284) - (285).

(284) $\emptyset \rightarrow /s/$

- (a) xada ughech'u 'he shoots a moose'
- = 'moose' u - gh - h - ch'u
- 7 7 11 stem
- der der cl 'shoot O'

(b) wəɖɛ dəʔughèch'u 'he shoots many caribou'
 = 'caribou' dà - u - gh - 's - h - ch'u
 4 7 7 8 11 stem
 distr der der cnj cl 'shoot O'

(285) Ø → /n/

(a) ʔəghatɪ'u 'they knitted O'
 = ʔ - gh - tɪ'u
 5 6 stem
 unsp O 3pS 'tie up O'

(b) dànàghənətɪ'u 'they each knitted O'
 = dànà - gh - 'n - tɪ'u
 4 6 8 stem
 distr 3pS cnj 'tie up O'

Secondly, distributive may necessitate the inclusion of position 7 /i/ transitional in certain verb themes. The addition of /i/ in distributive forms is illustrated in (286).

(286) Ø → /i/

(a) dəjè 'he is sick'
 = d - jè
 7 stem
 der 'be sick'

(b) sats'ədawa yàdàdijè 'many of my children are sick'
 = s - ts'ədawa yàdà - d - i - jè
 'my' 'children' 4 7 7 stem
 distr der der 'be sick'

1.9.3 Phonological Manifestations

I have found a total of 10 variations of the distributive morpheme in my HRB data. They are listed below with examples.

- (a) dà tʃezayadza chedàghaghale '3pS sank many puppies'
 = tʃeza - yadza che - dà - gh - gh - le
 'dog' diminutive 1 4 6 7 stem
 adv distr 3pS der 'handle pl. O'
- (b) yàdà sats'èdawa yàdàdijè 'many of my children are sick'
 = s - ts'èdawa yàdà - d - i - jè
 'my' 'children' 4 7 7 stem
 distr der der 'be sick'
- (c) dānà nānadānāghədəya '3pS stand around again'
 = nà - na - dānà - gh - d - `s - l - ya
 1 3 4 6 7 8 11 stem
 adv rev distr 3pS der cnj cl 'stand'
- (d) yà yàdijè 'many are sick'
 = yà - d - i - jè
 4 7 7 stem
 distr der der 'be sick'
- (e) nà sats'at yanāghatòn 'each of my dishes broke'
 = s - ts'at ya - nà - gh - tòn
 'my' 'dishes' 1 4 6 stem
 adv distr 3pS 'break O'
- (f) dṛnà dṛnāghatsəgh '3pS each cried'
 = dṛnà - gh - tsəgh
 4 6 stem
 distr 3pS 'cry'
- (g) dṛ k'èdṛghədè '3pS walk separately'
 = k'è - dṛ - gh - dè
 1 4 6 stem
 adv distr 3pS 'motion'
- (h) dṛṇò yadṛṇòghatòn '3sS put pl O here and there'
 = ya - dṛṇò - gh - tòn
 1 4 7 stem
 adv distr der 'handle O'

The second type of /na/ prefix is reversative, and is used to express the notion of performing an action "back" or "again". Examples of /na/ reversative (/“again”) are given in (289) - (292).

1.10.1.2 Examples

- Customary

(287) ts'odze naischuch '1sS always catches flies'

= 'flies' na - i - s - chut + ch
 3 7 10 stem cust.
 cust der 1sS 'handle O'

(288) yànasasja '1sS always swims across'

= yà - na - `s - s - d - ya
 1 3 8 10 11 stem
 adv cust cnj 1sS cl 'motion'

- Reversative

(289) nanaschush '1sS gives back cloth-like O'

= na - `n - s - h - tsus
 3 8 10 11 stem
 rev cnj 1sS cl 'handle cloth-like O'

(290) k'aju ʔɛdananàdèest'a '1sS cashes 3pO's check again'

= 'again' ʔɛda - na - nà - d - `s - s - d - 'a
 1 3 4 7 8 10 11 stem
 adv rev distr der cnj 1sS cl 'handle 3D O'

(291) dagwòt k'ènasda '3sS squatted again'

= d - gwòt k'è - na - `s - d - da
 refl 'knees' 0 3 8 11 stem
 pp rev cnj cl 'sit'

(292) ts'enadzadzizɔ '3sS wakes up repeatedly'

= ts'e - na - d - zadz + izɔ
 1 3 11 stem durative
 adv cust cl 'wake up'

1.10.2 Discontinuous dependencies

Both types of /na/ prefix co-occur with /d/ classifier.

1.10.3 Phonological manifestations

/na/ is often phonetically transparent, surfacing as [na]. This is seen in all of the examples in 1.10.1.2.

When /na/ is preceded by a position 1 prefix having the shape /Ca/ the expected [Cana] sequence has the optional variants [Cɔna] and [Cɔ]. Examples are given below. The (a) forms do not have /na/ while the (b) forms show the effect of /na/.

- (293)(a) *tasaya* '3sS went uphill'
 = ta - `s - ya
 1 8 stem
 adv cnj 'motion'
- (b) *tɔnasja* '3sS went back uphill'
 = ta - na - `s - ya
 1 3 8 stem
 adv rev cnj 'motion'
- (294)(a) *ts'at t'àtsiʔɔ* '3sS put hat on his head'
 = ts'at t'à - tsi - ʔɔ
 'hat' 0 2 stem
 pp. inc. stem 'handle 3D 0'
- (b) *ts'at t'òtsit'ɔ* '3sS put hat on his head again'
 = ts'at t'à - na - tsi - d - ʔɔ
 'hat' 0 3 2 11 stem
 pp rev inc. stem cl 'handle 3D 0'
- (295)(a) *kàdèeya* '1sS went outside'
 = kà - d - `s - s - ya
 1 7 8 10 stem
 adv der cnj 1sS 'motion'

- (b) kòdéesja '1sS went outside again'
 = kà - na - d - 's - s - d - ya
 1 3 7 8 10 11 stem
 adv rev der cnj 1sS cl 'motion'

/na/ precedes the distributive prefix in HRB. In both Sekani (Hargus 1988) and Slave (Rice 1989b), distributive may be underlyingly followed by /na/ customary/reversative. In fact, in Slave, /na/ customary/reversative must follow distributive in surface representation. However, in HRB distributives the [nà] following [dà] is definitely not /na/ customary/reversative. For one thing, the [nà] in [dàna] is marked with low tone in contrast with the tonally unmarked [na] meaning customary/reversative. Secondly, in distributive forms with customary/reversative meaning, /na/ may co-occur with [dàna] and /na/ is always found to the left of [dàna]. Examples are given in (296).

- (296) (a) nànadànàghedèya '3pS stand around again'
 = nà - na - dàna - gh - d - 's - l - ya
 1 3 4 6 7 8 11 stem
 adv rev distr 3pS der cnj cl 'stand'
- (b) yanadànàghèghèsyits 'each glass broke again'
 = ya - na - dàna - gh - gh - 's - l - yits
 1 3 4 6 7 8 11 stem
 adv rev distr 3pS der cnj cl 'break O'

1.10.4 Summary Charts

Position:	1	3	11
a.	/Ø/	+	/na/
	\ /		
	[na]		
b.	/Ca/	+	/na/
	\ /		
	Cana		
	Cɔna		
	Cɔ		

1.11 Incorporated Stem (position 2)

1.11.1 Function

Incorporated stems are stems which are often (but not always) free stems in the language, incorporated into position 2 of the verb. In this position, they function as either arguments of the verb or as adverbials. In 1.11.3, I present evidence showing that the incorporated stem position, even when occupied by a prefix functioning as an adverbial, is distinct from position 1 adverbial.

An example of a stem found as both incorporated (position 2) and as a free verb stem is given in (297).

(297) Incorporated = /nji/ ²⁰ :	yɔʔy|ich'ɨ	'3sS thought about 3sO'
'mind'	= y - ghɔ - nji - ch'ɨ	
	0 0 2 stem	
	inc pp inc stm	'think about O'

²⁰ The onset of the stem in (297) includes a nasal element as well as /j/, and the stem is therefore represented as /nji/. Evidence for the nasal element is seen in the form meaning '2sS got off track in your thinking', where /j/ is preceded by a nasalized vowel. This nasal element does not surface when the stem is a free verb stem, as in the form for '1sS remembered'.

k'èʔjinedzats '2sS got off track in your
 thinking'
 = k'è - ʔ - nji - n - d - zats
 1 2 2 10 11 stem
 adv unsp S inc stm 2sS cl ?

Free verb stem = /nji/ ʔədawasji '1sS remembered'
 = ʔ - da - w - s - d/1 - nji
 unsp 0 0 5 10 11 stem
 inc pp arl 0 1sS cl 'mind'

1.11.2. Discontinuous dependencies

When an incorporated stem is functioning as an adverbial, it may have the same discontinuous dependencies as position 1 adverbial; these dependencies are discussed in 1.12.2.

1.11.3. Phonological Manifestations

Incorporated stems are generally phonetically transparent, as the examples below show. There are specific phonological clues which indicate incorporation. First, if the stem is preceded by an adverb, it is necessarily incorporated, since it is within the prefix complex. Examples are given below.

(298) /nji/ k'èʔjinedzats '2sS got off track in your thinking'
 'mind' = k'è - ʔ - nji - n - d - zats
 1 2 2 10 11 stem
 adv unsp S inc stm 2sS cl ?

(299) /gwòt': jegwòtsiʔ '1sS bumped knee'
 'knee' = je - gwòt - 's - n - ʔ
 1 2 8 9 stem
 adv inc stm cnj mode 'handle 3D O'

(300) /chu/: nichudesxal '1sS washes O'
 'water' = ni - chu - d - s - h - xal
 1 2 7 10 11 stem
 adv inc stm der 1sS cl 'wash O'

- (301) /sa/ nàṣṣədəṣt'a 'sun goes down' (customary)
 'sun' = nà - sa - na - d - d - d - ʔa
 1 2 3 7 7 11 stem
 adv inc stm cust der der cl 'handle 3D 0'
- (302) /ke/ k'èkeesdzos '1sS slid around on feet'
 'feet' = k'è - ke - gh - s - d - zos
 1 2 8 10 11 stem
 adv inc stm cnj 1sS cl 'slide'
- (303) /t'à/ k'èt'ádədà '3sS is squatting'
 'rear end' = k'è - t'à - d - d - dà
 1 2 7 11 stem
 adv inc stm der cl 'sit'

Another indication of incorporation is the lack of final glottal stop in nouns which end with a low-toned vowel. For example, notice in (304) that there is no glottal stop between positions 2 and 11. However, when the noun /tsi/ is unincorporated, it is inalienably possessed and ends with a glottal stop: [sətsiʔ], 'my head'.

- (304) /tsi/: ts'at t'òtsit'ò '3sS put hat on his head again'
 'head' = ts'at t'à - na - tsi - d - ʔò
 'hat' 0 3 2 11 stem
 pp rev inc. stem cl 'handle 3D 0'

Another phonological property is that all continuant-initial incorporated stems are voiceless, as seen in (301), as well as in the form below.

- (305) /za/: řesachade '2pS talk to each other'
 'mouth' = ř - e - za - ch - a - de
 0 0 2 7 10 stem
 inc pp inc stm der 2pS 'talk'

A phonological property of incorporated verb stems is that they are suffixed with [-e]. They are usually found in motion themes and usually occur

with /d/ in position 7 because they have to do with oral activities. Examples are given below.

- (306) /dlòw/: medlòwechasda '1sS told a joke to 3s0'
 'laugh' = m - e - dlòwe - ch - s - d - da
 3s0 0 2 7 10 11 stem
 inc pp inc stm der 1sS cl 'talk'
- (307) /tsəgh/: nàtsəghedəzat '3sS stands crying'
 'cry' = nà - tsəghe - d - zat
 1 2 7 stem
 adv inc stm der 'stand'
- (308) /bət/: k'èbèdedəsà '1sS walks around eating'
 'be hungry' = k'è - bəde - d - s - à
 1 2 7 10 stem
 adv inc stm der 1sS 'motion'
- (309) /səl/: k'èsələdət'è '3sS runs around yelling'
 'yell' = k'è - sələ - d - l - t'è
 1 2 7 11 stem
 adv inc stm der cl 'run'

There is one more phonological characteristic of incorporated stems to discuss: the sequencing of position 3 /na/ and position 2. The sequencing of /na/ and incorporated stems freely varies between: stem-/na/ and /na/-stem. Examples are given below.

- (310) a) jegwòtnadànəghəst'ə '3pS bumped their knees again'
 = jə - gwòt - na - dənà - gh - 's - d - 'ə
 1 2 3 4 6 8 11 stem
 adv inc stm rev distr 3pS cnj cl 'handle 3D O'
- b) jenəgwòtnəghəst'ə
 = jə - na - gwòt - nà - gh - 's - d - 'ə
 1 3 2 4 6 8 11 stem
 adv rev inc stm distr 3pS cnj cl 'handle O'

- (311) a) nàsodədat'a 'slush goes down' (customary)
 = nà - sa - na - d - d - d - ?a
 1 2 3 7 7 11 stem
 adv inc stm cust der der cl 'handle 3D O'
- b) nòsədədat'a
 = nà - na - sa - d - d - d - ?a
 1 3 2 7 7 11 stem
 adv cust inc stm der der cl 'handle 3D O'
- (312) a) k'èsalenadət'i'e '3sS is yelling and running again'
 = k'è - sa - na - d - l - t'i'e
 1 2 3 7 11 stem
 adv inc stm rev der cl 'run'
- b) k'ènasələdət'i'e
 = k'è - na - sa - d - l - t'i'e
 1 3 2 7 11 stem
 adv rev inc stm der cl 'run'
- (313) a) k'èʔizenadəda '3sS walked around in slush again'
 = k'è - ?ize - na - d - d - da
 1 2 3 7 11 stem
 adv inc stm rev der cl 'motion'
 'slush'
- b) k'ènaʔizedəda
 = k'è - na - ?ize - d - d - da
 1 3 2 7 11 stem
 adv rev inc stm der cl 'motion'

The above cases are different from the "metathesis" cases in positions 6 and 7 in that metathesis is limited to prefixes having the phonological shapes /ts'/, /gh/ and /ch/. The free variation in ordering of positions 2 and 3 appears to apply to any position 2 or 3 prefix.

1.1.4 Summary charts

Phonological differences between unincorporated and incorporated stems

The chart below outlines three phonological differences between unincorporated and incorporated stems which were discussed in 1.1.1.3. (1) indicates that unincorporated stems end with glottal stop, while incorporated stems have no final glottal stop. (2) shows that continuants which begin stems are more likely to be voiceless when the stem is incorporated.²¹ (3) encodes the fact that incorporated stems which are verbs are always suffixed with [-e].

	<u>Unincorporated stem</u>	<u>Incorporated stem</u>
(1)	if [CVʔ]	then [CV] (no glottal stop)
(2)	if [C V...] | [+cont]	then [C V...] (stem-initial continuants | voiceless) [+cont] [-vd]
(3)	if [CVC] [+verb]	then [CVC-e] (verb stems suffixed [+verb] with [-e])

The free ordering between positions 2 and 3 is discussed in Chapter 3. Note that prefixes in these positions are the only disjunct prefixes which are not conjugation choosers. It is argued in Chapter 3 that this fact is relevant to an account of the free relative ordering of these prefixes.

²¹ Continuants in both unincorporated and incorporated stems are voiceless in word-initial position and voiced when they follow another morpheme such as a possessive prefix. Since incorporated stems are generally not preceded by a possessive prefix, they are more likely to surface with voiceless continuants than unincorporated stems, which are often preceded by another morpheme. See Rice (1988b) for details in Slave (where the facts are essentially identical).

1.12 Adverb (position 1)

1.12.1 Function

Position 1 adverb falls into the same category as position 7 der/thm and position 11 classifier in that some adverbs are thematic, while others are derivationally productive. Position 1 also groups with positions 4 and 7 in choosing a conjugation set in certain forms. In 1.12.2 this property is exemplified.

1.12.2 Discontinuous dependencies

Many adverbial prefixes co-occur with a position 7 derivational prefix. Also, many adverbials choose a specific conjugation set, i.e. the conjugation prefix occurring in each mode of a verb with certain adverbials is chosen by the adverbial. In (314)-(324) I give a partial list of HRB adverbial prefixes. In the first column, the adverbial is given along with its general meaning if it is known (in some cases, I am not sure of the meaning and thus leave this area blank). In the second column the conjugation set, if any, co-occurring with that adverbial is given, while in the third column an example form is given.

(314) /ʔa/ /Ø, gh, Ø/ [apples] ʔaghila '3sS took apples home'
 = ʔa - gh - n - la
 1 8 9 stem
 adv cnj mode 'handle pl. O'

(315) /che/ /n, `n, `n/ tʔeza chenichi 'I threw dog into river'
 'water' = 'dog' che - `n - n - s - chi
 1 8 9 10 stem
 adv cnj mode 1sS 'handle animate O'

(316) /dà/ /s, `s, `s/ ʔatsàn dāsila '1sS hung up meat'
 'up' = 'meat' dà - `s - n - s - la
 1 8 9 10 stem
 adv cnj mode 1sS 'handle pl. O'

- (317) /da+gh/ /Ø, `s, Ø/ tɛcho daghèstl'u '3sS tied up horse'
 7 = 'horse' da - gh - `s - tl'u
 der 1 7 8 stem
 'move quickly with adv der cnj 'tie up O'
 hands'
- (318) /je/ /s, `s, `s/ sagwòt jesiʔo '1sS bumped knee'
 = s - gwòt je - `s - n - s - ʔo
 'my' 'knee' 1 8 9 10 stem
 adv cnj mode 1sS 'handle 3D O'
- (319) /jè+d/ /Ø, gh, Ø/ jedixe jèdijʔèts '3sS kicked box into fire'
 7 = 'box' jè - d - gh - n - ʔèts
 der 1 7 8 9 stem
 'fire' adv der cnj mode 'kick O'
- (320) /jeta/²² /n, `n, `n/ jetaniʔa '2sS is hiding'
 = jeta - `n - n - ʔa
 1 8 10 stem
 adv cnj 2sS 'handle 3D O'
- (321) /k'è/ /Ø, gh, Ø/ k'èghasgwoch '1sS crawled around'
 'around' = k'è - gh - s - d - gwoch
 1 8 10 11 stem
 adv cnj 1sS cl 'crawl'
- (322) /ka/ /Ø, gh, Ø/ kaʔəghasdlò '1sS burst out laughing'
 'out' = ka - ʔ - gh - s - d - dlò
 1 5 8 10 11 stem
 adv unsp O cnj 1sS cl 'laugh'

²² The adverb in (320) is either /jeta/ or /je+ta/, where both parts are position 1 adverb.

- (323) /ʔak'e+n/ /Ø, gh, Ø/ ʔak'enànich'il '2sS is ripping cloth'
 7 = ʔak'e - nà - n - n - ch'il
 'into pieces' 1 4 7 10 stem
 adv distr der 2sS 'break O'
- (324) /ʔawo/ /Ø, gh, Ø/ ʔawòghat'al 'plane passed by'
 = ʔawò - gh - d - ʔal
 1 8 11 stem
 adv cnj cl 'motion?'
- (325) /ʔè/ /Ø, 's, Ø/ dasuneya ʔèsàʔø '3sS saved his money'
 'gather' = d - suneya ʔè - 's - ʔø
 'his' 'money' 1 8 stem
 adv cnj 'handle 3D O'
- (326) /ʔe+nè/²³ /n, 'n, 'n/ ʔenènija 'it stopped growing'
 1 = ʔe - nè - 'n - n - ya
 adv 1 1 8 9 stem
 'stop' adv adv cnj mode 'grow'
- (327) /mà/ /s, 's, 's/ màts'edètsi '1pS sat in circle'
 'circle' = mà - ts' - d - 's - tsi
 1 6 7 8 stem
 adv 1pS der cnj 'pl. sit'
- (328) /nà/ /Ø, gh, Ø/ yas nàghats'at 'snow fell'
 'down' = 'snow' nà - gh - d - ts'at
 1 8 11 stem
 adv cnj cl 'fall'

²³ The adverb in (326) may consist of a single morpheme, or of two morphemes, as I have indicated in the text. I choose two morphemes in this case because of the existence of the adverb /nè/ which means "terminative" and which also chooses the conjugation set /n, 'n, 'n/. I suggest that this adverb is included in (326).

- (329) /nà/ /Ø, `s, Ø/ nànaʔiʔ '3sS hides'
 continuative = nà - n - ʔiʔ
 1 7 stem
 adv der 'hide'
- (330) /son/ /Ø, `s, Ø/ soṣayà '3sS walked in circle'
 'circle' = so - `s - yà
 1 8 stem
 adv cnj 'sg. go'
- (331) /ta/ /Ø, gh, Ø/ desaʔò taghiʔo '3sS lost button'
 'lost' = 'button' ta - gh - n - h - ʔo
 1 8 9 11 stem
 adv cnj mode cl 'handle 3D 0'
- (332) /tà/ /Ø, gh, Ø/ tàghitiʔu '1sS knit wrong'
 'wrong' = tà - gh - n - s - tiʔu
 1 8 9 10 stem
 adv cnj mode 1sS 'tie 0'
- (333) /tà/ /`s, `s, `s/ tàsastiʔe '1sS is running uphill
 'up to shore' = tà - `s - s - l - tiʔe to shore'
 1 8 10 11 stem
 adv cnj 1sS cl 'run'
- (334) /ts'e/ /`n, `n, `n/ xəma ts'ets'anìʔàʔ '1pS wake up mother'
 'wake up' = x - ma ts'e - ts' - `n - n - h - ʔàʔ
 'our' 'mother' 1 6 8 9 11 stem
 adv 1pS cnj mode cl 'wake up 0'
- (335) /yà/ /`s, `s, `s/ yànasasja '1sS always swim across'
 'across' = yà - na - `s - s - d - ya
 1 3 8 10 11 stem
 adv cust cnj 1sS cl 'motion'

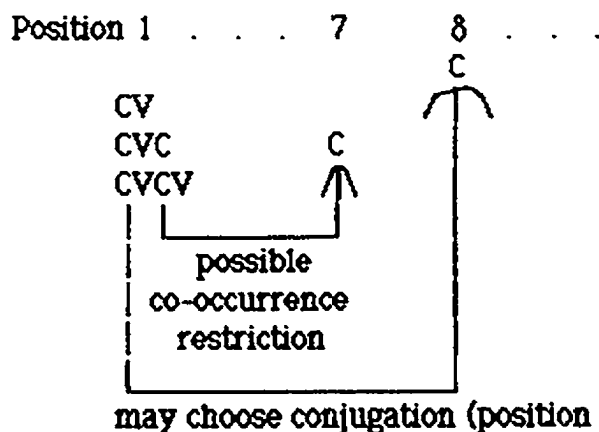
- (336) /ya/ /Ø, gh, Ø/ sats'at yanàghatwòn 'each of my dishes broke'
 'to pieces' = s - ts'at ya - nà - gh - d - twòn
 'my' 'dishes' 1 4 8 11 stem
 adv distr cnj cl 'break'
- (337) /yidà+n/ /Ø, Ø, Ø/ yidànastl'e 'lsS runs inside'
 7 = yidà - n - s - 1 - tl'e
 der 1 7 10 11 stem
 'inside' adv der lsS cl 'run'

1.12.3 Phonological Manifestations

Adverbials have the possible shapes CV, CVC and CVCV. In the case of CVC (cf. (330)), the coda [n] is incorporated into the nucleus as nasalization. Adverbials are syllabified in a straightforward manner; there is never any variation in the syllable position of any adverbial consonant.

Adverbials such as /che/ 'water' (cf. 315), /mà/ 'circle' (cf. 327), and /son/ 'circle' (cf. 330) are very similar to incorporated stems such as /cbu/ 'water' (cf. 300) and /tl'òn/ 'circle'. The question arises as to what distinguishes a position 1 adverbial from a position 2 incorporated stem if they can be virtually identical in function. These positions can be distinguished by testing the possible orders in which position 3 /na/ can co-occur with them. As demonstrated in (310) - (313), /na/ and position 2 are freely ordered; however, /na/ can never occur to the left of a position 1 prefix.

1.12.4 Summary charts



Insofar as position 1 may choose conjugation, it is reasonable to add position 1 before position 8 in underlying verb structure. See Chapter 3 for this argument in support of an underlying abstract verb structure.

1.13 Incorporated Postpositional Phrase (position 0)

1.13.1 Function

Incorporated postpositional phrases are made up of postpositions and their objects. Incorporated postpositions function in the same way as unincorporated postpositions; conditions for postposition incorporation are discussed in 1.13.3. Examples of incorporated postpositions and postpositional phrases are given below.

(338) /Ø/ wujò mesʔa '1sS takes care of 3sO'
 = 'good' m - Ø - s - ʔa
 0 0 10 stem
 3sO pp 1sS 'take care of O'

(In (338), the verb 'to take care of O' is syntactically intransitive, and thus the object is oblique.)

(339) /ch'a/ matolè mech'atadàniʔo '1sS put cork in bottle'
 = 'bottle' m - ch'a - ta - d - `n - n - s - ʔo
 0 0 1 7 8 9 10 stem
 3sO pp adv der cnj mode 1sS 'handle 3D O'

- (340) /dà/ matolè dadâni[?]ɔ '1sS closed bottle'
 'close, lock' = 'bottle' da - d - `n - n - s - [?]ɔ
 0 7 8 9 10 stem
 pp der cnj mode 1sS 'handle 3D 0'
- (341) /ikà`kà/ jije kàsaya '3sS went for berries'
 'searching for' = 'berries' kà - `s - ya
 0 8 stem
 pp cnj 'sg. go'
- (342) /k'a/ [?]atsàn k'adjj[?]aɬ '2sS chewed up meat'
 'chew' = 'meat' k'a - d - gh - n - [?]aɬ
 0 7 8 10 stem
 pp der cnj 2sS 'chew 0'
- (343) /k'e/ sek'enagwo '3sS pounded 1s0'
 'break' = s - k'e - `n - d - gwo
 0 0 8 11 stem
 1s0 pp cnj cl 'pound 0'
- (344) /k'e/ kwɔ wak'edàghatsat '(ball) bounced on roof'
 'on' = 'house' w - k'e - dà - gh - d - tsat
 0 0 4 8 11 stem
 ar1 0 pp distr cnj cl 'fall'
- (345) /k'e/ sak'esalats '(baby) urinated on 1s0'
 'on' = s - k'e - `s - lats
 0 0 8 stem
 1s0 pp cnj 'urinate'
- (346) /k'e/ [?]ets'èda mià k'edalet 'child's hand got burned'
 'burning' = 'child' 'hand' k'e - d - gh - let
 0 7 8 stem
 pp der cnj 'buru'

(351) a. kwe naja 'he went back inside'

= 'inside' na - Ø - d - ya

3 8 11 stem

rev cnj cl 'sg. go'

b. jije kàsaya 'he went searching for berries'

= 'berries' kà - `s - ya

0 8 stem

pp cnj 'motion'

(352) a. i. ʔonànila 'I put [pieces] back together'

= ʔo - nà - `n - n - s - la

1 1 8 9 10 stem

adv adv cnj mode 1sS 'handle pl O'

ii. ʔazàs wughànila '1sS gave hides to 3pO'

= 'hides' wu - ghà - `n - n - s - la

0 0 8 9 10 stem

3pO pp cnj mode 1sS 'handle pl. O'

- the underlying conjugation for perfective 'handle pl O' is /n/

b. i. ʔəjìè wutàsila 'I divided up candies'

= 'candies' wu - tà - `s - n - s - la

0 0 8 9 10 stem

3pO pp cnj mode 1sS 'handle pl O'

ii. tsatsònè wutàsila 'I gave one dime to each boy'

= 'money' wu - tà - `s - n - s - la

0 0 8 9 10 stem

3pO pp cnj mode 1sS 'handle pl O'

1.13.3 Phonological Manifestations

Incorporated postpositions can be distinguished from unincorporated postpositions in that they meet at least one of the following conditions:

(368) Diagnostics for Determining Postposition Incorporation

- (i) nothing may be inserted between the postposition and the verb
- (ii) the postposition immediately precedes a non-prefixed verb stem (i.e. epenthesis, which normally inserts a vowel before a non-prefixed verb stem to ensure that the verb has at least two surface syllables, does not apply)
- (iii) verb-internal phonological processes, such as /Ca/ + /na/ ---> [Cɔ], apply to the combination of postposition + verb

The list of pronominal objects which anchor postpositions is very similar to the list of direct objects in position 5. The only differences are the following:

- (1) the 3sO pronoun which is /Ø/ in position 5 is /m/ in position 0.
- (2) The reflexive object which is /ʔd/ in position 5 is /d/ in position 0.

1.14 Conclusion

We have seen that the HRB surface verb consists of a series of prefixes and a verb stem. Among the prefixes there are a number of discontinuous dependencies. This suggests that there is an underlying verb structure in which "choosing" prefixes are added before "chosen" prefixes, and which regularizes the structural status of inflection. In Chapter 3 it is shown that both empirical and theoretical claims require the underlying structure of the verb to differ from its surface structure.

The phonology of prefixes described in this chapter raises a number of issues. Foremost is the syllable position of consonantal prefixes. Chapter 4 deals with syllabification; the seemingly arbitrary behaviour of conjunct consonantal prefixes is seen to be systematic if we apply notions like template mapping and extraprosodicity to a phonological representation which is motivated on both phonological and morphological grounds.

A second puzzling aspect of phonology involves one of the effects of /s/- and /n/-conjugations: the apparently inconsistent interaction of tone placement and vowel tensing. Moreover, the occurrence of vowel tensing before conjugation (in certain cases) and before /h/-classifier seems unrelated, but not self-explanatory in either case. This second cluster of irregular phenomena is explored and systematized in Chapter 4.

CHAPTER THREE

Word Formation

0. Introduction

The goal of this chapter is to present the following arguments: (1) the underlying structure of the HRB verb, i.e. the morphosyntactic structure, differs radically from the surface linear structure; (2) despite the difference between structures, the mapping from morphosyntactic structure to phonological structure is a simple operation, given certain assumptions concerning the lexical entries of verbs; (3) the correlations between morphosyntactic dependencies, phonological rule domains, and the mapping operation make this model a robust, and therefore learnable, approach to word-formation.

In Chapter 2, the characteristics of the HRB verb were presented. The surface verb is composed of a varying number of prefixes attached to the verb stem, as shown in (1).

(1) HRB verb complex (surface)

Prefix position: 0 - 1 - 2 - 3 - 4 - 5 - 6 - 7 - 8 - 9 - 10 - 11 - stem

0 - oblique object + postposition (pp)	6 - deictic subject (dc sj)
1 - adverbial (adv)	7 - derivational (der)
2 - incorporated stem (inc st)	8 - conjugation (cnj)
3 - customary/reversative (rev)	9 - mode (m)
4 - distributive (dstr)	10 - subject (sj)
5 - (direct) object (obj, d.o.)	11 - classifier/voice (cl)

No verb has all of the positions phonetically filled. There are three reasons for this. First, many of the positions are optional. Secondly, some position pairs are mutually exclusive (e.g. - positions 6 and 10). Thirdly, many positions may be

filled by a Ø-morpheme (e.g. 3rd person singular Subject in position 10 is a Ø-morpheme).

I propose a model of HRB verb formation where the sequence of affixation does not follow surface order. Rather, derivational affixes are first added to a discontinuous lexical entry known as the "verb theme"; this forms a structure which is labelled the "verb base" in traditional Athapaskan literature (e.g. Sapir and Hoijer, 1967). Inflectional affixes are added last to complete the "verb form" (cf. Sapir and Hoijer, 1967). The sequence of affixation described here is shown in (2), where the verb theme is indicated in boldface.

(2) HRB verb (maximized underlying representation)

{ 10, 6, 5 }	|	9, 8, 1, 7, 4, 11, 3, 2	|	[(1)-(2)-(5)-(7)-11-stem]	|
inflectional affixes		derivational affixes		verb theme	

The sequence of affixation in (2) is clearly radically different from that implied in (1). The differences stem from three sources: (a) following traditional Athapaskan tradition, the "verb theme" in (2) is assumed to be a discontinuous lexical entry, resulting in a breaking-up of a section of the surface complex; (b) in (2), inflectional and derivational affixes are separated, whereas they are interspersed in (1); (c) within both the derivational and inflectional affix groupings in (2), there is re-ordering.

The organization of the present chapter is as follows: in Section 1 the reasons for proposing (2) as an underlying representation for HRB verbs are presented. In Section 2 the mapping to PF (Phonological Form) is outlined.

1. The Underlying Representation of HRB Verbs.

Given the surface structure of HRB verbs in (1), one of the simplest approaches to verb formation is to affix the verb prefixes to the stem, either in

one step or incrementally. This general approach is developed in Hargus (1988) for the Athapaskan language of Sekani. In this section I present the reasons for forming the verb as shown in (2); in doing so, I point out the deficiencies of a direct prefixation approach to verb formation such as that proposed for Sekani. In Section 1.1 I explain the representation in (2). In Section 1.2 I present morphosyntactic and phonological arguments in support of (2).

1.1 The Morphosyntactically-based Representation Explained

In order to explain the representation in (2), we first distinguish between inflectional, derivational and thematic affixes.

1.1.1 Inflectional Affixes

Inflectional affixes consist of those affixes which are relevant to the syntax. In HRB, these are the person affixes: position 5 object, position 6 deictic subject, and position 10 subject. Whether affixes providing modal or aspectual information (in HRB these consist of the position 8 conjugation + position 9 mode prefix pair) are inflectional or derivational is an open question. I will consider them to be derivational; this assumption does not make any difference to the model of word-formation proposed here.

1.1.2 Derivational Affixes

Derivational affixes are those affixes with predictable meanings which contribute componentially to the meaning of a verb and which are added to the verb by derivational rules.

1.1.3 Thematic Affixes

Thematic affixes have no isolable meaning but are integral to a verb's idiosyncratic meaning; thus, they must be listed as part of the verb's lexical entry. Thematic affixes may include affixes from positions 1, 2, 5 and 7, and must include position 11. However, in a given verb, an affix in positions 1, 2, 7

or 11 may be derivational rather than thematic, and an affix in position 5 may be inflectional rather than thematic. The determining factor in designating an affix from one of these positions as thematic, derivational or inflectional is whether the affix in question has an isolable meaning separate from the meaning of the verb's lexical entry. If it does, it is derivational or inflectional; if it does not, it is thematic. It must also be kept in mind that a single verb may have more than one affix in positions 1, 7 and 11. (3) shows the verb complex with each position labelled as to whether it may be inflectional (I), derivational (D) or thematic (T). Any affix may be absent, or may be represented by a \emptyset -morpheme.

(3) HRB verb complex

1	2	3	4	5	6	7	8	9	10	11	-	stem
T/D	T/D	D	D	T/I	I	T/D	D	D	I	T/D		

I assume, following Anderson (1982), Baker (1987), Speas (1984, 1986), and Wright (1983, 1985, 1986) that inflectional affixes are underlyingly positioned on the outside of the verb complex. (I explore this assumption in Section 2). Consequently, the HRB verb must have the pre-surface representation in (4).

(4) HRB verb (pre-surface representation)

Position: {5, 6, 10} [0, 1, 2, 3, 4, 7, 8, 9, 11, stem]
 inflection

The distinction between derivational and thematic affixes subdivides the material between square brackets in (4). Since thematic affixes are integral to the meaning of a verb, they are listed in the verb's lexical entry. We can substitute the term "verb theme", the term used in the Athapaskan literature,

for "lexical entry". Thus, HRB verbs have maximally the following lexical entries.

- (5) HRB verb theme/lexical entry
 { (1) - (2) - (5) - (7) } - 11 - stem

Combining (5) with (4), and taking into account the facts presented above concerning the different potential roles of certain affix positions, yields a representation similar to that given in (2). (2) additionally shows a specific ordering of derivational affixes which is discussed in Section 1.2.1.3.

1.2 Arguments for the Morphosyntactically-based Representation

There are three morphosyntactic arguments in support of the representation in (2): (a) the notion of the verb theme (c.f. (5)), (b) lexical relatedness and (c) verb-internal dependencies. These arguments are outlined in Section 1.2.

1.2.1 The Verb Theme

The first argument in support of (2), the notion of the verb theme, has been discussed in Section 1.1. To recap, the lexical entry of a verb must include material which is integral to the basic meaning of the verb. Thematic affixes

fulfill this requirement. Thematic affixes may be from positions 1, 2, 5, and 7, thus creating a discontinuous lexical entry.¹

1.2.2 Lexical Relatedness

In the vast majority of languages, inflection is outside of derivation in the surface form of synthetic verbs. Athapaskan languages are exceptions to this generalization, since inflectional affixes are interspersed with derivational and thematic affixes in surface verb forms. Justification must be provided for an abstract representation of verbs where inflectional material is underlyingly outside of derivation.

Lexical relatedness is one of several arguments in the literature supporting "inflection-outside-derivation" structures. I choose this argument over others because it is neutral with respect to many aspects of syntactic theory, and the scope of this dissertation does not include a study of syntax. The reader is referred to Williams (1981), Anderson (1982), Speas (1986), and Di Sciullo and Williams (1987) for syntactic arguments for placing inflection outside derivation.

In addition to syntactic arguments, Speas (1986) uses the argument of lexical relatedness to justify placing inflection outside of derivation in Navajo

¹ The idea of a discontinuous verb theme has been recognized in the Athapaskan literature for some time: cf. Golla (1970), Hoijer (1949), Kari (1979), Li (1946) and Rice (1985a, to appear). Kari (1979) presents a model for Ahtna verb formation based on underlying verb themes which posits a sequence of derivational and inflectional processes parallel to that in (2). Kari's model includes more detailed structure than (2) suggests, including the possibility of a theme being formed into a subtheme. Also, the derivational level in Kari is different from (2) in that modal and aspectual derivation, by which conjugation and mode prefixes are added, precedes "super-aspectual" derivation, by which distributive is added. Co-occurrence between these two prefix types is acknowledged, but the issue of conjugation choice, discussed later in this chapter, is not discussed.

morphological structure. The argument, with application to HRB, is presented below.

It is important in universal grammatical theory to establish consistent definitions for concepts such as head of a word or phrase. A structurally based definition of head and nonhead in morphology has been proposed by Williams (1981). This definition states:

(6) Head of a word: we define the head of a morphologically complex word to be the righthand member of that word.
(Williams 1981:248)

Nonhead: the highest left branch of a word. (ibid:261)

Williams also makes the following universal claim concerning "lexical relatedness":

(7) X can be related to Y if X and Y differ only in a head position or in the nonhead position. (ibid:261)

It is desirable for these proposals or ones similar to them to be incorporated as universals into a theory of grammar. If we accept Williams' principle of lexical relatedness as a universal, and apply it to HRB verb surface structure, the result is an unlikely system of difficult-to-learn verb paradigms. Let us see how this is so.

Consider the two HRB forms in (8). These forms share the same prefixes, all of which are derivational; however, the forms have different stems.

- (8) a. *dasiʔq* 'I hung it (e.g. piece of meat) up'
 = da - `s - ʔq
 1 8 stem
 adv cnj 'handle O'
- b. *dasila* 'I hung them (e.g. pieces of meat) up'
 = da - `s - la
 1 8 stem
 adv cnj 'handle pl. O(bject)'

According to Williams' definitions, the stem in both (8a) and (8b), being the righthand member of the word, is the head of the word, and the adverbial /da/, being the highest left branch of the word, is the nonhead. Since (8a) and (8b) differ only in the head position, they are lexically related.

Now consider the two verbs in (9). They are members of the same inflectional paradigm, and therefore are identical except for the position 10 subject morpheme.

- (9) a. fèsti'u 'I tie together O'
 = fè - s - ti'u
 1 10 stem
 adv 1sS 'tie O'
- b. fèneti'u 'you tie together O'
 = fè - n - ti'u
 1 10 stem
 adv 2sS 'tie O'

As stated above, these two verbs differ only in their subject morphemes. Since both the nonhead (adverbial /fè/) and the head (stem /ti'un/) positions are the same, (9a) and (9b) are not related according to the definition of lexical relatedness given in (7). Not being related, these two verbs, which are members of the same inflectional paradigm, should presumably be stored separately. If members of inflectional paradigms are separately stored, it follows that HRB speakers must memorize a great number of isolated forms which differ only in inflection. A sample of one such set of forms is given in (10).

(10)	tà...s...tle	'run uphill'	tàsastle	'I run uphill'
			tàsitle	'you run uphill'
			tàsatie	's/he runs uphill'
			tàts'estle	'we run uphill'
			tàghastle	'they run uphill'
			tàsatie	'you (pl.) run uphill'

The notion of lexical relatedness is intended to eliminate the requirement that members of inflectional paradigms be individually learned and stored.

When applied to a language like English, where inflectional morphemes occupy a head or non-head position, lexical relatedness allows us to claim that words which differ only in their inflectional morphemes are related and belong to a single paradigm; all the members of a paradigm can be derived through productive rules of affixation. For example, the words in (11a) are lexically related since they differ only in head position; the words in (11b) are lexically related since they differ only in nonhead position. On the other hand, the words in (11c) are not lexically related, since they do not differ in only their head or only their non-head positions (both head and non-head are the same). The words in (11d) are also not lexically related, since they differ in both their head and their non-head positions.

- (11) (a) [shave - Ø], [shave - s], [shave - d], [shave - n], [shave - ing]
 (b) [macro - economic], [micro - economic]
 (c) [re - assign - ment], [re - enact - ment]
 (d) [re - assign - ment], [un - happi - ness]

Lexical relatedness works for English because English inflection is always added to the edge; therefore, if only the head differs in a set of words as in (11a), they do differ only in inflection. This results in a learnable inflectional system; on the other hand, the surface position of Athapaskan inflection appears to be so

different from the systems of other languages and appears to be so highly unlearnable that a system for Athapaskan word formation that makes inflection an accessible level should be considered.

This can be done in two ways. One way is to change Williams' definitions of "head", "non-head" and/or "lexical relatedness" so as to allow Athapaskan verbs that differ only in internally positioned inflectional morphemes to be lexically related. However, this option ignores the great number of languages for which Williams' notion of lexical relatedness seems to be appropriate. In these languages, inflectional morphology is usually outside of derivational morphology and thus occupies head or non-head positions. This is a significant generalization that it is desirable to maintain, and which is maintained with Williams' definitions.

A second alternative to the unlikely system of Athapaskan lexical relatedness is to maintain Williams' notions, but allow for an abstract underlying structure of Athapaskan verbs whereby inflectional morphemes are external to non-inflectional morphemes. (2) exhibits such an underlying structure. This would result in lexical relatedness between words differing only in inflectional morphemes. This would also allow for greatly simplified storage of lexical items, similar to English, where only one uninflected form needs to be stored for each word. The members of inflectional paradigms would be derived by productive rules of affixation.

The arguments in 1.2.1. and 1.2.2 account for two aspects of the structure in (2): 1.2.1 accounts for the discontinuous lexical entry labelled "verb theme", while 1.2.2 accounts for the placing of inflection outside of derivation. The third morphosyntactic argument, verb-internal dependencies, accounts for the ordering of derivational affixes in (2).

1.2.3 Verb-Internal Dependencies

The argument of verb-internal dependencies principally concerns conjugation choice; that is, the choice of whether /Ø/, /n/, gh/, or /s/ occur in position 8 of a verb.

Conjugation choice is a complicated matter. In the first place, conjugation is chosen by the verb's theme category. The idea of theme category which organizes verb themes into semantic and morphological classes was first proposed in Golla (1970). Kari (1979) explores this notion extensively:

- (12) A verb theme is the structural and semantic common denominator that underlies all verb forms derived from it...verb themes can be grouped into lexical verb theme categories that have definable semantic content and a common structure in their most basic derived forms
(Kari 1979:5)

Thus, each verb theme belongs to a theme category. Each theme category is characterized by a general meaning, a derivational potential shared by the verb themes in the category, a primary aspectual string (PAS), and a conjugation set. The PAS identifies the one aspect above all others which characterizes the theme category. "Conjugation set" refers to a pairing of one of the four conjugation morphemes in position 8 to each of the modes in position 9 of any given verb (see chapter 2 for details).

Recall from Chapter 2 the four modes: imperfective (marked by /Ø/ in position 9), perfective (marked by position 9 /n/² in /Ø/ and /h/ classifier

² I represent perfective mode /n/ in the same way as position 7 /n/, even though their phonological patterning differs. Syllabification conditions account for the differences in patterning in Chapter 4. In contrast, Hargus (1988) suggests that the position 7 /n/ prefix in Sekani includes a diacritic in its representation which makes it uniquely subject to certain phonological processes. Historically, modal /n/ is derived from *ŋ, a palatal velar nasal, while other /n/'s such as position 7 thematic is derived from *n.

forms and by /Ø/ in /d/ and /l/ classifier forms), optative (marked by position 9 /w/), and future (marked simultaneously by position 7 /d/ and position 8 /gh/). Verbs belonging to a single theme category will have the same conjugation-mode pairings in the conjugation set. Conjugation sets list the conjugation pairings of the first three modes. Thus, the set /Ø, gh, Ø/ indicates that the imperfective mode is marked by /Ø/ conjugation, the perfective mode by /gh/ conjugation, and the optative mode by /Ø/ conjugation. All three modes may be paired with the same conjugation affixes, for example: /n, `n, `n/. In (13), I give an example of one conjugation set: /Ø, gh, Ø/.

(13) ? - d - tsits 'eat'
 5 11 stem
 unsp. 0 cl 'eat'

	Impf	Perf	Opt
1s	?estsits	?eghestsits	?ustsidzè
2s	?enatsits	?eghĩtsits	?awòtsidzè
3s	?etsits	?atsit	?utsidzè

Beyond the fact that verb theme categories choose a conjugation set, certain verb affixes take precedence over the theme category choice. These affixes are appropriately referred to as "conjugation choosing" affixes (cf. Rice 1985b, 1989). One of these is in the adverbial position (position 1). For example /ta/ adverbial, meaning "up", chooses the conjugation set /s, `s, `s/. A /ta/ perfective form is given in (13).

(14) tàwùsichĩ 'I carried them up'
 = tà - wu - `s - n - s - chi
 1 5 8 9 10 stem
 adv 3pO cnj mode 1sS 'handle animate O'

Another example: /che/ adverbial, referring to "water", chooses /n, `n, `n/. A perfective form is given in (15).

- (15) tleḻa chenichi 'I threw a dog into the river'
 'dog' che - `n - n - s - chi
 1 8 9 10 stem
 adv cnj mode 1sS 'handle animate O'

A second affix position which chooses conjugation is /dà/ distributive (position 4). /dà/ distributive chooses different conjugation sets depending on the theme category of the verb. For example, the verb theme in (16) belongs to a theme category which takes /n/ conjugation in the perfective.

- (16) satsasgè daghawədèech'il 'I tore my pants pocket'
 = d - gha - w - d - `n - n - s - ch'il
 0 0 5 7 8 9 10 stem
 'my pocket' inc pp arl O der cnj mode 1sS 'tear O'

The presence of /n/ conjugation is indicated in bold print as the nasalized low-toned sequence. In the distributive form the conjugation marker shifts to /s/.

- (17) satsasgè daghadòṇàwədèech'il 'I tore each of my pants pockets'
 = d - gha - dṇa - w - d - `s - n - s - ch'il
 0 0 4 5 7 8 9 10 stem
 'my pocket' inc pp distr arl O der cnj mode 1sS 'tear O'

In (17) the bold print sequence [dṇà] is the distributive morpheme. The non-nasalized sequence [èe] indicates that conjugation has shifted from /n/ to /s/.

A third affix position which may determine conjugation is position 7.

Recall that position 7 may be occupied by a thematic or derivational affix.

When the affix in position 7 is a derivational affix with an aspectual meaning, it chooses conjugation. For example, position 7 /d/, when it indicates inceptive aspect, chooses /s/ conjugation in perfective mode. An example is given below.

- (18) əjīn 'he sang' vs. dəsīn 'he started to sing'
 = d - shin d - `s - d - shin
 11 stem 7 8 11 stem
 cl 'sing' asp cnj cl 'sing'

The theme category of a verb determines conjugation choice whenever the only affixes present are thematic. If there are no thematic affixes present and a verb form includes a non-thematic conjugation-choosing adverbial, the adverbial's choice of conjugation takes precedence over the conjugation set of the verb's theme category. However, if a verb form includes a non-thematic position 7 conjugation-choosing affix, such as /d/ inceptive aspect, then the position 7 conjugation choice overrides the adverbial conjugation choice. Finally, if a verb form includes /dà/ distributive in addition to the adverbial and/or the position 7 affix, conjugation choice is determined by /dà/ rather than by these other affixes.

These precedences are summarized in (19).

- (19) Conjugation chosen by verb theme category; this choice will be overridden by:
- (1) distributive (position 4); if absent, then by
 - (2) conjugation-choosing der/asp (position 7); if absent, then by
 - (3) conjugation-choosing adverbial (position 1).

A possible analysis of these facts is that "choosing" affixes are added to verbal structure before "chosen" affixes. Thus, thematic affixes, whose presence make the verb's theme category conjugation choice inviolable, are located closest to the verb stem (in fact, form a constituent with the verb stem). Since these affixes are present at the earliest stage of morphological structure, their choice of conjugation takes priority. If there are no thematic affixes, distributive choice takes precedence. Thus, distributive is positioned closer to the verb theme than other conjugation-choosers. Further out in the structure are the later conjugation choosers: aspectual (surface position 7), and non-thematic adverbial (surface position 1). The verb consequently must minimally have the underlying representation in (20).

(20) 8 1 7 4 [(1) (2) (5) (7) - 11 - stem]
 cnj adv der/asp distr verb theme

The ordering of derivational affixes in (2) reflects the order necessitated by the facts of conjugation choice.

The arguments in 1.2.1-1.2.3 present morphosyntactic evidence in support of the underlying verbal structure in (2). I now focus on the mapping which takes (2) as its starting point and results in the linear order of prefixes shown in (1).

2. The Mapping to PF

This section is organized as follows. I first elaborate on the concept of "verb theme" and relate this concept to the lexical entries of verbs (Section 2.1). I propose that the verb theme constitutes a template into which the affixes in the morphological representation, structured as in (2), are inserted. I then discuss the insertion frames of affixes in Section 2.2. Finally, in Section 2.3 I conclude with a summary of what has to be learned in this model of word-formation, and compare that with other models of word-formation proposed for Athapaskan languages.

2.1 The Lexical Entry of Verbs

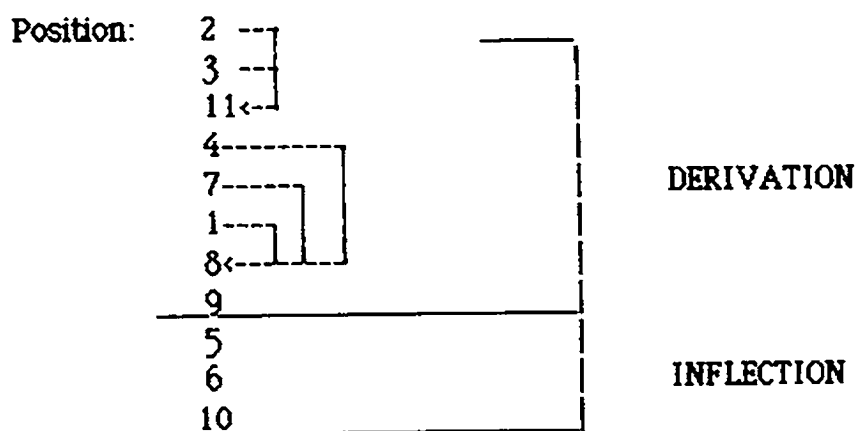
I have said that inflectional and derivational morphemes are inserted into a discontinuous lexical entry called the verb theme. The verb theme is structured as in (5). This structure is repeated below, rewritten in tree form.

(21)



Morphemes are added to this basic lexical entry/verb theme. I have argued in Section 1.2 that morphemes are added in the order indicated in (2), repeated in (22).

(22) Order of affixation



In addition to showing ordering, (22) encodes two previously discussed ordering arguments. First, arrows pointing from positions 4, 7 and 1 to position 8 conjugation indicate that the former set of prefixes are conjugation-choosers. Secondly, derivational morphemes are affixed before inflectional morphemes. A further fact which has not been discussed in this chapter, but was referred to in Chapter 2, is that position 3 /na/ chooses position 11 /d/ classifier; in addition, some incorporated stems force /d/ classifier. This is indicated by the arrows pointing from 2 and 3 to 11. Notice that the ordering of positions 2 and 3 is not

independently accounted for; in Section 2.2.2.3 I comment on the ordering of these two positions.

I propose that the verb theme forms a verb template which bounds the phonological word. The existence of phonological material outside the template forces mapping of this material into the template/word. This means that mapping proceeds from right to left, since it is the rightmost non-thematic material which is first visible to the left of the template. Therefore, the right-to-left sequence of material outside the template should reflect the order of mapping into the template. That is, if a verb form contains both the /na/ reversative position 3 affix and position 4 distributive, the /na/ affix is mapped into the template before position 4 distributive, since /na/ is closer to the template in underlying structure.

The template represents more than simply the discontinuous lexical entry of a verb theme. This aspect of the template is a morphosyntactic one. In addition, each branch of the template bounds the domain of four respective sets of phonological rules. In other words, the morphosyntactically motivated structure of the template also corresponds to a phonologically motivated structure showing rule domains (these domains are described in detail in Chapter 4). The template thus has the striking property of explaining the division of phonological rules into domains of application. In a theory like LPM (Lexical Phonology and Morphology), phonological rules are associated with levels of morphology, but no explanation is available for why the divisions between levels are placed where they are. In this model of word-formation, the divisions between levels correspond to points in a thematic template, which represent the positions of thematic affixes in a discontinuous lexical entry.

In the model which I propose, the mapping of non-thematic affixes, occurring in the order created by morphosemantic structure, uses simple and constrained insertion frames. These are the topic of the next section.

2.2 Insertion Frames

Insertion frames could conceivably be defined in at least two ways: (a) phonologically, where the insertion frame refers only to phonological information such as CV structure, or (b) morphologically, where the insertion frame may refer to morphological structure. In this section, I argue that insertion frames in HRB refer to morphological positions in the thematic template, and are thus morphologically defined. Before presenting HRB insertion frames, I outline some problems associated with one proposal for phonologically based insertion.

2.2.1 Problems with Phonologically Defined Insertion Frames

Phonologically defined insertion frames must be based on a phonological template. In order for such a template to exist, there must be some phonological regularities in the language. Speas (1984) originally proposed that Navajo verb theme lexical entries include an abstract CV skeleton/template of the form CVCCVC. This template is similar in content to the template in (21), the difference being that Speas' focus is on the CV structure of the points in the template in lieu of the points' morphological position. We can draw parallels between Navajo and HRB verb structure and state that the first CV (CVCCVC) corresponds to position 1, which is a disjunct position and as such has a CV representation. The second C (CVCCVC) corresponds to position 7, which is a conjunct position and as such is represented as C (the vowels of conjunct prefixes are largely predictable and are therefore inserted by epenthesis). The final CVC (CVCCVC) corresponds to the stem, which is often CVC. Each affix in

the morphological representation is inserted into the template by frames which refer only to CV points in the template. Only three frames are required in Speas' proposal. They are listed in (23).^{3,4}

- (23) (a) *CV__ (i.e. after the first syllable)
 (b) __ (C) C (V) VC* (i.e. before the last syllable)
 (c) CV __ CC (i.e. between the string of open syllables and the string of consonants)

Applying the Navajo proposal to HRB would require a template CVCCVC (where the second C corresponds to thematic position 5). A minimum of four insertion frames would be needed to ensure proper surface order. These are presented below.

- (24) (a) *CV__ (i.e. after the first syllable)
 (b) C__ CV (i.e. before the last syllable)
 (c) V__ CC (i.e. between the string of open syllables and the string of consonants)
 (d) VC __ C₀ V (i.e. position 6: between the first and second Cs in the string of consonants)

Frame (24a) is needed for positions 2, 3 and 1 (i.e. the leftmost surface prefixes), which are inserted in that relative order, given (22). Frame (24b) is needed for positions 7, 8-9 and 10 (i.e. the rightmost surface prefixes), which are inserted in that relative order. Frames (24c) and (24d) are needed to correctly insert the "middle" prefixes: positions 4, 5 and 6. (24c) is the frame for positions 4 and 5; position 4 is inserted first. (24c) works as follows: Position 4 is a disjunct prefix, so its representation is CV. When position 5 C is

³ These frames could be represented more elegantly in terms of syllable notation; however, since I reject this approach, the CV notation in (23) suffices for the purposes of exposition.

⁴ Wright (1985, 1986) presents a simpler proposal for phonological infixation, in which all prefixes are inserted after CV. This approach shares the second problem of Speas' approach explained further on, which is that all disjunct prefixes are wrongly assumed to have the representation CV.

inserted by (24c), the V to the left of the focus bar is the V of position 4; thus, position 5 is inserted to the right of position 4. (24c) is unable to correctly insert position 6 (C) however; (24c) would place position 6 between positions 4 (CV) and 5 (C). Therefore, the fourth insertion frame is needed to sandwich position 6 subject between position 5 and the string of consonants.

There are two problems with inserting HRB affixes using these phonologically defined insertion frames. First, the insertion works only if all conjunct prefixes (i.e. positions 5 - 10) are represented as C. However, as I shall argue in Chapter 4, there are conjunct prefixes in HRB and other Athapaskan languages which must have the representation V or CV: for example, position 7 /i/ transitional aspect, position 7 /u/ conative aspect, position 5 /ghu/ 3pO. If these prefixes are inserted into the template, the "string of consonants" constituent of the template is no longer well-defined. The insertion of a position 7 /u/ vowel position in the conjunct domain will make it possible for all following conjunct affixes in (22) (position 8 conjugation, position 9 mode, position 5 object, position 6 deictic subject and position 10 subject) to be wrongly inserted (i.e. the V in insertion frames (24b) and (24c) can be interpreted as position 7 rather than the V of the stem (which frame (24b) intends) or the V of the last disjunct affix (which frame (24c) intends)).

The second problem with these phonologically defined insertion frames is that the insertion works only if all disjunct prefixes have the representation CV. However, adverbs may have other representations, as shown in the example below.

(25) CVCV: /ʔònè/: ʔònèdjtɪ'a 'you run away'
 'away' = ʔònè - d - n - l - tɪ'a
 1 7 10 11 stem
 adv der 2sS cl 'run'

In addition, some forms have more than one adverb, as in (26).

- (26) /te+nè/: tènènjya 'it stopped growing'
 = te - nè - `n - n - ya
 1 1 8 9 stem
 adv adv cnj mode 'grow'

The insertion site in frame (24a) changes if a thematic adverbial or incorporated stem occupies more than a C and a V timing slot.

Thus, in both the conjunct and disjunct domains, there is variation in the skeletal structure of a set of prefixes which the phonological template in Speas' proposal does not adequately capture. This is not to say that there are no phonological patterns of syllable shape; in Chapter 4 I argue that because disjunct prefixes have different underlying syllable shapes from conjunct prefixes, their treatment in the phonological component is different from that of conjunct prefixes. However, this difference in disjunct and conjunct syllable patterns does not suffice to define phonological insertion frames. I therefore maintain that the verb theme lexical entry, with morphological positions marked, is the template for the word, and that insertion frames are morphologically based.

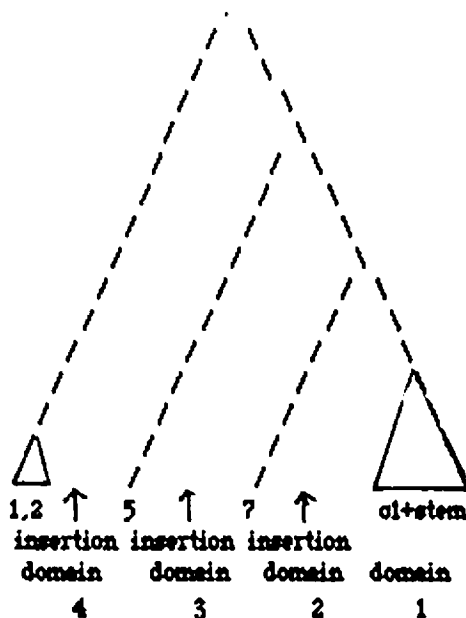
2.2.2 HRB Insertion Frames

This section is organized into four parts. First, the notion of insertion domains is introduced. Secondly, I outline the type of phonological information required in the lexical entries of affixes. Thirdly, I list the lexical entries of affixes. Finally I show some sample mappings.

2.2.2.1 Insertion domains

Speas (1986) introduces the notion of insertion domains when discussing the morphological template for Navajo. I have followed Speas in constructing the template from the morphological structure of the verb theme lexical entry.

(30)



The mapping from (22) to the surface string involves inserting morphemes into one of the above domains; each domain is headed by a point in the template. I assume that the head of each insertion domain is the domain's leftmost branch; thus, I assume that the notion "head" is parametrically defined: although "head" often labels righthand elements, here it labels the leftmost morpheme positions within domains. The head of domain 1 is the classifier (cl), the head of domain 2 is position 7 (derivational/aspectual), the head of domain 3 is position 5 (object), and the head of domain 4 is position 1 (adverbial).

2.2.2.2 Information in Affix Entries

The following information is listed in the lexical entry of an affix: (a) the timing slot(s) occupied by the affix, with underspecified feature representations (cf. Archangeli and Pulleyblank (1986)), (b) the domain which the affix belongs to (recall that "domain" refers simultaneously to insertion domain and phonological rule domain, since these are identical), (c) one of two insertion frames, listed in (31).

(31) Insertion Frames

Marked: Head position

Unmarked: Right-adjoining whatever phonological material is already in the domain

In (32) I list the lexical entries of affixes in the order in which they appear outside of the template in underlying structure. Note that the insertion frame is either marked as the head position or left unmarked; if unmarked it is understood to be "right-adjoining whatever else is already in the domain".

(32)	Affix	Domain	Frame	i.e. (see below)
	2 - inc stm	4		R
	3 - /na/	4		R
	11 - cl	1	Head	L
	4 - distr	4		R
	7 - der/asp	2	Head	L
	1 - adv	4	Head	L
	8-9 - cnj-m	2		R
	5 - object	3	Head	L
	6 - dc sj	3		R
	10 - sj	2		R

An alternative way of envisioning these frames is in terms of edges: domain "heads" are inserted into the left edge of a domain (L), while all other affixes are inserted into the right edge of a domain (R). This alternative interpretation of frames is indicated in the rightmost column of (32).

2.2.2.3 Sample Mappings

In this section I map three verbs. The verbs are chosen on the basis of their rich morphology in each of the affixal domains; thus, the first example has all four domain 4 prefixes, the second example has both of the domain 3 prefixes, and the third example has all four domain 2 prefixes.

The first example, in addition to its rich domain 4 morphology, reveals an interesting property of morphosyntactic structure. The verb meaning "they bumped their knees again" has the two surface variants given in (33).

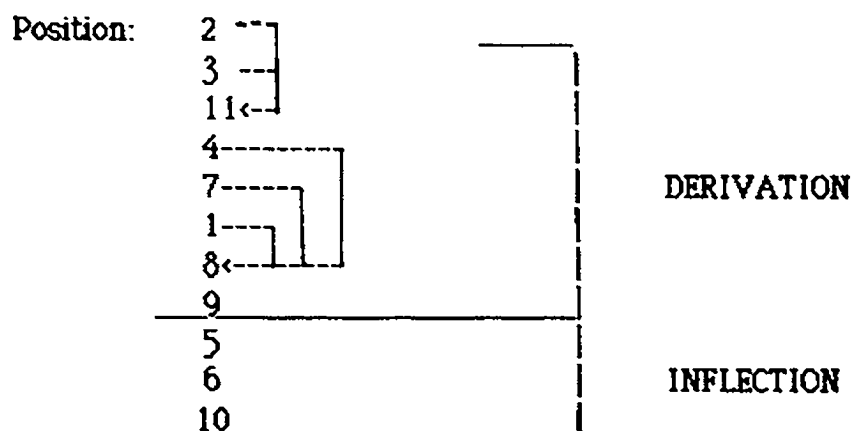
(33) a) jegwòtnadànàghèst'ò 'they bumped their knees again'
 = je - gwòt - na - dànà - gh - 's - d - ?on
 1 2 3 4 6 8 11 stem
 adv inc stm 'again' distr 3pS cnj cl 'handle O'
 'knee'

b) jenagwòtdànàghèst'ò 'they bumped their knees again'
 = je - na - gwòt - dànà - gh - 's - d - ?on
 1 3 2 4 6 8 11 stem

These forms show that prefixes functioning as incorporated stems (position 2) and prefixes functioning as reversatives (position 3) are unordered with respect to each other in the surface complex; two variants can be found for any verb having derivational positions 2 and 3, so this fact is not restricted to the particular verb in (33) (positions 2 and 3 are viewed as distinct positions despite this fact because prefixes in these positions have different functions). I argue below that the free variation exhibited by these two prefix positions is expected given the fact that conjugation choice is a major determinant of ordering of affixation.

Recall from (22) (repeated here in (34)) that positions 2 and 3 are the only derivational prefixes never involved in conjugation choice (i.e. positions 1, 4 and 7, in that order, choose position 8 conjugation).

(34) Order of affixation

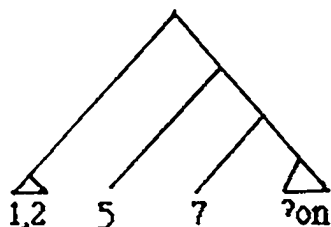


The strongest position one could take on ordering of affixation is that it is entirely "intrinsic", such that all ordering follows from the general principle of a choice hierarchy, such as the conjugation choice hierarchy. Obviously, the strongest position is the most desirable position to maintain. In contrast, the weakest ordering position is one where all ordering is extrinsically determined (in 2.3.2 I describe this position as it is found in a Lexical Morphology model of word formation). In HRB, almost all ordering is intrinsic; the only extrinsic requirement is that the prefixes not involved in the conjugation choice hierarchy, positions 2, 3 and 11, are added before the prefixes relevant to conjugation. Significantly, the internal ordering of positions 2 and 3, having no intrinsic motivation, is free; this is an important fact which allows us to maintain that derivational affixation is almost totally motivated by choice hierarchies with the exception that non-conjugation-choosers are added before conjugation-choosers.

Thus, positions 2 and 3 are freely ordered with respect to each other, and yield two surface forms. I show derivations for the two forms below.

In (33a), the thematic template/lexical representation of the verb is as in (35).

(35) thematic template = lexical representation of verb

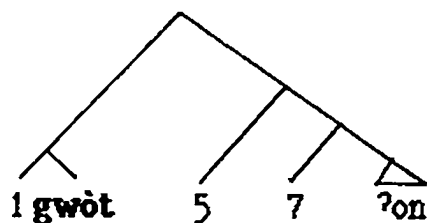


As argued above, derivational affixes are added before inflectional affixes. Within the set of derivational affixes, it is stipulated that non-conjugation-choosers are added before conjugation-choosers and conjugation. Otherwise, the order of adding the rest of the derivational affixes is totally intrinsic. The affixes to be added are shown in (36).

		<u>Domain</u>	<u>Frame</u>	
derivational affixes: unordered	{gwòt	position 2	4	
	{na	position 3	4	
	d	position 11	1	Head
	dàná	position 4	4	
	je	position 1	4	Head
inflectional affix:	o	position 8	2	
	gh	position 6	3	

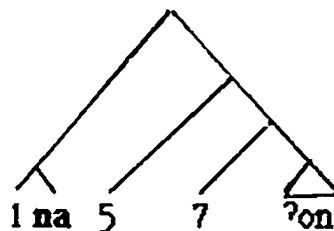
Since positions 2 and 3 are unordered there are two possible series of mappings which will yield correct surfacing ordering. Both of these series are given below.

(37) i. Map /gwòt/ (position 2)



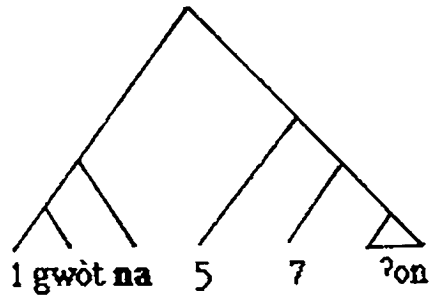
Map /na/ (position 3)

OR



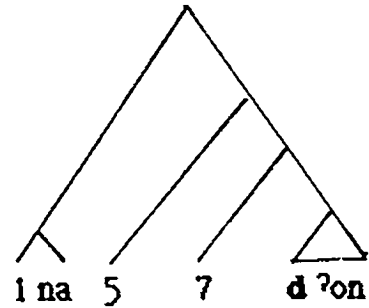
-as non-heads, the positions 2/3 affixes are mapped to the right edge of domain 4.

ii. Map /na/ (position 3)



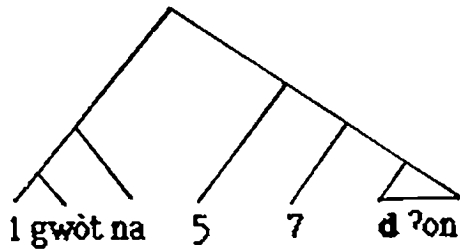
-as a non-head /na/ is mapped to the right edge of domain 4

Map /d/ (position 11)



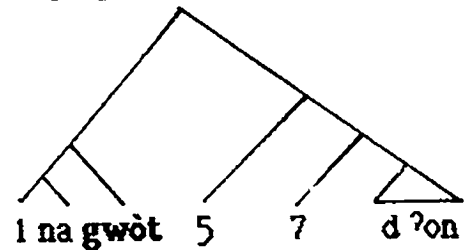
-since position 11 /d/ is dependent on position 3 /na/ it is mapped following position 3. As a head it is mapped to the left branch of domain 1.

iii. Map /d/ (position 11)



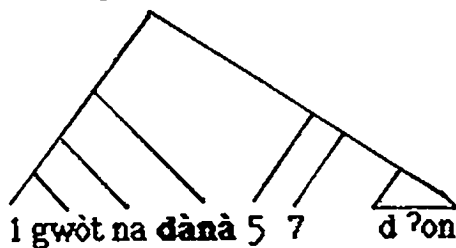
-since position 11 is dependent on position 3 /na/ it is mapped following position 3. As a head it is mapped to the left branch of domain 1.

Map /gwòt/ (position 2)

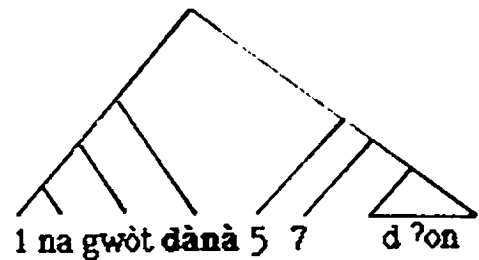


-as a non-head, /gwòt/ is mapped to the right edge of domain 4.

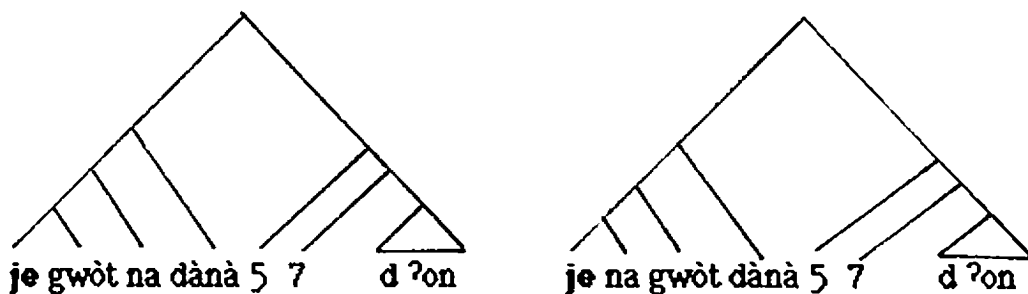
iv. Map /dànà/ (position 4)



-as a non-head, /dànà/ is mapped to the right edge of domain 4.

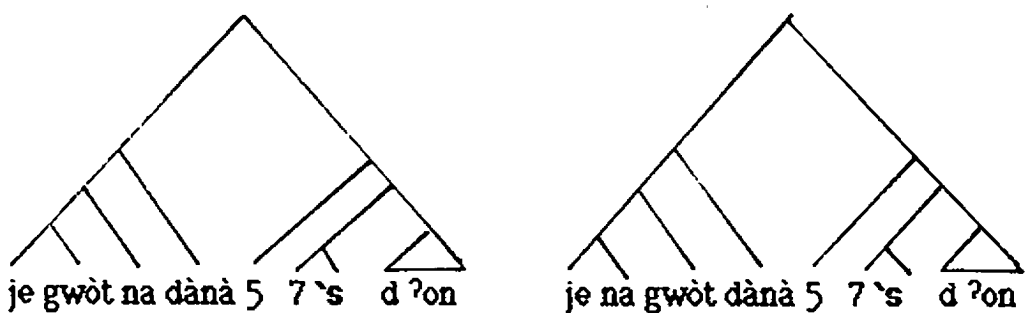


v. Map /je/ (position 1)



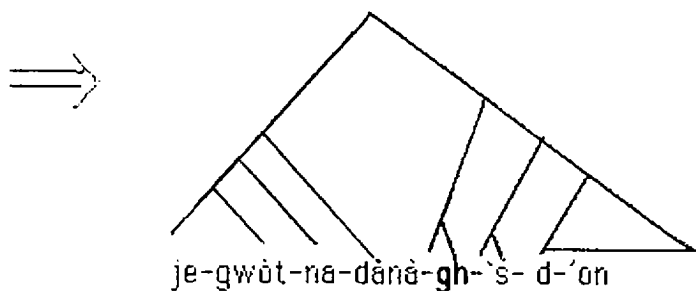
-as a head, /je/ is mapped to the left edge of domain 4.

vi. Map /s/ (position 8)

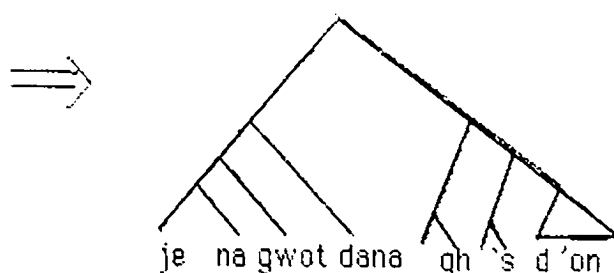


-as a non-head, /s/ is mapped to the right edge of domain 2.

vii. Map /gh/ (position 6)



OR



-as a non-head, /gh/ is mapped to the right edge of domain 3.⁵

The next derivation focuses on the insertion of domain 3 affixes. The example form is given in (38); the thematic template/lexical representation is given in (39); the affixes to be added to the template are given in (40); the mappings are given in (41).

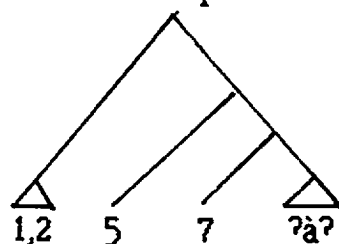
(38) ts'ewuts'àni?à? 'we woke them up'

= ts'e - wu - ts' - 'n - n - ?à?

1 5 6 8 9 stem

adv 3pO 1pS cnj mode 'wake up O'

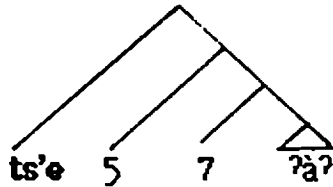
(39) thematic template = lexical representation of verb



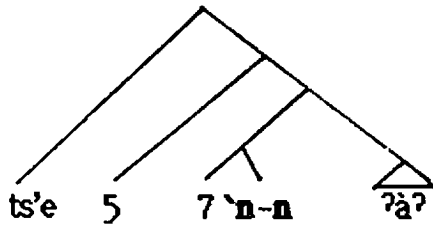
⁵ Not all of the structural relationships which the final trees in (37) (vii) indicate carry over into the phonology. The left branches of the tree are significant for phonology, as they indicate phonological domains; however, the sisterhood relations which the right branches indicate do not have phonological relevance (e.g. it is not significant that in the second mapping series je and na are sisters and that dàna is sister to the string jenagwòt). The right-branching components of the tree are the result of morphological mapping, and serve only to correctly position affixes. On the other hand, the left branches exist prior to mapping into phonology and frame phonological structure. This aspect of the template is elaborated on in Section 2.3.

(40)			<u>Domain</u>	<u>Frame</u>
	derivational affixes:	ts'e	position 1	4
				Head
		`n-n ⁶	positions 8-9	2
	inflectional affixes:	wu	position 5	3
		ts'	position 6	3

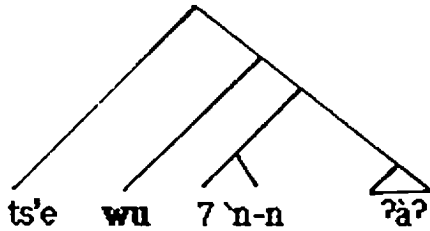
(41) i. Map /ts'e/ (position 1)



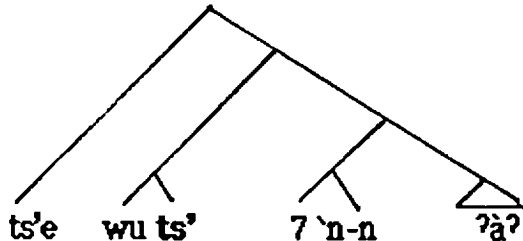
ii. Map /`n-n/ (positions 8-9)



iii. Map /wu/ (position 5)



iv. Map /ts'/ (position 6)



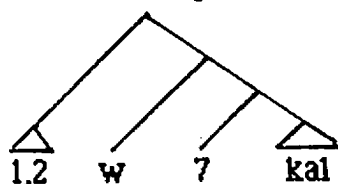
The final example focuses on the insertion of domain 2 affixes. The example form is given in (42); the thematic template/lexical representation is

⁶ I assume that conjugation-mode pairings are mapped as a unit.

given in (43); the affixes to be added to the template are given in (44); the mappings are given in (45).

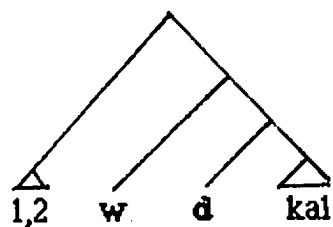
(42) sòna w d `s n s kaŋ 'I yawned'
 = sòna - w - d - `s - n - s - kaŋ
 1 5 7 8 9 10 stem
 adv der der cnj mode 1sS 'yawn'

(43) thematic template = lexical representation of verb

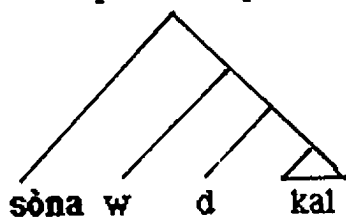


(44)		<u>Domain</u>	<u>Frame</u>
derivational affixes:	d	position 7	2
	sòna	position 1	4
	`s-n	positions 8-9	2
inflectional affix:	s	position 10	2

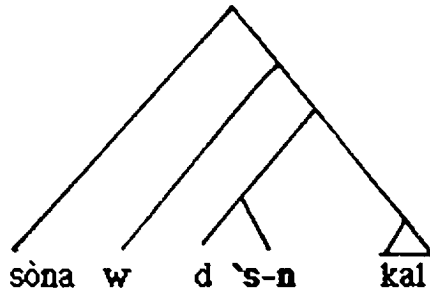
(45) i. Map /d/ (position 7)



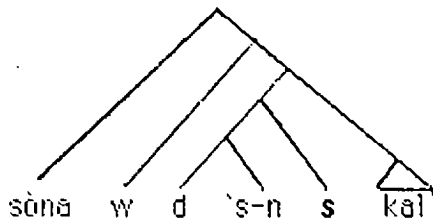
ii. Map /sòna/ (position 1)



iii. Map /s-n/ (position 8)



iv. Map /s/ (position 10)



2.3 Summary

In this summary, I review what needs to be learned in the above model of word-formation, and compare this with what needs to be learned in other models of word-formation.

The proposed model has the following elements: (a) a dual representation of the verb: a morphosyntactic representation and a phonological representation, (b) a mapping principle, (c) a template which is the verb theme lexical entry, (d) insertion frames for non-thematic affixes. I argue that only (d) must be learned, while all other elements in the model are given by UG. In contrast, the other models explored in this section require that much more be learned.

2.3.1 UG Principles in the Proposed Model

I assume that learners can identify derivational and inflectional affixes in HRB, as well as discontinuous dependencies relating to verb theme and conjugation choice. I also assume that learners divide the properties of affixes and themes which they figure out from the data into morphological and phonological categories.

The morphological properties govern the building of morphological structure in accordance with UG principles. One principle, as pointed out by Speas (1987), is the adjacency condition, originally proposed by Siegel (1978) and rephrased below by Lieber (1980).

(46) The Adjacency Condition (Lieber 1980:103)

No [morphological] subcategorization frame can state a dependency between X and Y if there is more than 1 bracket between X and Y, i.e.:

$$\begin{array}{l} *X / \quad Y | Z | ___ \\ *X / ___ | Z | Y \end{array}$$

The Adjacency Condition is significant in three respects. First, it requires that the verb stem + thematic prefixes be grouped together as one constituent in morphological structure, because they are mutually dependent: the meaning of a verb is constituted by the combination of thematic prefixes and the stem. Given this dependency, the Adjacency Condition excludes the possibility of intervening prefixes between thematic prefixes and the stem, as this would create brackets between X (the stem) and Y (thematic prefixes). This dependency is labelled "dependency 1" in (47). Secondly, the Adjacency Condition requires that position 3 /na/ and position 11 classifier be adjacent, where /na/ is added first, because /na/ chooses /d/ classifier. This is indicated as "dependency 2" in (47). Finally, the Adjacency Condition requires that conjugation-choosers and conjugation be underlyingly represented as in (47),

"dependency 3", where the conjugation-choosers are added before conjugation, and the predominant conjugation-choosers are added first. Again, this is because the chosen affix, conjugation, is dependent on the affix which chooses it; if prefixes intervened between the chooser (X) and the chosen (Y), additional brackets would be created between X and Y.

(47) $\boxed{8 \leftarrow 174}$ $\boxed{11 \leftarrow 3}$ [thematic prefixes \leftarrow stem]
 dependency 3 dependency 2 dependency 1

The Adjacency Condition, supplied by UG, thus provides the learner with (a) the thematic template and (b) most of the ordering of derivational affixes in the morphosyntactic representation. Consequently, these two aspects of representation do not need to be learned.

A second principle is Lexical Relatedness, which was discussed in Section 1.2.2. I assume that the learner is aware of aspects of word-formation which are predictable and systematic; I further assume that the learner's storage of lexical items reflects this systematicity. The principle of Lexical Relatedness serves to capture the systematicity of inflection; accepting lexical relatedness as a working principle leads to the reasonable proposal that the learner stores members of inflectional paradigms together, where inflection is represented outside of derivation.

Combining such a representation with the representation required by the Adjacency Condition yields the structure given in (22). Thus, underlying morphological structure is wholly determined by innate structural principles.

Given a morphological structure, I follow Sproat (1981) in assuming that UG provides a Mapping Principle which is based on the earlier assumption that lexical properties are divided into morphological and phonological types. Phonological entries are relevant to the mapping of morphological structure into

P(honological) F(orm). I take the following universal Mapping Principle from Sprac (1981).

(48) Mapping Principle

If B is a morpheme, then the phonological mapping of the syntactic representation of B is just its phonological entry.

I have said that the phonological entries of affixes include insertion frames. The Mapping Principle thus forces the movement of affixes into their respective frames.

I now move into aspects of the model which may require some learning: the formulation of insertion frames, and the use of the thematic template as the basis for these frames. I first examine the plausibility of the thematic template.

The template chosen in this model is similar to what Speas (1984) would call a "global insertion frame": "a skeleton labeled with morpho-syntactic information, perhaps with pre-linked discontinuous morphemes" (Speas 1984:102). Speas presents two arguments against such templates; however, these arguments are not relevant to the particular template chosen for HRB. Speas argues first that fully labelled global insertion frames are unlearnable because "some positions are mutually exclusive" so "the child would never hear a word with prefixes from all of the positions in it" - not to mention the fact that there are morpheme metathesis rules. In other words, in order for a fully labelled global insertion frame to be learnable, the child has to hear words which match the template in every morpho-syntactic detail.

However, in the model proposed here, the template is not fully labelled. It is a partial template in terms of the amount of morpho-syntactic information present and therefore necessary to be learned. This information consists of the cl+stem and the three points of the template, which correspond to the three prefix positions which may be thematic. Is this amount of information

learnable? The answer is yes, since once the child arrives at the knowledge that verbs are discontinuous themes, the positions of thematic elements supply the learner with the morphological information necessary to label the template.

Speas also argues: "If the template is a global insertion frame...the question arises as to why we should assume that Navajo [or Athapaskan languages generally] uses such a template but, say, Spanish does not...we could propose that...each language (including English) has a template to specify the order of morphemes on the same stratum which do not change lexical category. The main problem with an approach like this is that it predicts that the order of non-category-changing affixes is totally random...However,...it does not appear to be true that affix order is random...a template listing affix order will be redundant, as order will follow from independent principles" (Speas 1984:102). Notice that this argument assumes a template which "specifies the order of morphemes on the same stratum...". The HRB template does not stipulate order within a stratum, since this order does follow from independent principles; moreover, the HRB template actually provides the strata(/domains) of the verb, something which the template critiqued by Speas would fail to do. Thus, the HRB template not only avoids redundancy; it also provides a reason for the domain boundaries, as these correlate with thematic positions.

Let me turn now to the learning of insertion frames. I suppose that, at the point that the Mapping Principle is applied, the learner has already determined that the lexical entry of verbs is a discontinuous thematic template. How does the learner subsequently determine that the insertion frames of affixes are based on insertion "domains" and heads vs. non-heads (or left and right edges, cf. (32))?

The learning of insertion domains relates to the structure of the thematic template and to the fact that there are four phonological rule domains in HR³; the range of each rule domain corresponds exactly to the range between each pair of adjacent thematic positions. This is a significant correlation. It does not require any extra learning to posit that each one of these morphological ranges in turn corresponds to an insertion domain; doing so permits a simple formulation of two edge-based insertion frames. This is therefore a robust model: if the learner knows a little (i.e. - verb theme structure), then she knows a lot (i.e. - phonological rule domains, and hence insertion domains for mapping to PF).

It thus appears that the learner, having figured out thematic affix positions (and hence the template) needs only learn which of two insertion frames belongs to each affix. With this in mind, consider now two alternative models of word-formation: (a) LPM Prefixation (Hargus 1988) and (b) Phonological Infixation (Speas 1987).

2.3.2 LPM Prefixation

A version of the Lexical Phonology and Morphology (LPM) model is applied to the Sekani language in Hargus (1988). In this version of the model, lexical entries for affixes include a phonological/morphological level listing (as in my model) and a morphological diacritic which is referred to by word-formation rules; in addition, the lexicon includes an ordered set of word-formation rules and a set of lexical phonological rules divided into levels of application. Applying this model to HRB, a partial lexical entry for position 10 1sS is as follows.

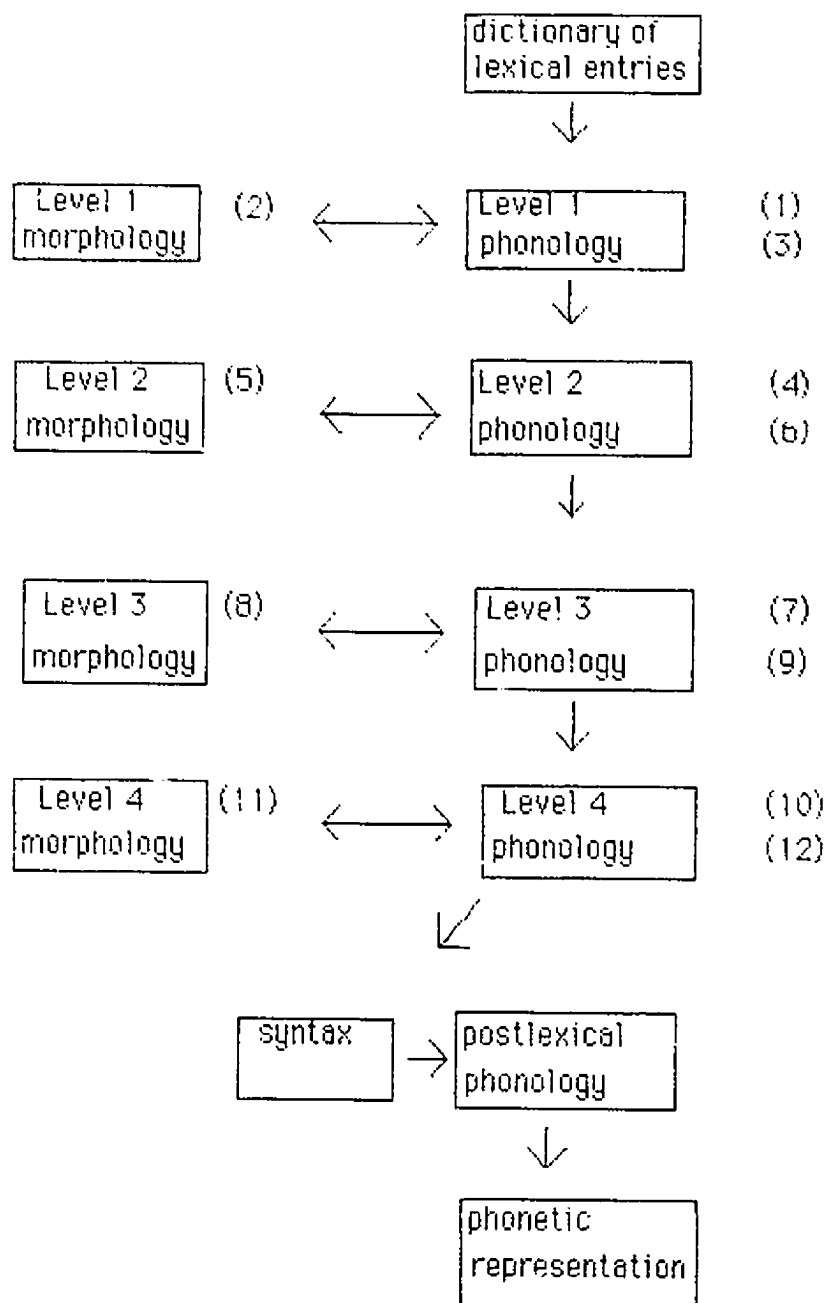
- (49) /s/: level 2
[+subject]

The list of ordered word-formation rules is given in (50).

- (50)
1. Insert [+classifier]
 2. Insert [+subject]
 3. Insert [+mode]
 4. Insert [+conjugation]
 5. Insert [+derivational]
 6. Insert [+deictic subject]
 7. Insert [+direct object]
 8. Insert [+distributive]
 9. Insert [+customary/reversative]
 10. Insert [+incorporated stem]
 11. Insert [+adverbial]

The word-formation model proceeds as follows.

(51)



- (1) Beginning with the verb stem, apply level 1 phonological rules.
- (2) Apply WFR 1 (cf. (46)).
- (3) Re-apply level 1 phonological rules.
- (4) Erase internal brackets. Apply level 2 phonological rules.
- (5) Apply WFR 2.
- (6) Re-apply level 2 phonological rules. Return to morphology, apply WFRs 3, 4, 5 cyclically, returning to level 2 phonology after each WFR.

- (7) Erase internal brackets. Apply level 3 phonological rules.
- (8) Apply WFR 6.
- (9) Re-apply level 3 phonological rules. Return to morphology, apply WFR 7 and re-apply level 3 phonological rules.
- (10) Erase internal brackets. Apply level 4 phonological rules.
- (11) Apply WFR 8.
- (12) Re-apply level 4 phonological rules. Return to morphology, apply WFRs 9, 10, 11 cyclically, returning to level 4 phonology after each WFR.

Two types of criticism can be levelled against the LPM model: certain generalizations are missed entirely, and the model requires stipulations which leave certain facts unexplained. The first criticism consists in the fact that the LPM model totally disregards the discontinuous dependencies in the verb; in addition, the model provides no insight into lexical relatedness.

Secondly, the LPM model must stipulate both the number and location of lexical levels, and the order of morphemes within each level. Therefore, these properties remain unexplained, implying that they could have been otherwise. In other words, there is no reason why the levels in HRB might not have been divided as in (52b) instead of as in (52a).

(52) (a) LPM levels in HRB

prefix position:	1-4	5-6	7-10	11-stem

prefix position:	1-2	3-5	6-7	8-9	10-11	stem

Why are there four levels in HRB, and why are the boundaries at positions 5, 7 and 11? In the model proposed here, the levels and level boundaries follow from the thematic template. The template specifies possible thematic positions, which correlate with level boundaries.

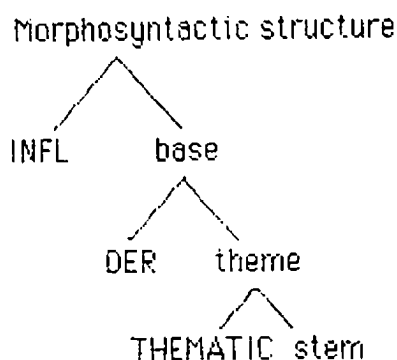
Similarly, there is no reason why morphemes within each level are ordered as they are; the LPM theory must adopt the problematic and costly

convention of extrinsically ordered WFRs. In the model proposed in this chapter, the order in which affixes are added to the template follows from morphological universals, while the mapping into the template which results in the correct linear order obeys one of two simple insertion frames.

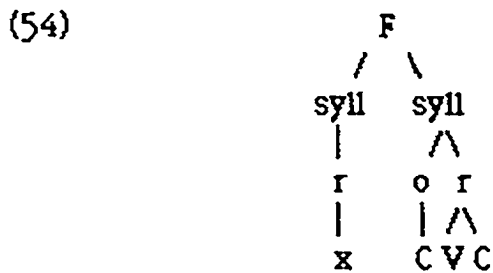
2.3.3 Phonological Infixation (Speas)

The above stipulation of morpheme order in the LPM model can be eliminated if we suppose that the verb theme is the lexical entry of a verb. This is done in the model proposed in this chapter and also in the model of Speas (1987). Speas' model recognizes a morphosyntactic organization of verb structure where inflectional affixes are outside of derivational morphemes, as in (53).

(53)



The underlying phonological representation of verbs, into which the representation in (53) is mapped, is a phonological template which captures the following fact: Navajo requires at least one vocalic element between the disjunct-conjunct boundary (i.e. the level 4-3 boundary) and the stem. In the template, the stem is represented as a CVC syllable, and the additional required element is represented as an unspecified rime segment. These two parts of the underlying verb are gathered into a foot, as shown in (54).



Morphemes are added to this verb structure by five possible infixation frames.

- (55)
1. * ___ (beginning of word)
 2. ___ F* (before final foot)
 3. ___ CVC* (before final syllable)
 4. (CV) ___ (after at most one syllable)
 5. ___ CnF* (before final foot and n consonants)

Phonologically-based infixation derives from the combination of two factors: (a) the Mirror Principle (Baker 1987), and (b) a specific understanding of the nature of morphological infixation.

The Mirror Principle states that morphological derivations must reflect syntactic derivations. This can be applied to Athapaskan in that the morphosyntactic properties of the verb represented in (53) determine the order of affixation in word formation. Since words are represented at only one level in Speas' model, the Mirror Principle says that the morphosyntactic structure of the verb must determine a sequence of infixation which directly yields surface ordering.

Morphologically-based infixation is ruled out by the Mirror Principle if this infixation is modelled in terms of adjacency to position class (e.g. - "insert [+distributive] before [+object]"). The problem here is that the adjacent morphological position needed to target the environment may not be present since it is inserted later, as determined by the morphosyntactic facts. In the model I propose, morphological infixation is not dependent on adjacency to morphemes which might not be present, but on domain membership in a pre-

existing, independently motivated thematic template. Thus, since Speas' and my assumptions regarding word representation in the grammar and the nature of morphological infixation differ, Speas' arguments for the necessity of phonological infixation do not apply to the model proposed in this chapter.

In Speas' model, infixation proceeds in morphological cycles which mirror the morphosyntactic organization of verbs given in (53). That is, thematic morphemes are added to the phonological template in (54) in the first cycle, derivational morphemes are added in the second cycle and inflectional morphemes are infixed as clusters in the third cycle.

In contradistinction to *Lexical Morphology*, which rigidly orders position classes and ignores morphological organization, this model incorporates facts about both the morphosyntactic and phonological organization of the Navajo verb system. The morphosyntactic organization in (53) is mirrored in verbal derivations by means of morphological cycles. In the remainder of this section, I wish to present two criticisms of Speas' phonological model, one directed at this particular version of Speas' model and one more general in nature which can include other versions of this type of phonological infixation model.

This particular version of Speas' model does not work for HRB because the foot structure proposed in (54) has no phonological basis in HRB. That is, the foot is proposed to capture the fact that Navajo requires epenthesis in a word having the structure [disjunct prefix(es) - stem]; HRB does not require epenthesis in this environment, as seen in (56).

- (56) *nàchít* 'it's raining'
 =*nà* - *chin* + *l*
 ! stem progressive
 adv 'rain'

Notice that there is no epenthesis between [nà] and [chin], as there would be in Navajo. Therefore, while the left edge of the Foot in Navajo captures the requirement that there be at least one vocalic element between the disjunct-conjunct boundary (i.e. the level 4-3 boundary) and the stem, the same left edge of the foot in HRB would be serving more as a morphological diacritic: it would provide a basis for a necessary insertion environment located between the disjunct and conjunct boundaries. Since the Foot structure would have no phonological cues, there is no way for a learner to learn this phonological template for HRB.

The above argument against this version of phonological infixation does not preclude the possibility that a more appropriate phonological template might be found for HRB and a workable version of phonological infixation might be devised.⁷ This research remains to be done. A phonological infixation model, when worked out in detail, would not only include motivated infixation frames, but would also specify how infixation cycles relate to phonological facts. It is not clear in Speas' model whether phonology is interspersed with infixation or done after all infixation is complete; in addition, it is not clear how the structures in (53) and (54) relate to phonological rule domains, if they do at all.

In summary, Speas' phonological infixation model, when it works correctly, demonstrates that morpheme ordering is predictable and surface ordering can be derived through infixation cycles and constrained insertion frames. The infixation cycles maintain morphological universals such as the Adjacency Condition and Lexical Relatedness, in the same way as the model proposed in this chapter does. However, the phonological infixation model does

⁷ In fact, Rice (1983) adopts a foot-like template for Slave, although an explicit account of infixation using this template has not yet been proposed.

not explicitly relate morphological universals to phonological rule domains. In contrast, the model proposed in this chapter posits a morphological template which not only demonstrates that morpheme ordering is predictable and surface order can be derived through very constrained insertion frames, but also demonstrates a relationship between morpheme insertion, lexical (thematic) representation and phonological rule domains. In other theories, these correlations must be treated as serendipitous.

The model presented in this chapter raises interesting questions about how phonology and morphology interact, to which I turn in the following chapter.

CHAPTER FOUR

HRB Phonology

0. Introduction

In this chapter I analyze aspects of HRB phonology whose counterparts in other Athapaskan languages have been the subject of decades of research. I focus on two issues: (1) the similarity of disjunct prefix phonology and stem phonology, in contradistinction to conjunct prefix phonology, and (2) complex allomorphic variation in conjunct prefixes.

Recall from Chapter 1 that disjunct prefixes are characterized in other Athapaskan languages as similar to verb stems, and are more loosely connected to the verb than conjunct prefixes (cf. Li 1946 among others); this property is assumed to be a reflection of the late incorporation of disjunct prefixes into the verb. From a synchronic perspective, phonological equivalencies between discontinuous phonological elements like disjunct prefixes and the stem is unusual; in Section 1 of this chapter I show that these similar parts of the verb are not discontinuous, but are rather adjacent at a particular stage of word formation.

The allomorphic variation referred to in (2) involves prefixes whose surface forms can include the following shapes: [C] ~ [Cə] ~ [Ce] ~ [Cè]. A recent analysis of these alternations (Hargus 1988) requires a proliferation of segmental rules, many of whose conditioning environments overlap. This suggests that possible generalizations are missed in the segmental account. In contrast, these alternations can be seen to be regular and unexceptional when viewed in the light of current syllable theory. In Section 2 I propose, following

recent accounts of Navajo conjunct prefix phonology (Wright (1983, 1987) and Speas (1984, 1986, 1987)), that alternations involving [ə] can be given a simple account if [ə] is epenthetic and inserted in order to conform to the syllable template of the language. The most exceptional behaviour of [ə] occurs in the final position in the conjunct domain; the apparently unpredictable behaviour of [ə] in this environment is accounted for using Extraprosodicity (Itô 1986) and lexical specification of syllabic positions.

Conjunct prefix alternations involving [ə] and [ɛ], as well as the conjunct domain occurrences of [a], are the focus of Section 3. The surfacing of these vowels is also accounted for using the syllable template, supplemented by an autosegmental rule of Vowel Backing.

1. Disjunct and Conjunct Phonological Patterns

Recall from Chapter 1 that the surface verb in HRB has the following structure.

(1) prefix position: 0 1 2 3 4 * 5 6 7 8 9 10 11 - stem

traditional		
label:	DISJUNCT	CONJUNCT

(* = boundary between disjunct and conjunct prefixes)

The disjunct prefixes and the stem share the phonological properties in

(2):

(2) Disjunct prefix and Stem properties

(a) Can begin with almost any consonant

(b) Can include any vowel; however, occurrence of [ə] very restricted¹

(c) Vowels have fixed lexical tone

(d) Are exempt from many processes affecting conjunct prefixes.

Conjunct prefixes have many properties which contrast with those of disjunct prefixes:

(3) Conjunct prefix properties

(a) Begin with a limited set of consonants

(b) Include a limited set of vowels, usually [ə]

(c) Most vowels have no fixed tone in surface forms

(d) Undergo a unique set of rules

One would expect that phonological elements having identical properties undergo phonology together; it is therefore unusual that disjunct prefixes are separated from the stem by a range of prefixes having contrasting properties, implying that the phonology which applies to the stem "turns off" while conjunct prefixes are derived and then "turns back on" again to derive disjunct prefixes. In this section I exemplify the contrasting properties listed in (2) and (3) and review the historical explanation of this surface ordering of phonological constituents given in Chapter 1. I then propose a synchronic account of this phonological patterning based on the word formation model presented in Chapter 3.

To illustrate Property (a), I list the consonants which can begin disjunct prefixes, and the smaller set of consonants which can begin conjunct prefixes.

¹ A precise statement of the distribution of shwa is given in Hargus (1988). Shwa never surfaces in a disjunct prefix. However, shwa may be found in the disjunct domain as part of an incorporated stem (position 2); even in this one case, the distribution of shwa is limited: shwa may only occur in stems of the shape CVC, not in stems of the shape CV.

- (4) Disjunct initials: d t t' n ts ts' z s dl tʃ tʃ'
 l ʃ j ch ch' g k k' kw gh w
 ?
- Conjunct initials: d n ts' z s
 ʃ ch gh w
 ?

To illustrate the vowel facts which distinguish disjunct and conjunct prefixes, note the following inventory of vowels occurring in disjunct prefixes.

- (5) i/i - nìchuts'ədexal '1pS wash up'
 = nì - chu - ts'...
 1 2
 adv inc stm
- e - chenebèts '2sS boil water'
 = che - n...
 1
 adv
- a - dàsetsùs '3sS hang up 0'
 = dà - `s...
 1
 adv
- o/ɔ - ?òdèetsùs '1sS threw away 0'
 = ?ò - d...
 1
 adv
- u - chunèsdɔ '3sS was drunk'
 = chu - n...
 2
 inc stm

Note that (5) does not include shwa.² In contrast, the vowel in a conjunct prefix is usually shwa or a high vowel.

To illustrate the difference in tonal properties between the two prefix types, consider the forms in (6) and (7). In (6), the adverbial disjunct prefix /ʔònè/, meaning "away" occurs. In (6a) /ʔònè/ is followed by a low-toned disjunct prefix, while in (6b) /ʔònè/ is followed by a high-toned conjunct prefix. Note that the low tone on both syllables is fixed regardless of what prefix follows it.

- (6) a. ʔònèdànwats'adèsat 'we went **away**'
 b. ʔònèditi'a 'you sg. run **away**'

In (7), the low tone on /mà/, an adverbial disjunct prefix meaning "(in a) circle" is stable regardless of what prefix follows it: in (a)-(c) high-toned conjunct prefixes follow /mà/, while in (d) a low-toned disjunct prefix follows /mà/.

- (7) a. ʔastí'ù **màsəsch'e** 'I build fence'
 fence I build
 b. ʔastí'ù **màwasch'eè** 'I will build fence'
 fence I will build
 c. **màdaya** 's/he walks **in circle**'
 d. ts'édawa **màk'èts'ədas** 'we walked the children around **in circle**'
 children we walked around in circle

In contrast, compare the (a) and (b) forms in (8) - (10). The prefixes in boldface are conjunct prefixes. In each case, in certain environments, a conjunct prefix may be marked with a low tone, while in other environments the same prefix is marked with high tone. The (b) forms illustrate the effects of the prefix /s/-conjugation (see chapter 2, section 1.5.3.3)

² See Note 1.

- (8) a. *dəji* 's/he is sick' b. *tədəsta* 's/he lost O'
 (9) a. *ts'əjin* 'we sing' b. *tàwuts'əschi* 'we carry them uphill'
 (10) a. *nəghəsʔi* 'I saw you' b. *danəsəsʔa* 'I hold you up'

In (8), both forms have a position 7 /d/. In (9), both forms have position 6 /ts'/. In (10), both forms have position 5 /n/. When a conjunct prefix precedes s-conjugation, as in all the (b) forms, it receives low tone.³ Significantly, if a disjunct prefix precedes s-conjugation, its tone is unaffected, as can be seen in (11).

- (11) *tusekwèn* 's/he has a fever'
 = tu - `s - kwèn
 1 8 stem
 adv cnj 'be hot'

Property (d), the different sets of phonological processes which affect disjunct vs. conjunct prefixes, is the subject of Sections 2 and 3 of this chapter. With respect to this property, it is worth noting that the above examples of specific disjunct prefixes show no alternations, whereas the surface vowels of conjunct prefixes do alternate, as in (8) - (10).

The historical explanation for the similarity of disjunct prefixes and the stem is that disjunct prefixes were once free stems which were later incorporated into the verb. This conclusion, documented in Li (1933), is forcefully supported by Kari (1975); Kari points out that in Eyak, considered to be a relic language which is related to Athapaskan and which has preserved properties of archaic Na-Dene, the verb begins with the direct object position, and what are disjunct prefixes in Athapaskan are preverbal elements in Eyak.

³ If the schwa preceding s-conjugation follows a position 7 consonant, as in (8b), then the schwa tenses to [e]. See section 3 for discussion.

Synchronically, the disjunct-stem pairing might be viewed as unusual in light of the surface discontinuity of the disjunct and stem domains. However, as claimed in Chapter 3, surface ordering is derived from an underlying structure where derivational prefixes are added to the verb theme before inflectional prefixes. Since derivation includes all disjunct prefixes and all inflection is in the conjunct domain, disjunct prefixes may be adjacent to the verb theme containing the stem at an early stage in the derivation, before most conjunct prefixes are added. This stage of the derivation has the representation in (12).

(12) Derived word (between mapping of disjunct and conjunct affixes)

[disjunct prefixes [(5) [(7) [cl-stem]]]]⁴

Notice that in (12), disjunct prefixes and the stem are not exactly adjacent: thematic prefixes in positions 5 and 7 may intervene. However, as I shall argue in Section 2.1, intervening conjunct prefixes do not interfere with applying phonology simultaneously to disjunct prefixes and the stem, since disjunct and conjunct prefixes have different underlying representations. I shall argue that conjunct morphemes generally do not have underlying vowels, while disjunct prefixes and the stem are minimally CV. Syllabification and other phonological processes thus apply over a continuous range which is unaffected by unsyllabifiable conjunct consonants, as shown in (13).

(13) [disjunct [(C₀) [(C₀) [cl-stem]]]]
 C V C V .. C V ...

This preliminary account of phonology assumes that major restructuring has occurred in HRB and other Athapaskan languages, where historically peripheral disjunct prefixes are synchronically verb-internal at a stage in word-formation where phonology applies. The magnitude of the restructuring

⁴ The representation is equivalent to the "verb base" as described by Sapir and Holjer (1967) and Karl (1979), among others.

assumed might seem excessive, were it not for the following supporting morphological evidence: (a) certain disjunct prefixes may occupy thematic positions, where they are semantically inseparable from the stem and other thematic prefixes and are underlyingly internal to both derivational and inflectional prefixes; (b) certain disjunct prefixes are conjugation choosers, where they determine the occurrence of more internal conjunct prefixes.⁵

In summary, the word formation model and phonological facts support each other, in that an intermediate representation during the word formation process unifies discontinuous phonological material whose phonological patterns are equivalent. A detailed description of the interaction of morphology and phonology is not appropriate at this point since a formal account of the different syllabification processes and phonological rules affecting disjunct, conjunct and stem domains has not yet been presented. In the next section, a description of HRB syllabification is given which includes in 2.4 a discussion of derivational levels resulting from phonology-morphology interaction.

2. HRB syllable structure

In this section I present an analysis of HRB syllable structure which is partially based on recent studies of Navajo phonology (cf. Wright 1983, 1987) and recent work on syllable theory (cf. Itô 1986). There are two facts to be accounted for: (1) the largely predictable surfacing of [ə] in the conjunct domain, and (2) the seemingly unpredictable shape of the final syllable in the conjunct domain. The first fact is dealt with by assuming that most conjunct vowels are epenthetic; this idea is presented in 2.1. The unusual properties of

⁵ The validity of (b) depends on the assumption that conjugation choice should be determined word-internally. This is an assumption which I make in the absence of evidence to the contrary.

the final conjunct syllable are presented in 2.2. An account of conjunct domain syllabification is given in 2.3. This account is based on mechanisms discussed in Itô (1986): syllable templates, epenthesis, and extraprosodicity; in addition, it is necessary for certain syllable positions to be prelinked in underlying representations to account for exceptional behaviour. The remainder of the section is devoted to explaining and demonstrating complete phonological derivations.

2.1 Epenthetic Conjunct Vowels

Within each Athapaskan language, there is one vowel which surfaces most often in conjunct prefixes. For example, in Chipewyan (Li 1946) and Slave (Rice 1988a, 1989b) this vowel is [e], in Navajo (Sapir and Hoijer 1967) this vowel is [i], and in Sekani (Hargus 1988) and HRB this vowel is [e]. In addition, these languages also have a "peg element" which is added to the verb when either there are no syllabic prefixes before the verb stem (as in Chipewyan, Slave, Sekani and HRB), or there are no conjunct prefix syllables besides the verb stem (i.e. - there are no syllables between the disjunct boundary and the stem, as in Navajo).⁶ This peg element consists of a conjunct vowel and sometimes a preceding consonant. Kari (1976) proposes the following rule of *i* insertion to account for the surfacing of this peg vowel.

(14) *i* insertion

$\emptyset \rightarrow i / * _ C_0 [$ where * = disjunct boundary, [= stem boundary

Wright (1983) proposes that conjunct prefix phonology can be simplified by

⁶ Epenthesis in Chipewyan, Slave, Sekani and HRB occurs in a second context in addition to that given in the text: an epenthetic vowel is inserted between a consonant-final disjunct prefix and the stem. This second type of epenthesis is usually distinguished from the first type given in the text, and it is the first type which is used to differentiate one group of Athapaskan languages from languages like Navajo.

extending the independently needed rule of peg vowel *i* insertion to include all occurrences of [i] in conjunct prefixes. In other words, all [i]'s in Navajo conjunct prefixes are epenthetic; consequently, the underlying representation of any [Ci] conjunct prefix is simply /C/. Wright shows that this makes it possible to distinguish disjunct and conjunct prefixes on the basis of underlying syllable shape: disjunct prefixes are CV and conjunct prefixes are C.

I adopt Wright's argument for claiming that most HRB conjunct prefixes are underlyingly C, with [ə] surfacing by epenthesis. The operation of epenthesis is explained in Section 2.3 as a result of mapping a syllable template. Before syllabification is presented I give the facts concerning the final syllable in the conjunct domain in the following section.

2.2 The Final Syllable in the Conjunct Domain

Most surface syllables in HRB are open, i.e. they are either (C)V or CVV. There are two environments in which syllables may be closed: the final syllable in the word, and the final syllable in the conjunct domain. In this section, I present the syllable patterns in the conjunct domain, specifying the conditions under which the final conjunct syllable is closed. An account of these facts is given in the following section.

The set of prefixes which may close a syllable in the conjunct domain are limited to positions 8, 9 and 10; i.e. - most prefixes in these positions alternate between being onsets and codas, while all other consonantal conjunct prefixes are invariably onsets. The list of prefixes which are invariably onsets is given in (15).

- (15) Group 1: Conjunct Prefix Onsets
- position 5 domain 3
 - position 6 domain 3
 - position 7 domain 2

I label these prefixes as "Group 1". Examples are given below.

(16) Examples of Group 1 (=invariable onsets)

a. **kanàsats'at** 's/he pinched me'

= ka - nà - s - 1 - ts'at

1 1 5 11 stem

adv adv 1s0 cl 'pinch O'

b. **təghək'òts** 'they kiss each other'

= t - gh - k'òts

5 6 stem

recip 3pS 'kiss O'

c. **nanats'əch'ì** 'we saw you customarily'

= na - n - ts' - d - ch'ì

3 5 6 11 stem

cust 2s0 1pS cl 'see O'

d. **na[?]ədədat'ets** 's/he kicked him/herself'

= nà - [?]d - d - d - [?]ets

1 5 7 11 stem

adv refl0 der cl 'kick'

e. **ts'atsal** 'we cry'

= ts' - tsal

6 stem

1pS 'cry'

f. **k'èghats'anats'ats** 'we stagger around'

= k'è - gh - ts' - n - ts'ats[?]

1 7 6 7 stem

adv der 1pS der 'fall'

g. **təzə kadədzus** 's/he whips dog'

= ka - d - dzus

'dog' 1 7 stem

adv der 'whip O'

[?] Notice that metathesis occurs between position 6 /ts'/ and position 7 /gh/. See Chapter 2, section 1.6.3 for discussion.

h. ʔəji 's/he is sweet'
 = ʔ - ji
 7 stem
 der 'be sweet'

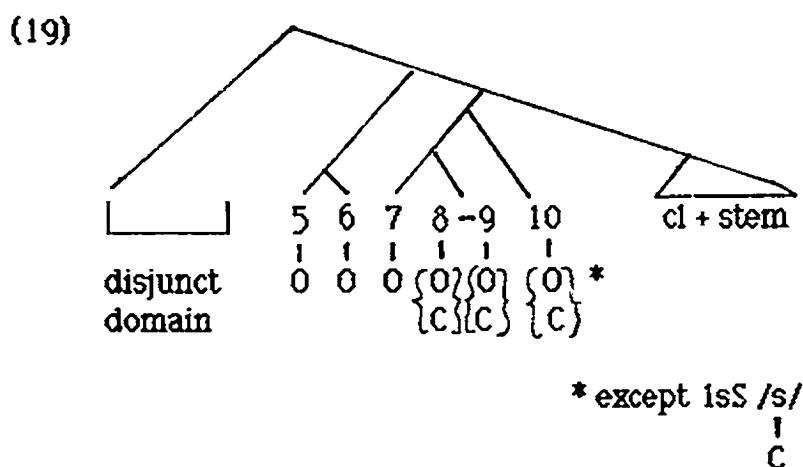
With the exception of 1sS /s/, which I deal with below, all prefixes in positions 8, 9 and 10 in domain 2 alternate between onset and coda. This is indicated in (17), where these prefixes are labelled group 2 (examples are given later in (20) and (21)).

(17) Group 2: Conjunct Prefix Onsets ~ Codas
 - position 8 }
 - position 9 } domain 2
 - position 10 }

Group 3 is constituted by 1sS /s/, which is invariably a coda (examples are given later in (22)).

(18) Group 3: Conjunct Prefix Codas
 - position 10 1sS /s/ domain 2

In (19) these syllable facts are viewed within the context of the surface representation of the verb resulting from affix mapping into the template.



A prefix in positions 8, 9 or 10 is a coda if it is the final prefix in the conjunct domain and is preceded by another conjunct prefix. Examples are given below.

(20) Examples of Group 2 codas

a. ʔatsit^8 's/he ate [something]'

= ʔ - gh - d - tsits
 5 8 11 stem
 unsp 0 cnj cl 'eat'

b. $\text{ts'esaghi}^9\text{ʔa}^9$ 'they wake me up'

= ts'e - s - gh - `n - ʔaʔ
 1 5 6 8 stem
 adv 1s0 3pS cnj 'wake up'

c. sònawədèskaf^{10} 's/he yawns'

= sòna - w - d - `s - kal
 1 5 7 8 stem
 adv arl 0 der cnj 'yawn'

⁸ Forms with [gh] as a syllable coda are subject to the rule of Backing Absorption which results in surface [Ca] from /Cagh/. See Section 3 of this chapter for an examination of this process.

⁹ Forms with [n] as a syllable coda are subject to Nasalization, which results in [Ci] from /Cən/. See Section 2.5.1 for discussion.

¹⁰ In (20 c), /s/ is a coda and not part of a complex /sk/ onset. In HRB, syllable onsets are always C, never CC. Apparent exceptions to simple onsets is the occurrence of affricates and glottalized consonants in onset position. To account for these onsets, I follow Rice's analysis of the underspecified features of Slave consonants. Affricates are underlying marked as [Δ continuant] (i.e. are marked as branching segments with respect to the feature [continuant]). A redundancy rule marks the second branch of segments thus marked as [+continuant]. Thus, affricate onsets occupy only one C slot. Glottalized consonants are marked as [+constricted glottis]; thus, they too are simple C's.

d. ts'enizat¹¹ 's/he woke up'

= ts'e - `n - n - zat

1 8 9 stem

adv cnj m 'wake up'

e. zixit¹² 'you kill O'

= z - n - h - xit

7 10 11 stem

der 2sS cl 'kill O'

If a prefix from positions 8, 9 or 10 (i) is not the final prefix in the conjunct domain, or (ii) is the only prefix in the conjunct domain, then it is an onset. Examples are given below.

(21) Examples of Group 2 onsets

a. i. daghas²at 'I am holding up O' (progressive)

= da - gh - s - ²a + t

1 8 10 stem progressive

adv cnj 1sS 'handle 3-D O'

ii. daghe²at 's/he is holding up O' (progressive)

= da - gh - ²a + t

1 8 stem progressive

adv cnj 'handle 3-D O'

b. i. chenas²a 'I put O in water'

= che - `n - s - ²a

1 8 10 stem

adv cnj 1sS 'handle 3-D O'

ii. chenats²at 's/he drowns'

= che - `n - l - ts²at

1 8 11 stem

adv cnj cl 'fall'

¹¹ See note 9.

¹² See note 9.

- c. i. **səsdà** 'I sit'
 = `s - s - d - dà
 8 10 11 stem
cnj 1sS cl 'sit'
- ii. **sədà** 's/he sits'
 = `s - d - dà
 8 11 stem
cnj cl 'sit'
- d. ii.¹³ **nətsəl** 'you sg. cry'
 = n - tsəl
 10 stem
 2sS 'cry'

1sS /s/ is distinct from Group 2 prefixes because it is always a coda, regardless of whether or not it is preceded by another conjunct prefix.

Examples are given below.

(22) Examples of Group 3 (=invariable coda)

- a. **əsjin** 'I sings'
 = s - d - yin
 10 11 stem
 1sS cl 'sing'
- b. **nətsət** 'I stand'
 = n - s - zət
 1 10 stem
 adv 1sS 'stand'

The facts about final conjunct syllable codas seem complicated. In Section 2.3 these facts are accounted for in terms of syllabification. More precisely, the correct syllable position for each segment is determined by the mapping of a

¹³ Since all position 10 subjects are final in the conjunct domain, there can be no examples showing position 10 /n/ followed by another conjunct prefix.

syllable template, with certain positions accorded special status as either extraprosodic or prelinked to a syllable position.

2.3 Conjunct Domain Syllabification

This account of syllabification accounts for the properties described in Sections 2.1 and 2.2: the surfacing of [ə], and the final syllable in the conjunct domain. When these facts are dealt with in linear phonology (for example, see Hargus (1988)), the domain 2 alternations between [C_{coda}] and [C_{onset} ə] appear arbitrary; Hargus' account, which posits the deletion of [ə] to produce [C_{coda}] forms, requires at least two separate rules, including a rule of Conjugation ə Deletion which is morphologically conditioned. I propose that these alternations are systematic manifestations of a principled syllabification process.

This account has three parts. First, in 2.3.1, is the operation which drives syllabification: the mapping of a syllable template according to proposals made by Itô (1986). Secondly, in 2.3.2, the relevance of extraprosodicity to "final position" phenomena is examined. Finally, I show in 2.3.3 that it is necessary to posit prelinked syllable positions to complete the account of the facts.

2.3.1 The Syllable Template and Stray Epenthesis

There have been two recent approaches to syllabification in the generative phonology literature. One approach, of which Levin (1985) is an example, has explicit rules in the phonology which create syllable structure. Other representatives of this approach include Kahn (1976) and Steriade (1982). In the second approach, which I adopt, the idea that syllabification is done by phonological rules sensitive to, for example, phonological features, is abandoned. Thus, Itô (1986, 1989) recasts syllabification in terms of mapping syllable templates onto a CV skeleton. For Itô,

syllabification consists of mapping the phonological string to the syllable template of the language. A syllable template is a kind of wellformedness condition defining the possible skeletal sequences of a language, e.g. [CCVC]...There are also other universal as well as language-specific wellformedness conditions on syllable structure beyond the simple skeletal sequencing... Language-specific wellformedness conditions... typically place restrictions on the class of segments which can be mapped to a certain template position.

(Itô 1986:4-5)

In other words, the source of syllable structure for any given string is an independently existing syllable template, which is a wellformedness condition replacing the syllable-building rules of other theories.

A given language has one syllable template to which phonological strings in the language are mapped. In addition to the syllable template, all languages adhere to the Universal Core Syllable Condition (UCSC) given in (23), which says that a sequence CV is interpreted as tautosyllabic.

(23) Universal Core Syllable Condition (UCSC)

IF	_____C__V_____
	\ /
THEN	6

(The sequence CV must belong to a single syllable.)

Mapping of the language-specific template is driven by the principle of Prosodic Licensing, which states that all phonological units must be prosodically licensed, i.e., belong to higher prosodic structure. The "higher prosodic structure" being spoken of here is syllable structure. Material that is not licensed is automatically eliminated. The mapping operation is unambiguous in that it adheres to the stipulated setting of the directionality parameter for the language. Thus, if a language has the syllable template [CCVC], with a

directionality parameter of right-to-left, the following CV string has the syllable structure in (24).

(24) b a b a b l a b l a b
 C V C V C C V C C V C
 \ / \ / \ \ / \ \ //
 6 6 6 6

Notice that with right-to-left mapping of the template [CCVC], onsets are maximized. In contrast, with the directionality parameter of a language set as left-to-right, syllable codas are maximized. This is shown in (25).

(25) b a b a b l a b l a b
 C V C V C C V C C V C
 \ / \ | / \ | / \ | /
 6 6 6 6

As described in 2.2, except for the conjunct domain-final syllable, HRB syllable structure follows a consistent CV pattern. (The conjunct domain-final syllable is accorded special status, as explained below.) Thus, a first approximation of the HRB syllable template is that in (26).

(26) HRB syllable template : [C V]

In a form like (27), mapping of the syllable template results in the syllabification in (28).

(27) kwe naja 'he went back inside'
 = 'inside' na - d - ya¹⁴
 3 11 stem
 rev cl 'motion'

(28) n a j a
 C V C V
 \ / \ /
 6 6

¹⁴ d + y coalesce to form [j] (see Chapter 2, 1.2.3.1 (34) for a description of this process known as the "D-Effect").

Notice that with a coda-less template like [C V], directionality of mapping is noncritical. Directionality is crucial only with templates including both onset and coda positions. As Itô explains,

- (29) "Right-to-left template mapping maximally incorporates segments into the onset and thus results in onset maximization (e.g. in Indo-European languages), whereas left-to-right mapping leads to coda maximization" (Itô 1986:10)

2.3.1.1 Epenthesis

There may be failure to achieve a one-to-one match between each syllabic constituent in the syllable template and segments. Specifically, segmental material (usually a consonant) may be left over after the syllable template is mapped across the string; this unsyllabified material is "stray". In Itô's theory, there are two ways of dealing with stray elements: they are deleted (= "Stray Erasure", a universal option), or a vowel is inserted into the string to allow a further mapping of the syllable template, thus saving the previously unsyllabified segment (= "Stray Epenthesis", a parametrized option). Only because both operations yield representations whose once stray elements are either eliminated or fully incorporated are these operations considered to be "stray operations". However, there is no distinction made between "stray" epenthesis and any other kind of "unmarked" epenthesis.

I assume that HRB chooses the parametrized option of Stray Epenthesis to handle stray material; Stray Epenthesis applies before Stray Erasure. Epenthesis takes the form "Map stray consonant to syllable template". Applying this option to the CV template, a stray C is mapped to the onset C of the template, and an empty slot is created in the segmental string to which the V of the template is mapped; this slot is filled in by default rules and surfaces as [ə].

Stray Epenthesis is demonstrated in the form (21 c ii), repeated here in

(30).

(30) sədà 's/he sits'

= s d à

C C V

Stray Epenthesis: s d à

C V C V

∨ ∨

6 6

Eventually: sədà

Stray Epenthesis derives all the forms in Group 1 (cf. (16)), as Stray Epenthesis forms CV syllables from underlying C prefixes, resulting in the C's being mapped to onset position.

In the next two subsections (2.3.2 and 2.3.3), an account of the syllable patterns of Groups 2 and 3 is given. This is followed in 2.4 and 2.5 with detailed derivations of a sample of all the forms discussed above.

2.3.2 Extraprosodicity

Extraprosodicity is the principle which accounts for codas in the conjunct domain.

As mentioned above, only two HRB syllables may have codas: the final syllable in the conjunct domain, and the final syllable in the word. These two positions have something in common: both constitute edges of a domain. One domain is the conjunct prefix domain, and the second domain is the word. Following Itô (1986), segments found at edge positions may be "extraprosodic". When extraprosodicity is defined on a syllable, it makes the extraprosodic segment invisible when the syllable template is mapped. Being invisible, the extraprosodic consonant is not considered stray, and is therefore licensed.

Recall that Group 2 prefixes surface as codas when they are final in the conjunct domain; if we assume that extraprosodicity is operative on the conjunct domain, we can express the coda generalization as: "Group 2 prefixes surface as codas when they are extraprosodic". This statement reveals an underlying systematicity in the syllable position alternations of conjunct prefixes.

Detailed derivations showing extraprosodicity are given in 2.4, following a discussion of derivational levels. At this point, I give simplified derivations which demonstrate the operation of extraprosodicity in a general way. The following simplified derivation for (20 e), repeated as (31), shows the general derivational pattern followed by all forms in (20).

(31) Derivation for (20 e) **zixit** '2sS kills O'
 = z - n - h - xit
 7 10 11 stem
 der 2sS cl 'kill O'

Input to Syll. Mapping **[z n [x i]]**¹⁵

Syll. Mapping [[z (n)] x i (l)]
 C V C V
 √ √
 6 6

-the outermost square brackets enclose the word. The bold square brackets enclose the conjunct domain. Segments in parentheses are extraprosodic: (n) is extraprosodic because it is final in the conjunct domain; (l) is extraprosodic because it is final in the word domain. Stem segments are unproblematically syllabified by Syllable Mapping. This leaves only one consonant, [z], in the conjunct domain. Without any vowels, this consonant cannot be syllabified, and is therefore stray. Stray Epenthesis results in [zə(n)], which eventually surfaces as [zi].

¹⁵ /h/ classifier is not represented in this derivation, as its underlying form requires discussion; see Section 3 for an in-depth exploration of /h/ in HRB.

By Stray Epenthesis I have given a general account of forms where prefixes are invariably onsets (Group 1); by extraprosodicity I have given a general account of instances of codas in forms where prefixes alternate between onset and coda (Group 2). I now introduce a constraint on extraprosodicity which helps to account for all instances of onsets in Group 2 forms.

Recall that there are two environments in which a Group 2 prefix is an onset: (i) it is not final in the conjunct domain; (ii) it is the only prefix in the conjunct domain. The explanation for onsets in environment (i) is already available given the mechanisms presented hereto: if a Group 2 prefix is not final in the conjunct domain, it is not extraprosodic, and will therefore be mapped to the onset C position of the CV template, with stray epenthesis filling in the rest of the syllable.

Why are Group 2 prefixes in environment (ii) syllable onsets and not syllable codas? As the only prefixes in the conjunct domain, they are also the final prefixes in the conjunct domain and therefore should qualify as extraprosodic. However, if the only material in a domain is extraprosodic, then the entire domain is extraprosodic. Hayes (1981) claims that when a similar situation arises in marking extrametricality in stress domains, extrametricality does not apply:

- (31) "...we must assume that extrametricality rules are blocked if their application would mark the entire stress domain . . . as [+ex(trametrical)]. This condition is apparently universal, and thus should not add any cost to the grammars of particular languages."
(Hayes 1981:74)

The Empty Domain Condition given in (31) is simply a formalization of this universal condition on extraprosodicity.

(32) Empty Domain Condition (E.D.C.)

* $a[\ x]_a$ where $[x]$ is extraprosodic
 and $a[\]_a$ = domain which is visible to syllable mapping
 and $a[\]_a$ is empty (except for $[x]$)

The E.D.C. is illustrated in the form given in (21 a ii), repeated here as

(33).

(33) $da\eta^{\text{a}}t$ '3sS holds up O' (progressive) (= (21 a ii))

[d a [gh] ? a (t)]

=Because $[gh]$ is the only prefix in the conjunct domain, the E.D.C. prevents it from being extraprosodic.

6 Mapping

[d a [gh a] ? a (t)]

C	V	C	V	C	V
\	/	\	/	\	/
6		6		6	

=Stray Epenthesis applies, and the correct form is derived.

By introducing extraprosodicity, the simple stray epenthesis account given in 2.3.1 of Group 1 (= invariable onset) forms is no longer as simple. Specifically, there are two categories of Group 1 forms which are problematic in an account which incorporates extraprosodicity. In addition, the account given so far cannot derive Group 3 (= invariable coda) forms. The following section (2.3.3) deals with one category of Group 1 problems and Group 3 problems; the second category of Group 1 problems is discussed in Section 2.4.

2.3.3 Prelinked syllable positions

The account given so far can be summarized in terms of its effects on the following three conjunct domain inputs:

- (34) i. [C]
 ii. [C C]

iii. [C C C]

These inputs are charted below, with column two listing the mechanisms which operate in syllabification of the given conjunct material and column three showing the output of the syllabification mechanisms.

(35)	Conjunct Domain		Syllabification Mechanisms		Output of Syllabification
i.	[C]	->	(Extraprosodicity blocked by E.D.C.) 6 Mapping Stray Epenthesis	->	[C ə] ∨ 6
ii.	[C C]	->	Extraprosodicity 6 Mapping Stray Epenthesis	->	[C ə C] ∨/ 6
iii.	[C C C]	->	Extraprosodicity 6 Mapping Stray Epenthesis	->	[C ə C ə C] ∨ \ / 6 6

(35 i) shows that whenever there is only one consonantal prefix in the conjunct domain, the prefix should be an onset. This is true with respect to all Group 1 and Group 2 forms. However, Group 3 (= invariable coda) forms show the opposite result. The crucial forms, given in (22), are repeated here as (36).

(36) Examples of Group 3 (=invariable coda)

a. əsjɪn 'I sings'
= s - d - yɪn
10 11 stem
1sS cl 'sing'

b. *nassat* 'I stand'
 = na - s - zat
 1 10 stem
 adv 1sS 'stand'

In both of these forms, 1sS /s/ is the only prefix in the conjunct domain. Therefore, this prefix should be subject to the E.D.C. and should not be subject to extraprosodicity. Mapping a CV template onto the non-extraprosodic phonological string should result in forms (37 a, b) for (36 a, b) respectively.

(37) a. *səjin

b. *nasasat

As mentioned before, 1sS forms are unique in that /s/ is invariably a syllable coda. The unique status of 1sS /s/ can be captured by proposing that 1sS /s/ is lexically marked as a coda, as shown in (38).

(38) Lexical entry for 1sS /s/: s
 |
 C | 6

Given (38), the account of syllabification proposed works for all (35 i) (i.e. [C]) inputs.

There are four Group 1 (= invariable onset) forms given in 2.2 which should include coda syllables according to (35 ii) and (35 iii), but do not. These forms are divided into two categories. Category 1 is comprised of (16d) and (16f), repeated here as (39) and (40).

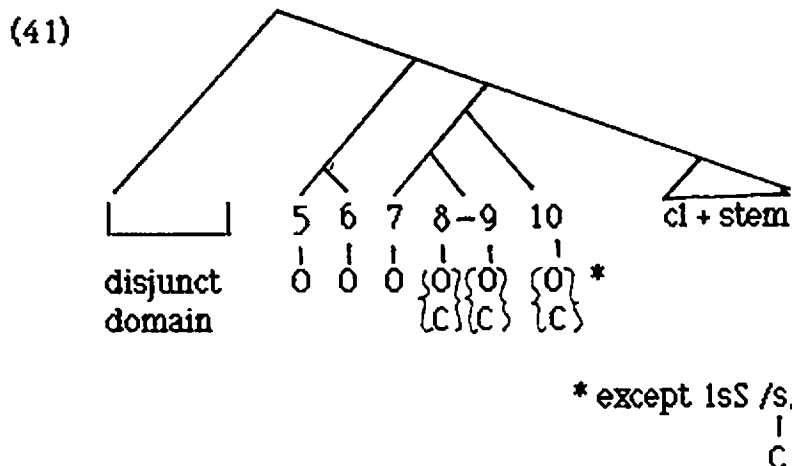
(39) *naʔadadətʔets* 's/he kicked him/herself'
 = nà - ʔd - d - d - ʔets
 1 5 7 11 stem
 adv **ref10 der cl** 'kick'

According to (35 iii), (39) should surface as *[nàʔadətʔets], with the final prefix surfacing as a coda.

(40) k'èghats'anats'ats 'we stagger around'
 = k'è - gh - ts' - n - ts'at
 1 7 6 7 stem
 adv der 1pS der 'fall'

According to (35 iii), (40) should surface as *[k'èghats'its'ats], with the final prefix surfacing as a coda.

In both (39) and (40), the onset which is expected to be a coda is a position 7 prefix. There appears to be some kind of constraint which prevents position 7 prefixes from surfacing as codas. I propose that the solution to this problem lies in the structure of the thematic template. Recall the summary of syllable facts given in (19), repeated here in (41).



Whenever there are at least two prefixes in the conjunct domain, the account I have proposed predicts that the final prefix should be extraprosodic and eventually surface as coda. Therefore, in (41), positions 6 and 7 should alternate between onset and coda just as positions 8, 9 and 10 do. In order to deal with the failure of position 7 to ever be a coda, I propose a constraint that domain heads in the thematic template must be syllable onsets. Therefore, since position 7 is a domain head, it must be a syllable onset.

(44) Constraint on Domain Heads

Domain heads must be mapped to onset.

Since position 7 is a domain head, it must be a syllable onset.

As a result of the constraint in (44), position 7 /d/ and position 7 /n/ in (39) and (40) respectively do not get mapped to coda as they would if they were in a non-head conjunct position.

The other category of problematic Group 1 forms are those in (17 b) and (17 c). In these forms, positions 5 and 6 are the only conjunct prefixes; we expect position 6 to be extraprosodic and to eventually surface as a syllable coda. However, in all forms position 6 is invariably an onset.

There are various ways to account for this: for example, it might be stipulated that position 6 is an onset position. However, position 6 is not a well-defined position in the template; in fact, position 6 is not even marked in the template. It would be desirable to maintain the positionally-based constraint that only template heads are required to be onsets. Therefore, I propose another solution for these forms, having to do with constraints on extraprosodicity. This solution is presented in the next section, where I discuss derivational levels in preparation for a series of full derivations given in section 2.5

2.4 Derivational Levels

In Sections 2.1 - 2.3 an account has been given of conjunct domain syllable patterns. In this section I incorporate this account into the larger picture of verb derivation, beginning with underlying representation and ending with surface form.

Recall from Chapter 3 that word formation follows the schema in (44).

(44) inflectional affixes(I)-derivational affixes(D)-[thematic affixes(T)+stem]
=thematic template

Affixes are added to the thematic template in the sequence shown in (44). Affix lexical entries include insertion frames which place affixes into their correct phonological positions; the Universal Mapping Principle (cf. Chapter 3 Section 2.3 (48)) triggers mapping from morpho-syntactic structure to phonological form in accordance with insertion frames. The first series of mappings will result in the structure in (45), where bold square brackets enclose the phonological word. Plain square brackets indicate the structural domains of the thematic template.

(45) I - D(conjunct) - **[[D(domain 4) - T - domain 1 affixes]]**
 =[[1-2-3-4 [5 [7 [11-stem]]]]]

The representation in (45) is the result of mapping all domain 4 affixes to the phonological word. This same representation was discussed in Section 1, where it was shown that the model of word formation allows a stage where disjunct affixes and the stem are placed close together and can undergo phonological processes in tandem. I propose that after domain 4 affixes have been inserted, the derivational level of disjunct-domain phonology is entered. Disjunct-domain phonology begins with syllable mapping. The syllable template in the disjunct domain is CV, where the final C in the word is extraprosodic. Syllable mapping results in the representation in (46), which is explained below.

(46) [[1-2-3-4 [5 [7 [11-stem]]]]]
 [[C V C V ... [(C) [(C) ... [C V (C)]]]]]
 V V V
 6 6 6

Before domain 4 affix insertion, the thematic template allows for verb themes that have any or all of the domain heads filled in by consonantal thematic prefixes. The second row of (46) indicates this by including parenthesized (C)'s in head positions 5 and 7; depending on the verb theme, one or both of these positions may or may not be filled by a consonantal thematic prefix. When

syllable mapping is done at this disjunct/stem derivational level, there is no Stray Epenthesis, so any thematic conjunct consonants present do not get syllabified. However, rather than being eliminated by Stray Erasure as in the theory of Itô, I assume that they remain stray until the stage of the derivation at which conjunct prefixes are inserted into the template; at this point, they must either be prosodically licensed or erased. Another way of thinking about this is to assume that the entire conjunct domain is extraprosodic at the point of disjunct/stem domain syllable mapping because it is at the right edge of the prefix domain. This is illustrated in (47).

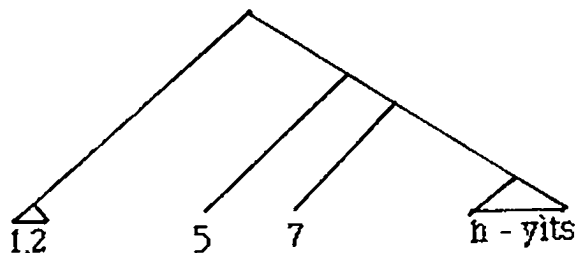
(47) [[DISJUNCT ([CONJUNCT])] [CL-STEM]]
 1-2-3-4 (5 7) 11-stem
 [[C V C V ... ((C) (C))] ... [C V (C)]]
 V V V
 6 6 6

The items in boldface in (47) represent that which is visible to syllable mapping at this derivational level.

In (48) a form is derived from initial word-formation through disjunct domain phonology.

(48) yanadànàghèghèsyits 'each [glass] broke again'
 = ya - na - dānā - gh - gh - `s - d+h - yits
 1 3 4 6 7 8 11 stem
 adv 'again' distr 3pS der cnj cl 'break'

theme:



derivational affixes:		Position	Domain	
	na	3	4	
	d	11	1	
	dà nà	4	4	
	gh	7	2	
	ya	1	4	
	-----end of disjunct			
	`s	8	2	domain
inflectional affixes:	gh	6	3	mapping
Disjunct				
domain mapping		[[ya na d`nà 5[7[[d+h - yits]]]]] ¹⁶		
Syllable		[[y a n a d`n à 5[7[[y i(ts)]]]]]		
Mapping		CVCVCVCV		CV
		∨ ∨ ∨ ∨		∨
		6 6 6 6		6

Following disjunct-domain phonology, the brackets enclosing domains 1 and 4 (the domains subject to disjunct-domain phonology) are erased by the Bracket Erasure Convention (see Kiparsky (1982)), and mapping of the remaining derivational and inflectional affixes outside of the phonological word is performed. This mapping results in the structure in (49).

$$(49) \quad [CVCV \dots [C \dots [CC \dots]] CV (C)]$$

$$\begin{array}{ccc} \vee & \vee & \vee \\ 6 & 6 & 6 \end{array}$$

At this point the derivational level of Conjunct-domain phonology is reached. The first step of the phonology is syllable mapping. I examine conjunct domain syllabification below, using (50) for reference, which is a "close-up" of the conjunct domain.

¹⁶ Since the d+h or "1" classifier is not accorded a timing slot and does not play a role in syllabification in this form, it is suppressed in the rest of the derivation. See Section 3 for a discussion of classifier representations.

i.e. Position: 5 6 7-10
 [C V C V []]
 √ √
 6 6

Why is a final position 6 C not extraprosodic? Evidently, a final C is blocked from extraprosodic status if it is in domain 3. This fact can be incorporated into the analysis by a simple stipulation: domain 3 consonants may not be extraprosodic. Can any motivation be found for such a stipulation? One possibility involves the structure of the thematic template during initial Syllable Mapping. Syllable Mapping is first done on the entire conjunct domain immediately after conjunct affix insertion into the template. At this point in the derivation, the conjunct domain is visibly divided into two smaller phonological domains, shown in (52).

(52) Position: 5 6 7-10
 [C C []]
 Domain: 3 2

Conceivably, position 6 does not qualify as an edge position within the conjunct domain as a whole, even if domain 2 is devoid of prefixes, because of the presence of domain 2 templatic structure. That is, in order for something to be at the right edge of a domain it must be adjacent to a right bracket. A position 6 C is not at the right edge of the conjunct domain according to this definition, and therefore cannot be extraprosodic and cannot surface as coda.

Let me summarize the claims I have made about Syllable Mapping in the conjunct domain. First, I assume that the conjunct domain syllable template is mapped over the entire conjunct domain after conjunct prefixes are inserted into the thematic template. The conjunct domain at this stage is divided into two domains: domain 2 and domain 3. Syllable Mapping is guided by the constraint that domain heads must be mapped to onset; in addition, the 1sS

prefix is prelinked to coda. Stray Epenthesis applies to fulfill the requirements of the template. Finally, I assume that the consonant at the right edge of the conjunct domain is extraprosodic. In order for a consonant to be at the right edge it must be adjacent to a right bracket; consonants in domain 3 are therefore never at the right edge of the conjunct domain and so are always mapped to onset.

Full derivations showing how the conjunct domain assumptions operate are given in Section 2.5.1. I now complete the account of derivational levels.

Following syllable mapping over the entire conjunct domain, a sub-level of conjunct-domain phonology is reached: domain 2 phonology. Domain 2 phonological rules apply on domain 2, after which domain 2 brackets are erased. This results in the structure in (53).

(53) [domain 4 [domain 3 domain 2] domain 1]

The next sub-level of conjunct-domain phonology is domain 3 phonology. Domain 3 phonological rules apply, after which the conjunct domain brackets are erased. This results in the structure in (54).

(54) [domain 4 domain 3 domain 2 domain 1]

At this point, the derivational level of word-level phonology is reached. At this level, extraprosodicity is off. Consequently, final consonants in the conjunct domain and in the word are made visible. These consonants must be syllabified. The word-level syllable template which incorporates these consonants is CVC. At this stage, word-level phonological rules apply.

The information presented in this section is summarized in (55).

(55) <u>Derivational Level</u>	<u>Syllable Template</u>	<u>Extraprosodicity</u>	<u>Epenthesis</u>
Disjunct-domain	CV	on	off ¹⁸
Conjunct-domain	CV	on	on
Word-level	CVC	off	off ¹⁹

2.5 Derivations and Domain-Sensitive Rules

This section begins with three derivations showing the different steps by which a final C is mapped to onset. This is followed by derivations showing the different steps by which a final conjunct-domain C is mapped to coda. One of the latter derivations involves the phonological rule of Nasalization discussed in Section 2.5.1.

When there is only one C in the conjunct domain, this C is mapped to onset by syllable mapping and Stray Epenthesis. Extraprosodicity is blocked by the Empty Domain Condition (E.D.C.). In the derivation below, non-conjunct material is already syllabified by syllable mapping during disjunct domain phonology. Thus, the derivation begins with syllable mapping in the conjunct domain, which is outlined in bold print.

¹⁸ If it is assumed that the conjunct domain is extraprosodic at disjunct-domain syllable mapping, then epenthesis can be on, but its structural description is never met. Thematic conjunct consonants are not syllabified at this level because they are extraprosodic. If it is assumed that thematic conjunct consonants are not extraprosodic but can be left stray until conjunct domain derivation, then epenthesis must be off at the disjunct-domain level; because epenthesis is off, thematic conjunct consonants do not get syllabified at this derivational level.

¹⁹ Evidence that Epenthesis is off at the word level is provided in Section 3, Derivation 4.

(56) daghaʔaʔ '3sS holds up O' (progressive) (= (21 a ii))

Input to Conjunct [d a [[gh]] ʔ a (ʔ)]
 Domain 6 Mapping C V C V
 \ / \ /
 6 6

=Because [gh] is the only prefix in the conjunct domain, the E.D.C. prevents it from being extraprosodic.

6 Mapping [d a [[gh ə]] ʔ a (ʔ)]
 C V C V C V
 \ / \ / \ /
 6 6 6

=Stray Epenthesis applies.

Word Level [d a gh ə ʔ a ʔ]
 C V C V C V C
 \ / \ / \ | /
 6 6 6

= Extraprosodicity is turned off. Word-final [ʔ] is incorporated into the final syllable in accordance with the word-level template [CVC].

When there is more than one C in the conjunct domain, there are two cases in which the final C is mapped to onset. The first case involves C's in the position of domain head which must be mapped to onset position. A derivation for (39) is given below.

(57) naʔadadətʔets 's/he kicked him/herself'
 = nà - ʔd - d - d - ʔets
 1 5 7 11 stem
 adv reflO der cl 'kick'

Input to Conjunct [n a [ʔd [d]] tʔ e(ts)]
 Domain 6 Mapping C V C C V
 \ / \ / \ /
 6 6 6

6 Mapping

[n a [ʔ d [d]]t' e(ts)]
 C V C V C V C V C V
 \ / \ / \ / \ / \ /
 6 6 6 6 6

= position 7 /d/ is mapped to onset position because it is the head of domain 2 in the template. Stray Epenthesis applies.

Word Level

[n a ʔ a d a d a t' e ts]
 C V C V C V C V C V C
 \ / \ / \ / \ / \ / \ /
 6 6 6 6 6

= Extraprosodicity is turned off. Word-final [ts] is incorporated into the final syllable in accordance with the word-level [CVC] template.

The last case in which a final C is not mapped to Coda is when the final C is in domain 3; domain 3 C's may not be extraprosodic. The derivation for (16 b) is an example; it is given in (58).

(58) Derivation for (16 b) təghək'əts

Input to Syll. Mapping [[t gh []] k' ə (ts)]
 C V
 \ /
 6

Syll. Mapping [[t gh []] k' ə (ts)]
 CV C V C V
 \ / \ / \ /
 6 6 6

= [gh] is not extraprosodic because it is not in edge position (i.e. it is not adjacent to a right bracket). The CV template is mapped twice, with Epenthesis applying to complete the syllables.

Word Level

[	ṭ	ə	gh	ə	k'	ɔ̄	ts]
	CV		C V		C	VC	
	\		\		\		/
	6		6		6		

=Extraprosodicity is turned off. Word-final [ts] is mapped to the final syllable in accordance with the word-level template [CVC].

There are two ways in which a conjunct domain-final C is mapped to coda. First, if this final C is 1sS /s/, the C is prelinked to coda position. In this case, the conjunct domain-final syllable has a coda regardless of whether the E.D.C. applies. A derivation which shows this is given in (59).

(59) Derivation for (36 a) asjin

Input to Syll. Mapping	[	[	[	s	]	]	j	i(n)]
			C				CV		
			/				\		
			6				6		

=Recall that the outermost bold brackets enclose the conjunct domain, while the innermost bold brackets enclose domain 2 of the conjunct domain. 1sS /s/ is lexically marked as a syllable coda.

Syll. Mapping

[	[	[	a	s	]	]	j	i(n)]
		V		C			CV		
		\					\		
		6					6		

= The CVC template is mapped. The minimal syllable in HRB must include a V, but the onset C need not be mapped if it does not find any material in the phonological string.

Word Level	[ə s j i n]
	V C C V C
	∨ ∨ /
	6 6

= Extraprosodicity is turned off. Word-final [n] is incorporated into the final syllable in accordance with the word-level template [CVC].

The second way in which a consonant is mapped to coda is if it is extraprosodic. At the word level, extraprosodicity is turned off and the word level syllable template, which includes a coda position, is mapped. A formerly extraprosodic consonant is mapped to this coda position. The first example of this type of mapping to coda involves /s/-conjugation. The following derivation is somewhat simplified, since /s/-conjugation derivations involve domain-sensitive rules which are discussed in Section 3. (These rules do not affect the steps in the derivation by which coda is mapped.) In Section 2.5.1 I show a derivation with /n/ coda and the rule of Nasalization. The other consonant which may be a coda, /gh/, involves a rule of Backing Absorption which is discussed in Section 3 along with the /s/-conjugation rules.

(60) Derivation for (20 c)	sònawədèskat	's/he yawns'
Input to Syll. Mapping	[s ò n a [w [d s]] k a (l)]	
	C V C V	C V
	∨ ∨ /	∨
	6 6	6
Syll. Mapping	[s ò n a [w [d (s)]] k a (l)]	
	C V C V	C V C V C V
	∨ ∨ /	∨ ∨ ∨
	6 6	6 6 6

=(s) is extraprosodic. The CV template is mapped, where [w] and [d] are mapped to onset and Stray Epenthesis applies.

Word Level

[sòna wadə skat]

CVCV CV CV CCVC

V \ / V \ / \ /

6 6 6 6 6

=Extrprosodicity is turned off. [s] and [l] are mapped to the coda of the syllables to their left, in accordance with the word-level template CVC. The vowel of the conjunct-domain-final syllable is tense; an account of vowel tensing is given in Section 3 of this chapter. The surfacing of tone on this vowel is also discussed in Section 3. Word-final [l] undergoes the word-level rule of continuant devoicing, whereby word-final continuants are devoiced. This results in the surface form [sònawadəskat].

2.5.1 Nasalization

A rule of nasalization is assumed in the derivation for (62). A rough version of nasalization is as follows.

(63) Nasalization

Vn]6 → Ṽ

(64) Derivation for (20 e)

zixit̃

'2sS kills O'

Input to Syll. Mapping

[[[z n]] x i (l)]

C V

V

6

Syll. Mapping

[[[z (n)]] x i (l)]

C V

C V

V

V

6

6

=(n) is extrprosodic because it is final in the conjunct domain; (l) is extrprosodic

	because it is final in the word domain. Stray Epenthesis applies in the conjunct domain to save [z].
Word Level	[z ɛ n x i l] C V C C VC \ / \ / 6 6 -Extrprosodicity is turned off. [n] and [l] are mapped to syllable codas in accordance with the word-level template [CVC].
Nasalization	[z̥ɛ̃l] (a rule of vowel raising has also applied)

In this section, I have given an account of syllabification which uses the mechanisms of template mapping, extrprosodicity, and prelinked syllable positions. These mechanisms account for all surface occurrences of [ɛ], making it possible to underlyingly represent most conjunct prefixes as simple /C/'s. The facts of [ɛ] occurrence were shown to be as follows: (a) [ɛ] occurs between any two consonants in the conjunct domain; (b) [ɛ] occurs only sometimes between the final consonant in the conjunct domain and the stem-initial consonant. The restriction on [ɛ] distribution in (b) seems odd, and contributes to the notion that phonological alternations in Athapaskan languages are arbitrary and unsystematic. However, we have seen that the distribution of [ɛ] is governed by the following processes and principles: Stray Epenthesis (i.e. - an operation which saves consonants not syllabified by syllable template mapping), extrprosodicity, and prelinked syllable positions. Thus, [ɛ] regularly surfaces to break up conjunct C clusters in accordance with the CV template, and the only place where [ɛ] does not regularly do so is in final position in the conjunct domain, which is a unique position because it is extrprosodic. The limited set of cases in which there is epenthesis in final position involve domain head onsets in position 7 or restrictions on extrprosodicity in domain 3.

Other vowels besides [a] may surface in the conjunct domain. I will show that surface vowel quality can be derived to a large extent, thus maintaining the claim that most conjunct prefixes are underlyingly /C/. In the next section, I derive all conjunct domain occurrences of [e/è] and [a]. The occurrence of [e] is determined by the presence of either /h/ classifier or /s/-conjugation, while the occurrence of [a] is determined by the presence of 2pS, /gh/, or /x/.

3. [e] and [a] in the Conjunct Domain

In this section the surfacing of the conjunct vowels [e] and [a] is examined.

3.1 The Distribution of [e] and [a]

The occurrence of the vowel [e] in the conjunct domain is restricted to the following environments.

(64) [e] in the conjunct domain

(i) {word boundary, conjunct consonant} ___ /h/ classifier (cf. (65))

(ii) domain 2 conjunct consonant ___ /s/ conjugation (cf. (67))

(65) (a) degàsh 's/he is black'

= d - h - gàsh

7 11 stem

der cl 'be black'

(b) ?atsàn nawexij 's/he wants to thaw meat'

= 'meat' na - w - h - ghij

1 9 11 stem

adv mode cl 'melt'

(66) shows that the vowel following /w/ mode in (65b) is [a] in the absence of /h/ classifier.

(66) atsən nawəghij 'meat thaws' (Opt.)

= 'meat' na - w - ghij
 1 9 stem
 adv mode 'melt'

(67) sònawədèskaf 's/he yawns'

= sòna - w - d - `s - kal
 1 5 7 8 stem
 adv arl 0 der cnj 'yawn'

When [e] occurs before /s/-conjugation, it is always marked with low tone, as (67) shows.

The context for [e] described in (64ii) includes forms which are less transparent than (67). These more opaque forms can be grouped into two categories. The first type of form differs from (67) in the syllable position to which /s/ conjugation is first mapped: in (67), /s/ is mapped to syllable coda; in (68) below, /s/ is first mapped to a syllable onset, and is later deleted.

(68) sònawədèeskaf '1sS yawns'

= sòna - w - d - `s - s - kal
 1 5 7 8 10 stem
 adv arl 0 der cnj 1sS 'yawn'

We know from the morphemes in (68) that /s/ conjugation is present (i.e. position 1 /sòna/ chooses /s/ conjugation). Therefore, the domain 2 segmental string is underlyingly /d `s s/. In addition to the occurrence of [è] before /s/ conjugation and the eventual deletion of /s/ conjugation, (68) shows that the vowel which is originally inserted between position 8 /s/ and position 10 /s/, and which is adjacent to [è] on the surface, is also phonetically [e].

A second environment where [è] surfaces, but /s/ conjugation is not phonetically present, is exemplified in (69). In this form, /s/ conjugation is underlyingly adjacent to /h/ classifier.

- (69) k'ets'anèch'è? 'we count O'
 = k'e - ts' - n - `s - h - ch'è?
 1 6 7 8 11 stem
 adv 1pS der cnj cl 'count O'

An important point to note about these facts is that the occurrences of [e], [è] and [èè] are totally predictable. Moreover, these vowels are in complementary distribution with [ə]. That is, in a subset of the environments where [ə] (the unmarked, empty vowel) is expected as a result of syllabification, [e/è] surfaces. The analysis in Section 3.2 is an attempt to capture these facts; however, regardless of the particular analysis proposed, the facts show that [e/è] need not be underlyingly represented.

Another conjunct vowel whose distribution is predictable is [a]. The occurrence of the vowel [a] in the conjunct domain is restricted to the following environments.

- (70) [a] in the conjunct domain

(i) ___ /x/ (cf. (71))

(ii) ___ /gh/, Condition: /gh/ must be a coda (cf. (72))

(iii) ___ (cf. (74))
 2pS morpheme

- (71) t̄anaxale '3sS carries 2pO uphill'
 = t̄a - nx - gh - le
 1 5 8 stem
 adv 2pO cnj 'handle pl. O'

- (72) a. t̄ayədacheŋe '3sS will carry up 3sO' (Future)
 = t̄a - y - d - gh - h - che + ŋe
 1 5 7 8 11 stem future
 adv 4O asp cnj cl 'handle animate O'

b. *tàanaxale* '3sS carries 2pO uphill'
 = *tà* - *nx* - **gh** - *le*
 1 5 8 stem
 adv 2pO cnj 'handle pl. O'

Notice in the examples in (72) that [a] surfaces in forms having a /gh/ morpheme which is underlyingly in the extraprosodic position, i.e. /gh/ is the last consonantal prefix in the conjunct domain. This is a position which is mapped to coda at the word level. In these forms, the potential /gh/ coda does not surface, and the final vowel in the conjunct domain is [a]. When /gh/ is not extraprosodic, as in (73) below, (i.e. when /gh/ is mapped to onset, in this case because it is in domain 3), [a] does not surface.

(73) *ʔəghəkʔots* 'they kiss each other'
 = *ʔ* - **gh** - *kʔots*
 5 6 stem
 recip 3pS 'kiss O'

Notice that the requirement of being a potential coda does not apply to /x/; in (71), [a] surfaces before an /x/ onset.

Examples of [a] surfacing in 2pS forms are given in (74).

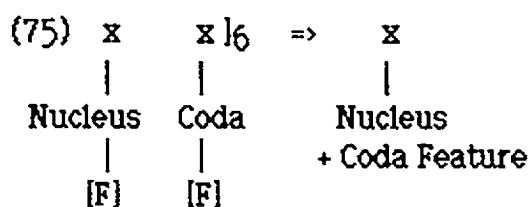
(74) a. *ʔüya aʔi* '2pS are shy'
 = ___ - *li*
 10 stem
 2pS 'be'

b. *dàsatsus* '2pS hang up cloth-like O'
 = *da* - 's - ___ - *h* - *tsus*
 1 8 10 11 stem
 adv cnj 2pS cl 'handle cloth-like O'

c. *naakwi* 'you pl. vomit'
 = *na* - ___ - *kwi*
 1 10 stem
 adv 2pS 'vomit'

Like [e], [a] is in complementary distribution with [ə]. There are never any other vowels in the contexts listed for [a], and these contexts substitute a subset of the contexts where we would expect Stray Epenthesis to insert an empty vowel slot.

The gist of the analysis of [a] presented in 3.3 involves a process of Coda Absorption. This process is roughly represented in (75).



I first present an analysis of conjunct domain [e] in 3.2, followed by an analysis of conjunct domain [a] in 3.3.

3.2 Analysis of conjunct domain [e]

There are two questions which need to be answered to analyze the [e] facts. First, what exactly is surfacing as [e]? That is, how is [e] to be represented? Secondly, why do /h/ classifier and /s/-conjugation trigger [e]? (And concomitantly, why does [e] surface with low tone when preceding /s/-conjugation?). The general answer to these questions is that there is something about the underlying representations of /h/ classifier and /s/-conjugation which causes the representation of the preceding vowel to be that of [e]. The first question, concerning the representation of [e], is discussed in 3.2.1.

3.2.1 Representation of [e]

A fully specified representation of [e] includes the following features:

- (76) [-high]
 [-low]
 [-back]
 [-round]
 [+tense]

I am assuming a general version of underspecification, where predictable values do not need to be underlyingly represented. However, features which are crucially referred to by phonological rules do need to be underlyingly represented. In the analysis I propose, the value [+tense] is crucially referred to by a phonological process of tensing prior to the stage of complete specification of values, so there is motivation for specifying [e] as [+tense] underlyingly. As for the rest of [e]'s features, most of them have the universal default values suggested by Archangeli and Pulleyblank (1988:353) (see Appendix for a chart of underspecified vowel features, and a list of redundancy and default rules).

For the analysis presented here, I assume that [e] is underspecified as only [+tense]; therefore, there is something about the representations of /s/-conjugation and /h/ classifier which effect the tensing of the epenthetic vowel. I first consider the representation of /h/ classifier and how this representation effects tensing.

3.2.2 /h/ classifier Tensing

3.2.2.1 Representation of /h/ classifier

HRB /h/ classifier, unlike /h/ classifier in the related dialects of Sekani and Doig River Beaver, is never audibly pronounced as [h]. However, /h/ classifier does have a number of effects on adjacent segments. A representation of /h/ classifier must reflect the following facts about /h/ classifier effects.

(77) /h/ classifier effects

(a) If the stem segment which follows /h/ classifier is a continuant, it is always voiceless (cf. (78)).

(b) If /h/ classifier is preceded by the conjunct vowel shwa, the vowel is realized as [e].²⁰

(c) If /h/ classifier is preceded by a consonant which could potentially be mapped to coda position, that consonant is never phonetically present (cf. (81)).

(78) (a) dets'à tadèfa 's/he loses dishes'
 = d - ts'à ta - d - `s - h - la
 refl 'dishes' 1 7 8 11 stem
 adv der cnj cl 'handle O'

(b) ?etsèn nawexij 's/he wants to thaw meat'
 = 'meat' na - w - h - ghij
 1 9 11 stem
 adv mode cl 'melt'

(c) ts'esènjæt 's/he woke me up'
 = ts'e - s - `n - n - h - zæt
 1 5 8 9 11 stem
 adv 1sO cnj mode cl 'wake up'

(79 a-c) shows verb stems which are phonemically the same as those in (78 a-c), but which are not preceded by /h/ classifier. Notice that in these cases, the continuants are voiced.

(79) (a) ?èdadèla 's/he is lazy'
 = ?èda - d - `s - l - la
 1 7 8 11 stem
 adv der cnj cl ?

²⁰ Any disjunct vowel may occur before /h/ classifier.

- (b) ?atsən nawəghij 'meat thaws' (Opt.)
 = 'meat' na - w - ghij
 1 9 stem
 adv mode 'melt'
- (c) ts'enizat 's/he woke up'
 = ts'e - `n - n - zət
 1 8 9 stem
 adv cnj mode 'wake up'
- (80)(a) ?atsən nawexij 's/he wants to thaw meat'
 = 'meat' na - w - h - ghij
 1 9 11 stem
 adv mode cl 'melt'
- (b) degāsh 's/he is black'
 = d - h - gāsh
 7 11 stem
 der cl 'be black'
- (81)(a) dats'à tadəta 's/he loses dishes'
 = d - ts'à ta - d - `s - h - la
 refl 'dishes' 1 7 8 11 stem
 adv der cnj cl 'handle O'
- (b) k'ets'anèch'è? 'we count O'
 = k'e - ts' - n - `s - h - ch'è?
 1 6 7 8 11 stem
 adv 1pS der cnj cl 'count O'

The representation of /h/ classifier must allow all three of the effects in (77) to be achieved.

Let us first consider effect (77 a), the voicelessness of following (stem-initial) continuants. This is a widespread characteristic of /h/ classifier, evidenced in many Athapaskan languages.

There are a number of ways to account for the voicing difference in the stem-initial continuants of forms (78 a-c) versus (79 a-c). Notice that the difference in meaning between (78 b-c) and (79 b-c) involves transitivity:

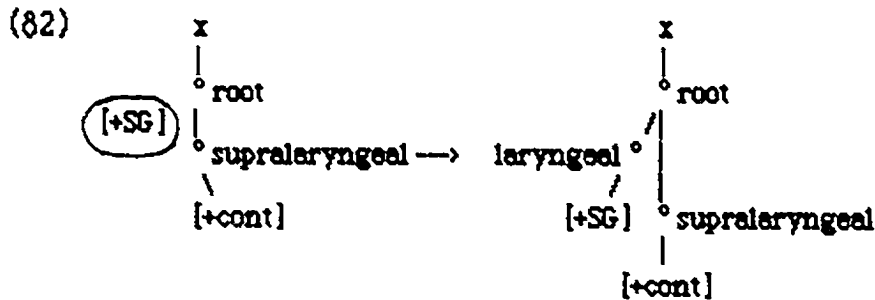
(78 b-c) represent the transitive forms of (79 b-c). One unlikely solution is to claim that transitivity is phonologically manifested by a rule of continuant devoicing of the stem-initial consonant. A more likely alternative is that transitive forms have some morphological transitive marker which combines with the stem-initial consonant to effect devoicing. In other Athapaskan languages (e.g. Slave, Sekani), the transitive marker is /h/ classifier, which is phonetically manifest as [h] preceding the devoiced stem-initial.²¹ In HRB, the "devoicer" exists at a more underlying level.

The devoicing effect of /h/ classifier has been examined in recent analyses of Navajo (Wright 1983, 1985, Speas 1984) and Slave (Rice 1989a, b). In Speas' account, /h/ classifier is underlyingly associated to a C slot; it then undergoes a rule which deletes the C slot, causing /h/ to link to the stem-initial C. This doubly linked C is devoiced if it is a continuant as a result of some unspecified feature of /h/. Wright (1985) also ends up with /h/ classifier in a doubly linked configuration; however, in this case /h/ is doubly linked with the subject prefix to a syllable coda preceding the stem-initial consonant (i.e. when the subject prefix is inserted into the word it links to /h/'s coda position). Devoicing is performed on the melody tier, so it is unnecessary for /h/ to be linked to the stem-initial consonant. Thus, in both these analyses, /h/ originally occupies a timing unit which it either loses by phonological rule (Speas) or shares by the insertion of another prefix to occupy /h/'s syllable position (Wright), and devoicing is accomplished by stem-initial adjacency to [h], although the actual devoicing feature or mechanism is not specified.

Rice (1986, 1989b) proposes that all classifiers in Slave are floating features, since there is no evidence that classifiers occupy a timing slot. She

²¹ Historically this [h] derives from Proto-Athapaskan *ʔ (voiceless l).

proposes that the /h/ classifier in Slave consists of a floating [+SG] feature, where [+SG] stands for "spread glottis". Alternations in stem-initial voicing are accounted for by the spread of this floating [+SG] feature to the stem-initial continuant, as in (82).



I follow Rice in accounting for devoicing by means of the feature [+SG]. However, HRB /h/ classifier differs from Slave /h/ classifier in that it is not floating. One problem with adopting Rice's floating analysis for HRB is that it does not provide an account for effect (77 b), the occurrence of [e] before /h/ classifier; it would be difficult to attribute a phonological process such as tensing to [e] to a conditioning environment consisting of a floating feature.

In order to account for the occurrence of [e], two possibilities come to mind. One is a concrete analysis: a feature [+tense] spreads leftward in every context where [e] occurs; that is, the feature [+tense] is associated with both /h/ classifier and /s/-conjugation, and spreads to the vowel on the left. This analysis has some support in that consonants like /h/ and /s/ which are [+SG] (i.e. are pronounced with a widened glottis) have greater supraglottal pressure, making them tense.²² However, if any consonant which is [+SG] is also tense,

²² Heightened supraglottal pressure is what causes voicelessness; Chomsky and Halle (1968) associate this type of pressure with the feature [tense]. Thus, [+tense] and [+widened/spread glottis] are considered equivalent in Chomsky and Halle. Heightened subglottal pressure is what causes aspiration; this type of pressure is not associated with tension in Chomsky and Halle.

then why is vowel tensing not produced before other [+SG] consonants? Most notably, why should /s/-conjugation cause tensing, and not 1sS /s/ (or any of the other voiceless consonants in HRB such as /t/, /ts/, /k/, etc.)?

A second possibility for accounting for [e] is to opt for a more abstract solution which would make it unnecessary to stipulate that /h/ classifier and /s/-conjugation are [+tense] in a way that other voiceless consonants are not. Ideally, the solution would not involve phonetic features per sé, since there are no phonetic features which are unique to /h/ classifier and /s/-conjugation.

The analysis which I adopt is based on the recognition that tense vowels are often associated with length. Jakobson and Halle (1962) differentiate tense vowels from lax vowels precisely in terms of length, claiming that tense and lax vowels have the same articulatory target, but tense vowels are more precisely articulated and thus better able to reach and maintain that target; as a result of more precise articulation, tense vowels are generally longer than lax vowels. In other analyses also, tenseness is assumed to result from lengthening. For example, Halle and Mohanan (1985) (H & M hereafter) propose the rule of Long Vowel Tensing for English, given in (83).

(83) Long Vowel Tensing (H&M 1985)

		Rime	
		/ \	
		x x	x = unspecified timing slot
[-cons] ---> [+tense]	/	—	[-cons]

Notice in (83) that length of the vowel is represented metrically as a branching rime.

Following sources like H&M, I claim that the branching rime configuration in (83) is a requirement for tenseness. This configuration is created in HRB by

the combination of the epenthetic vowel and a timing unit provided by /h/ classifier. Thus, in this analysis, a timing unit is posited for /h/ classifier to account for why /h/ is the only classifier with a consistent leftward effect.²³

I propose the following representation for /h/ classifier.

- (84) /h/ classifier: [+SG] (= feature tier)
 |
 C (= CV tier)
 /
 6 (= syllable tier; this notation signifies that
 /h/ classifier is prelinked to Coda)

One question which arises from this representation is why /h/ classifier is a C on the CV tier. This will become clearer later in the analysis. The analysis will show that if /h/ classifier is a V, then Stray Epenthesis need never apply, in which case the V is never part of a branching rime and consequently never tensed.

A second question which arises from the representation in (84) is why /h/ classifier needs to be prelinked to Coda. The answer is that prelinking to

²³ In some /l/ classifier forms, the vowel preceding /l/ classifier is tensed, as in the form below.

setswas '3sS springs O' (e.g. mousetrap)

= `s - l - tswas

8 11 stem

cnj cl 'spring O'

However, in other forms the vowel preceding /l/ classifier is not tensed, as in the following form.

tàseti'a '3sS runs uphill'

= tà - `s - l - ti'a

1 8 11 stem

adv cnj cl 'motion'

In this analysis I do not provide an account of /l/ classifier complexities; I assume that, due to the extreme opacity of the classifier morpheme, some reanalysis is occurring, but I do not venture to describe the details of the reanalysis.

coda prevents /h/ classifier from being mapped to syllable onset. /h/ classifier always precedes the stem-initial consonant, producing a CC cluster. If /h/ classifier is an unsyllabified C, it could get mapped to onset, producing the incorrect sequence *CVC by Stray Epenthesis, where the second C is stem-initial. Therefore, /h/ classifier is prelinked to coda position.

The [+SG] feature in (84) is eventually delinked and spread to the right. The details of this analysis are given in the following section.

3.2.2.2 Analysis of Tensing

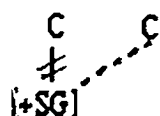
The analysis of /h/ classifier tensing is a metrical one; that is, tensing results from branching rimes. There are two parts to the analysis. First, in 3.2.2.2.1, I show how Compensatory Lengthening produces a branching VV rime. Secondly, in 3.2.2.2.2, I show how tensing results from a branching rime. Following this exposition of the mechanics of the analysis, a sample derivation is done in Section 3.2.2.2.3.

3.2.2.2.1 [+SG] Delinking and Compensatory Lengthening

Recall from 3.2.2 that two of the effects of /h/ classifier are: (i) if the stem segment which follows /h/ classifier is a continuant, it is always voiceless (cf. (77 a)), and (ii) if /h/ classifier is preceded by a conjunct vowel, that vowel is always [e] (cf. (77 b)).

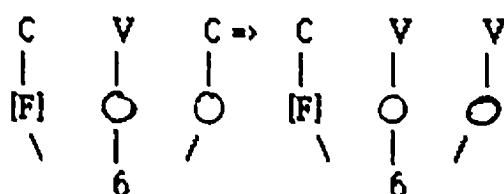
The first effect is accounted for by a Domain 1 rule of [+SG] Delinking and Rightward Association, given in (85).

(85) /h/ classifier Delinking and Association



The output of (85) is a featureless coda consonant. I propose that a rule of Compensatory Lengthening, given in (86), replaces a featureless coda consonant with a vowel.

(86) Compensatory Lengthening

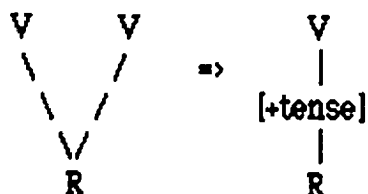


A branching VV rime is the result of Compensatory Lengthening. In the next section I state how this configuration yields the tense vowel [e].

3.2.2.2.2 Tensing

I assume that the long vowel which makes up a branching rime is interpreted as a tense vowel. This is represented in (87).

(87) Tensing



Before doing a derivation which illustrates the rules presented above, I summarize the analysis so far. I have shown that [e] is an epenthetic vowel which is in complementary distribution with [ə]. I claim that [e] is a tensed form of the epenthetic vowel which occurs before /h/ classifier. /h/ classifier has a timing slot which forms a branching rime with the epenthetic vowel as a result of Compensatory Lengthening. The branching rime is marked as tense, resulting in [e].

3.2.2.2.3 A Sample Derivation

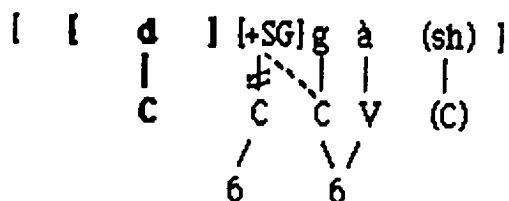
The following derivation and all other derivations in Section 3 are presented in the following manner. Part A of each derivation lists the phonological processes relevant to that derivation. Part B shows the input to conjunct domain syllable mapping; since my focus in this part of the chapter is conjunct domain phonology, the derivations omit the steps of derivation prior to conjunct domain phonology (i.e. disjunct domain mapping to phonology, disjunct domain phonology, and conjunct domain mapping to phonology). Part C shows syllable mapping on the conjunct domain. Finally, Part D gives the remainder of the derivation, including whatever processes were presented in Part A.

Derivation 1

(88) degàsh 's/he is black' (= (65 a), (80 b))
 = d - h - g à sh
 7 11 stem
 der cl 'be black'

A. /h/ classifier Delinking and Association
 Conjunct Domain Syllable Mapping
 Compensatory Lengthening
 Tensing

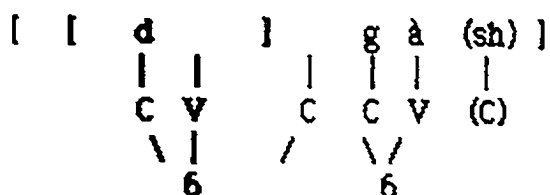
B. Input to Conjunct Domain Syllable Mapping



B shows the original representation of /h/ classifier, as well as the effect of /h/ classifier Delinking and Association, which applies at disjunct/stem domain phonology. It must be stipulated that association affects only continuants, since the association does not result in aspiration of /g/ (which is a voiceless unaspirated stop). Notice that the word-final consonant is

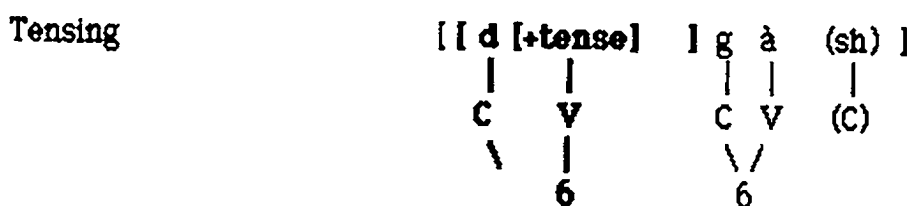
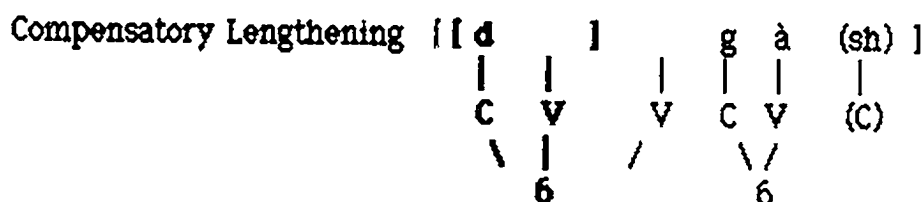
extraprosodic and therefore is not mapped at disjunct/stem domain syllable mapping.

C. Syllable Mapping



Stray Epenthesis applies in the conjunct domain to produce a CV syllable. Note that if /h/ classifier were a vowel instead of a consonant, there would be no need for epenthesis, leading to the incorrect form [*degàsh].

D. Conjunct Domain Phonology



Eventually [degàsh]

3.2.3. /s/ conjugation Tensing

A domain 2 conjunct vowel to the left of /s/ conjugation is always [e]; moreover, this vowel is always marked with low tone. If a domain 3 conjunct vowel precedes /s/ conjugation, it surfaces as [e]; that is, low tone consistently appears on conjunct vowels before /s/ conjugation, but the low-toned vowel is only tensed in domain 2.

3.2.3.1 Representation of /s/ conjugation

The representation of /s/ conjugation includes the representation of /s/, given roughly in (89), as well as some representation of low tone (henceforth L).

(89) C
|
s

How is L represented? One possibility is that L is a floating feature, located on its own tier; it associates to the vowel slot to the left of [s]. I discount this possibility for the following reason: L does not associate to any other vowel slot if no slot is available to the left of [s]; if L were floating, it would associate to any vowel in its domain, including the vowel to the right of /s/ conjugation if there were no vowel on the left. That is, the distinction between the position "left of /s/" and the position "right of /s/" is meaningless to a floating feature; only attached features can recognize the notions of left and right. An example which shows the failure of a floating L to associate to a vowel in its domain is given in (90), where /s/ conjugation is word-initial. A floating L would associate to the vowel following [s] in this context, but in (90) this vowel is unmarked for tone.

(90) sedà 's/he sits'
= `s - d - dà
 ø 11 stem
 cnj ci 'sit'

Therefore, L must be linked to a timing slot.

There are three possibilities for L linking: L is underlyingly linked to [s]'s timing slot (91), L occupies its own V timing slot to the left of [s] (92 a), or L occupies its own C timing slot to the left of [s] (92 b).

- (91) C
 |
 s
 |
 L
- (92) (a) V C
 | |
 L s
- (b) C C
 | |
 L C

I argue below that the representation in (92 a) leads to wrong results, while the representation in (91) does not pose problems for an analysis of tensing. The representation in (92 b) merits some further comment, as its adoption has both advantages and disadvantages in comparison to (91). There are discussed in 3.2.3.4. Let us first consider the problems of the representation in (92 a).

Consider the two morpheme-by-morpheme representations in (93).

- (93) (a) `s - s - d - dà 'I sit'
 8 10 11 stem
 cnj 1sS cl 'sit'
- (b) `s - d - dà 's/he sits'
 8 11 stem
 cnj cl 'sit'

If there is a low-toned vowel slot to the left of /s/-conjugation [s], this slot should be manifest in these forms, resulting in (94 a) as the surface form of (93 a). The correct form is given in (94 b).

- (94) (a) *`sasdà
 (b) sasdà

A second problem with the low-toned vowel slot in (92 a) is that it prevents (93 b) from being subject to the E.D.C.; that is, the vowel slot makes it possible for [s] of /s/ conjugation to be extraprosodic and eventually surface as

a coda. This results in (95 a) as the surface form of (93 b), as opposed to the correct form in (95 b).

(96) (a) *àsà

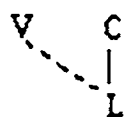
(b) sà

Thus, there appears to be counter-evidence to the existence of an independent low-toned vowel slot in the representation of /s/ conjugation. The representation in (91) does not posit a separate slot for L, thus avoiding the above problems. I adopt (91) as the representation of /s/ conjugation in the following analysis of /s/ conjugation tensing.

3.2.3.2 Analysis of /s/ conjugation tensing

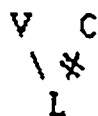
This analysis involves three rules: L Spread, L Delinking, and L Tensing. The first of these rules is given in (97).

(97) L Spread



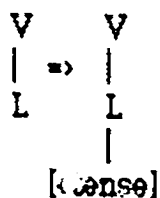
The second rule is L Delinking, which delinks tone from [s].

(98) L Delinking



The third rule is L Tensing, which tenses low-toned vowels.

(99) L Tensing



3.2.3.3. Sample Derivations

The following two derivations are presented in Parts A - D as explained in 3.2.2.2.3.

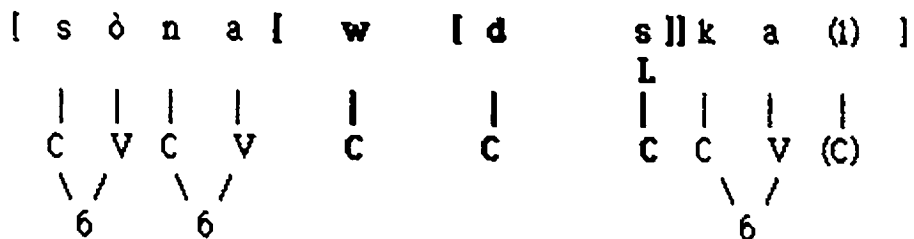
Derivation 2

(100) sònwədèskaf 's/he yawns' (=67))

= sòna - w - d - `s - kal
 1 5 7 8 stem
 adv arl O der cnj 'yawn'

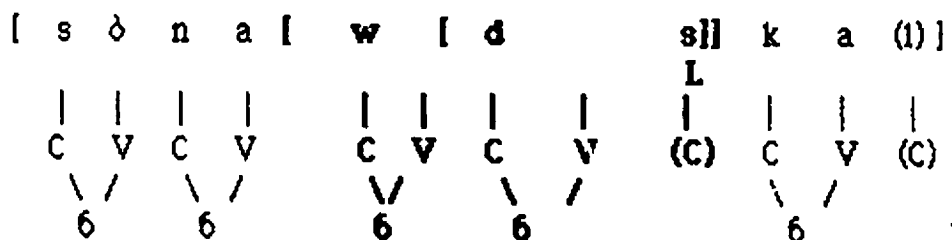
A. The sequence of rules is: Syllable Mapping
 L Spread
 L Delinking
 L Tensing
 C Deletion
 Tensing Assimilation

B. Input to Conjunct Domain Syllable Mapping



Note the representation of /s/-conjugation, consisting of L attached to the /s/ timing unit.

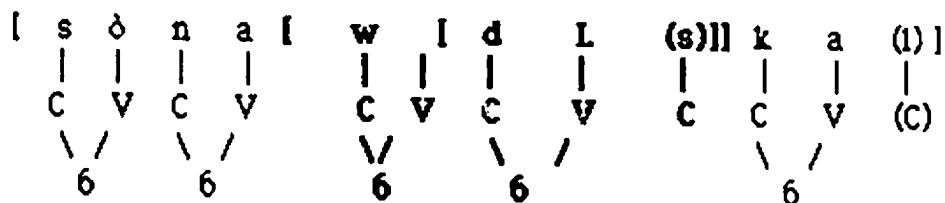
C. Conjunct Domain Syllable Mapping



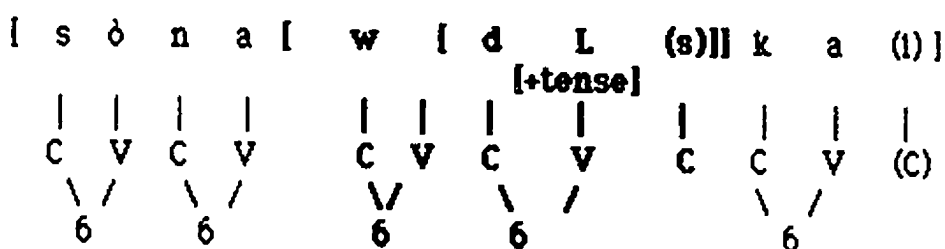
/s/-conjugation is extraprosodic. Mapping results in two syllables formed by Stray Epenthesis.

D. Conjunct Domain Phonology
Domain 2

L Spread, L Delinking



L Tensing



L Tensing results in the association of the feature [+tense] to the low-toned vowel.

Eventually [sònawədèskat]

Derivation 3

(101) sònawədèskat 'I yawn' (=68)

= sòna - w - d - 's - s - kal

1 5 7 8 10 stem

adv arl 0 der cnj isS 'yawn'

A. Derivation 3 involves the following rules.

(102) C Deletion

$$C \rightarrow \emptyset / \underset{\substack{| \\ L}}{V} _ V$$

(103) Tensing Assimilation

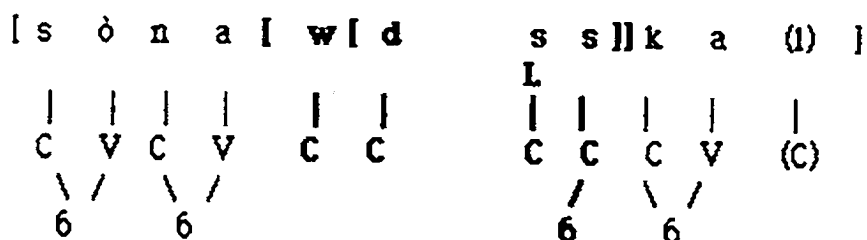
V	V	V	V		where V = a vowel without features
[+tense]	○	[+tense]	[+tense]		

The sequence of rules is: Syllable Mapping

L Spread
 L Delinking
 L Tensing
 C Deletion
 Tensing Assimilation

B. Input to Conjunct Domain Syllable Mapping

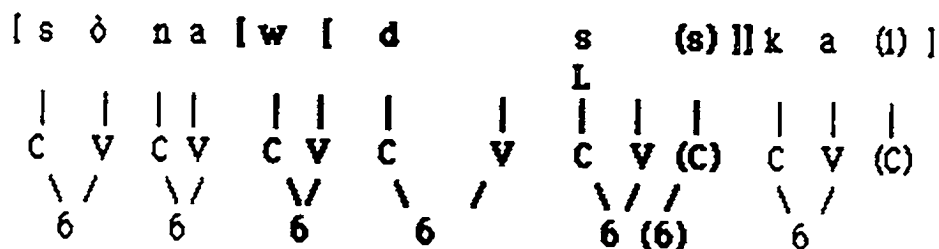
The input to syllable mapping for Derivation 3 is the same as that for Derivation 2 except for the presence of 1sS /s/.



Recall that the lexical entry for 1sS /s/ involves a segment that is prelinked to coda position, as indicated in the above input.

C. Conjunct Domain Syllable Mapping

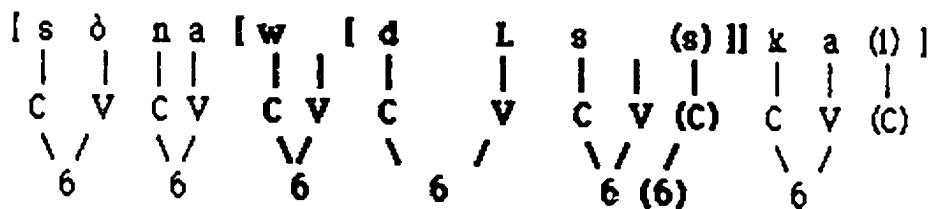
Syllable Mapping in Derivation 3 is the same as that for Derivation 2 except that in Derivation 3, 1sS /s/ is extraprosodic (in Derivation 2, /s/-conjugation is extraprosodic).



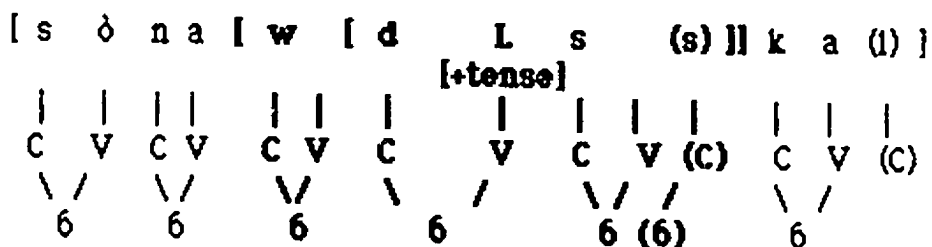
Syllable Mapping results in three conjunct syllables.

D. Conjunct Domain Phonology

L Spread, L Delinking

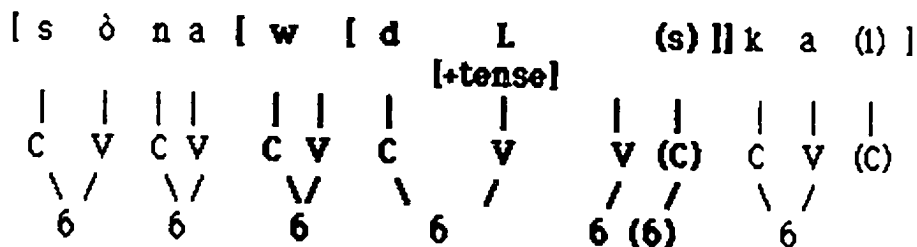


L Tensing



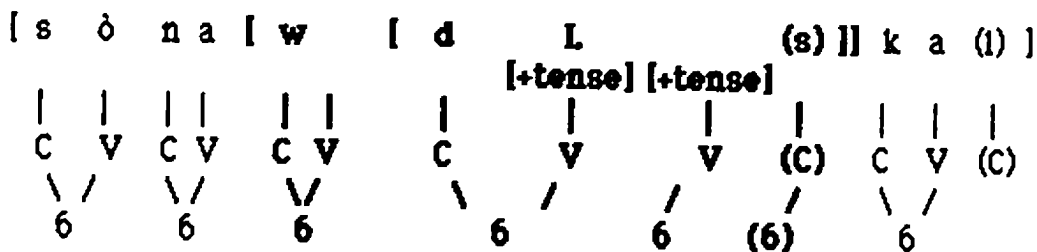
L Tensing applies in the same way in this form as in the preceding derivation, giving the conjunct domain output [wə [dèsə(s)].

C Deletion



Notice in the output of L Tensing, [s] of /s/-conjugation is positioned between a low-toned V (=è) and V; according to C Deletion (cf. (102)), [s] is deleted in this environment.

Tensing Assimilation

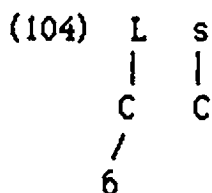


Eventually

[sònawedéeskaʔ]

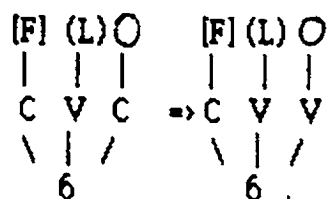
3.2.3.4 An Alternative Analysis of /s/ conjugation Tensing

If we adapt (92 b) as the representation for /s/ conjugation, an alternative analysis of /s/ conjugation Tensing comes to mind which parallels the analysis of /h/ classifier Tensing to a large extent. Let us suppose that the low-toned C in (92 b) is also prelinked to coda, as in (104).



Tensing in /s/ conjugation forms could then be accomplished by the same basic set of rules as in /h/ classifier forms. The sequence of rules involved would be L Spread (cf. (97)), L Delinking (cf. (98)), Compensatory Lengthening (cf. (86); this rule is modified in (105) below), and Tensing (cf. (87)). The modification to Compensatory Lengthening is the allowance of a low tone on the vowel preceding the featureless coda, as in (105).

(105) Compensatory Lengthening revised



To see how the alternative analysis works, I apply it to (68/101) which was derived in Derivation 3 above.

Derivation 3: Alternative analysis

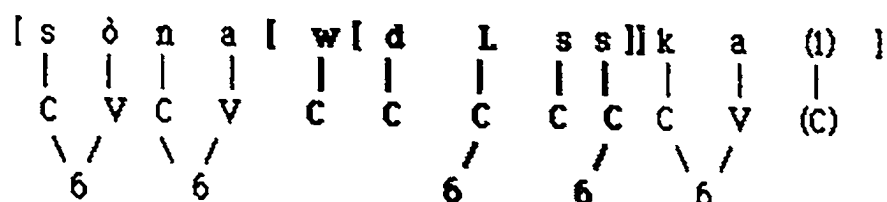
(106) sònawèdèeskaɾ 'I yawn' (= (68/101))

= sòna - w - d - `s - s - kaɾ

1 5 7 8 10 stem

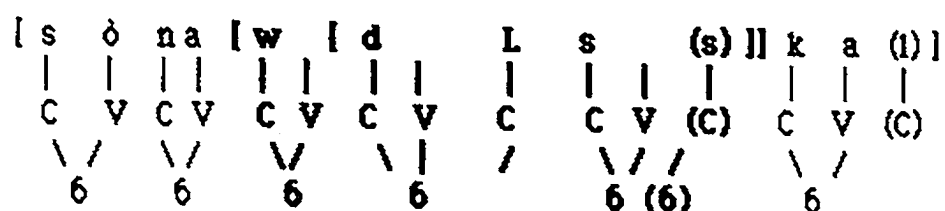
adv arlO der cnj 1sS 'yawn'

B. Input to Conjunct Domain Syllable Mapping



Recall that the lexical entry for 1sS /s/ involves a segment that is prelinked to Coda position, as indicated in the above input.

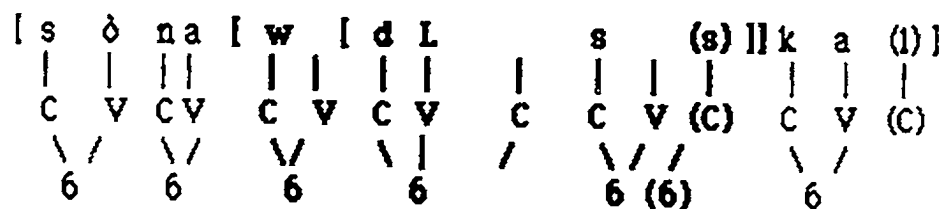
C. Conjunct Domain Syllable Mapping



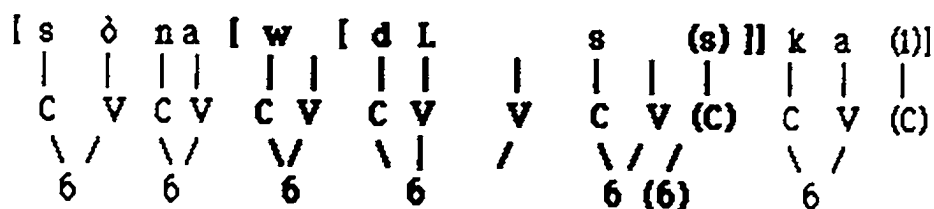
Syllable Mapping results in three conjunct syllables.

D. Conjunct Domain Phonology

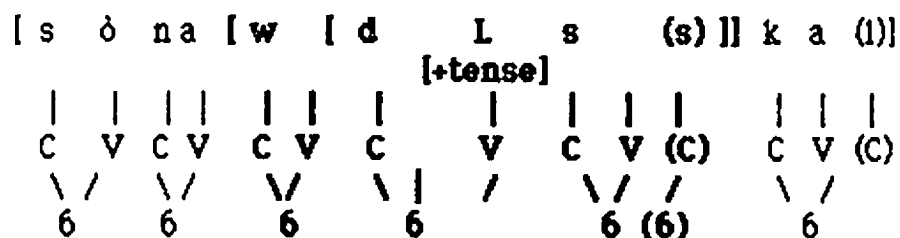
L Spread, L Delinking



Compensatory Lengthening



Tensing



From this point on, the derivation is exactly as in the original Derivation 2 (101), with C Deletion and Tensing Assimilation applying to yield the surface form.

Eventually [sònawədèeskaʔ]

The advantages of this analysis is that is so closely parallels the /h/ classifier tensing account. Therefore, the additional rule of L Tensing is not required.

However, the representation of /s/ conjugation which this analysis entails is subject to some of the same problems as the representation in (92 a). These problems arise in forms where /s/ conjugation is word-initial. The underlying representation of one such form is given in (107).

(107) sèdà 's/he sits'

= `s- d - da
 8 11 stem
 cnj cl 'sit'

L	s	d	à
C	C	C	V
/			
6			

Some way must be proposed to prevent the extraprosodicity of /s/, which would result in an /s/ coda. The E.D.C. cannot be appealed to because of the presence of the L consonant timing unit. In addition, some way must be proposed to prevent epenthesis before the L timing unit.

This alternative analysis clearly requires more work, and it is unknown whether the problems it poses outweigh the advantage of an account which unifies /h/ classifier and /s/ conjugation tensing.

3.2.4 An Additional Derivation

The analysis given so far accounts for the surfacing of both [e] and [è]. One more fact, having to do with /h/ classifier, remains to be accounted for. This is effect (77 c): /h/ classifier causes the deletion of a (potential) coda C if this C is preceded by a vowel with derived features.²⁴ Moreover, there is no other evidence of /h/ classifier in such forms beyond the absence of the conjunct domain final C.

Derivation 4 examines one such form.

Derivation 4

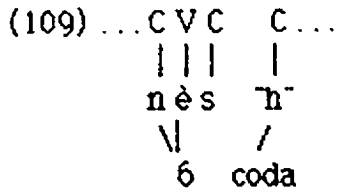
(108) k'ets'anèch'è? 'we count O' (= (81 b))
 = k'e - ts' - n - `s - h - ch'è?
 1 6 7 8 11 stem
 adv 1pS der cnj cl 'count O'

A. No rules are necessary to account for the deletion of /s/-conjugation in (108); rather, /s/ is deleted as a result of the fact that Stray Epenthesis is off at the word level (see (55), note 19).

Upon entering the word level, [s] of /s/ conjugation becomes visible to syllable mapping. It appears adjacent to /h/ classifier, which is prelinked to coda. This is shown in (109).

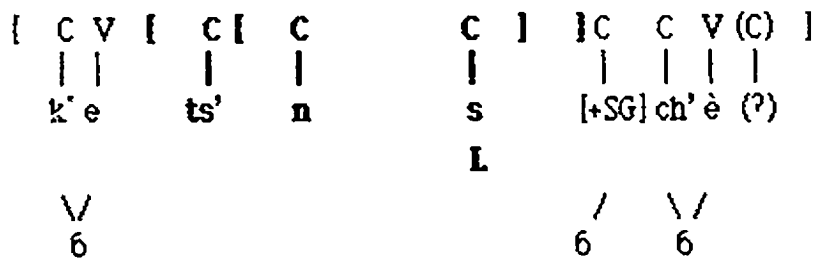
²⁴ If the vowel preceding the extraprosodic/Coda C is featureless, then /h/ classifier has no effect, as seen in the form below.

dasgàsh 'I am black'
 - d - s - h - gàsh
 7 10 11 stem
 thm 1sS cl 'be black'



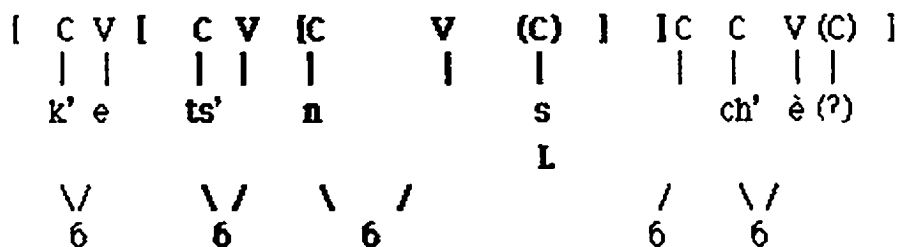
This configuration produces a potential problem for Syllable Mapping, since Stray Epenthesis is off at the word level. If [s] is mapped to coda, what becomes of /h/ classifier which is prelinked to coda? On the other hand, if prelinked /h/ becomes the coda of the preceding syllable, what becomes of [s]? I assume that /h/ classifier, because it is prelinked to coda, takes precedence over [s] and becomes part of the preceding syllable. [s], because it is unsyllabifiable, is lost by Stray Erasure.²⁵ This is illustrated below.

B. Input to Conjunct Domain Syllable Mapping



Recall that the representation of /h/ classifier involves a C slot with the feature [+SG] which is prelinked to coda. The rule of [+SG] Delinking and Association has already applied at disjunct/stem domain phonology.

C. Conjunct Domain Syllable Mapping



²⁵ Thanks to Keren Rice for helpful comments on this analysis.

The /s/ of /s/-conjugation is extraprosodic, which allows it to be prosodically licensed without being syllabified. /h/ classifier is prelinked to coda, which allows it to be prosodically licensed.

D. Conjunct Domain and Word Level Phonology

Usually, the first rule to apply in /h/ classifier forms is Compensatory Lengthening. However, at this point the structural description of Compensatory Lengthening is not met. In order for /h/ classifier's C slot to become a V slot, it must be preceded by a CV syllable. In this case, it is preceded by a C slot (which, although it is extraprosodic and invisible to Syllable Mapping, is visible to phonological rules).

Domain 2 Phonology

L Spread, L Delinking

[	C	V	|	C	V	|	[C	V	(C)	|	|	C	V	(C)	|
	k'	e		ts'		n	L	s				ch'	è (?)		
	\ /			\ /		\	/			/		\ /			
	6			6		6				6		6			

L Tensing

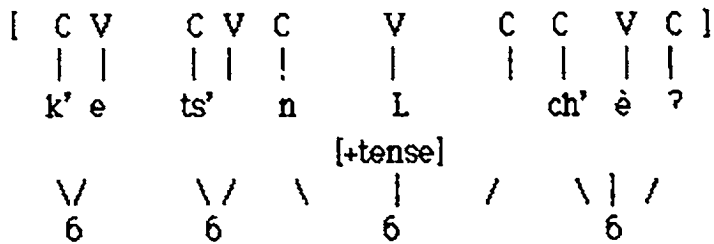
[	C	V	|	C	V	|	[C	V	(C)	|	|	C	V	(C)	|
	k'	e		ts'		n	L	s				ch'	è (?)		
	\ /			\ /		\	/			/		\ /			
	6			6		6				6		6			

Domain 3 Phonology

No rules apply

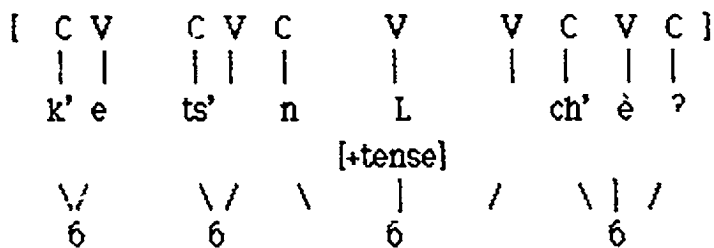
Word Level Phonology

Syllable Mapping, Stray Erasure



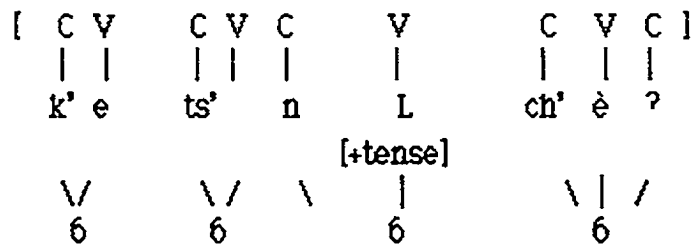
As explained in A, Stray Epenthesis is off at the word level. [s] does not get syllabified because it is adjacent to a prelinked coda, which is joined to the preceding syllable. Since [s] is unsyllabified and therefore not licensed, it is deleted by Stray Erasure.

Compensatory Lengthening



By Compensatory Lengthening the C slot of /h/ classifier changes to a V slot.

Tensing



Tensing applies vacuously, since the long vowel is already tense as a result of L.

Tensing in Domain 2.

Eventually

[k'ets'anèch'è?]

3.2.6 Summary

In summary, I have shown that [e] and [è] have predictable distributions and therefore do not need to be represented underlyingly. I claim that [e] and [è] represent the change in the quality of the epenthetic vowel when it precedes /h/ classifier or /s/-conjugation. This change in quality can be conceived of as tensing of the epenthetic vowel. In /h/ classifier forms, I analyze tensing as a metrical phenomenon, where tensing results from vowel length. Vowel length is derived by Compensatory Lengthening, where /h/ classifier's C slot becomes a V slot. The /h/ classifier timing unit is posited because /h/ classifier is the only classifier with consistent leftward effects. In /s/ conjugation forms, tensing results from low tone. I have presented the possibility that tensing may also be metrical in /s/ conjugation forms, but the feasibility of this analysis is in question because of the problems inherent in positing a low tone timing unit.

Given an analysis of tensing, the quality of the epenthetic vowel in the conjunct domain is almost entirely predictable. That is, the surface conjunct vowels [ə], [i], [e] and [è] can be derived by syllabification and phonological rules. One conjunct vowel remains to be analyzed: the vowel [a] is the subject of the next section.

3.3 Analysis of Conjunct Domain [a]

Recall the distribution of [a] presented in 3.1: [a] occurs before [x], before [gh] in certain environments, and in 2pS forms. Two questions come to mind regarding the [a] facts: first, how should this vowel be represented?, and secondly, why does it surface only in the aforelisted environments? The answers to these questions are the topics of the following sections.

3.3.1 Representation of [a]

A fully specified representation of [a] includes the following features: [-high, +low, +back, -round, +tense]²⁶. In the analysis I propose, [+back] is the underlying specification of [a]; this is the only value which is crucially referred to by phonological rules prior to complete specification. For a complete listing of underspecified vowel values and redundancy and default rules, see Appendix A.

I assume that 2pS [a] occurs as a result of a backing process which crucially refers to the feature [+back]. How does 2pS receive the [+back] feature? I consider first the derivation of [+back] vowels before the back consonants /x/ and /gh/.

3.3.2 [a] before /x/

3.3.2.1 Representation of /x/

There are two morphemes in the conjunct domain which include /x/ in their representations: position 5 1p0 /x/, and position 5 2p0 /nx/. Recall that position 5 is the leftmost position in the conjunct domain; conjunct domain syllable mapping begins on the first consonant in position 5 and proceeds rightward, mapping CV(V). 1p0 /x/ is therefore always mapped to onset, and Stray Epenthesis never applies to its left. 1p0 forms are thus irrelevant to our consideration of epenthetic [a].

2p0 forms, on the other hand, always include epenthetic [a], which breaks up the CC cluster /nx/. An example is given below.

²⁶ The tenseness value of [a] is irrelevant to the forthcoming analysis. Within the conjunct domain, no evidence is available which bears on the tenseness of [a]; the patterning of [a] in disjunct prefixes and the stem needs to be explored to argue for or against [a] as [+tense]. Such an exploration is beyond the scope of the present work; therefore, I make no strong claims about the tenseness value of [a].

- (110) tàaxale 's/he carries us uphill'
 = tà - nɣ - gh - le
 1 5 8 stem
 adv 2pO conj 'handle pl. O'

I propose the following representation of /ɣ/:

- (111) /ɣ/: C (= CV tier)
 |
 [+SG] (= feature tier)
 [+back]
 [+cont]

3.3.2.2 Backing Spread

[a] is derived before /ɣ/ by the rule of Backing Spread, given in (112).

- (112) Backing Spread



This rule spreads the feature [+back] from a consonant marked [+SG] to a preceding vowel. One may ask, why does the rule need to specify that the consonant is marked [+SG]? Is it possible to have a more general backing rule which would apply to all [+back] consonants (i.e. which would apply to both /ɣ/ and /gh/)?²⁷ The answer is no, because the contexts in which [a] appears before /gh/ are more restricted than those in which [a] appears before /ɣ/. Therefore, a different rule is required for /gh/ forms. The occurrence of [a] before underlying /gh/ is examined in the next section.

²⁷ All backing rules, as they are formulated in this section, could apply to /k/ as well as /ɣ/ and /gh/. Since there are no /k/'s in the conjunct domain, there is no reason to restrict the rules to /ɣ/ and /gh/ triggers.

3.3.3 [a] before /gh/

3.3.3.1 Representation of /gh/

There are two cases to consider in studying the presence or absence of [a] in /gh/ forms. The first case is when /gh/ is an onset. In such forms, there is no [a]; Stray Epenthesis applies to insert [ə] in a straightforward manner. An example is given in (113).

- (113) ʔəghək'ɔts 'they kiss each other'
 = ʔ - gh - k'ɔts
 5 6 stem
 recip 3pS 'kiss O'

The second case is when /gh/ is extraprosodic (i.e. when /gh/ is not mapped to onset). In such forms, [a] appears in the epenthetic vowel position before /gh/ and /gh/ does not surface as [gh]. Examples are given below.

- (114) təyədacheʔe 's/he will carry up him/her' (Future)
 = tə - y - d - gh - h - che + ʔe
 1 5 7 8 11 stem future
 adv 4 O asp cnj cl 'handle animate O'

- (115) tənaxale 's/he carries us uphill'
 = tə - nx - gh - le
 1 5 8 stem
 adv 2pO cnj 'handle pl. O'

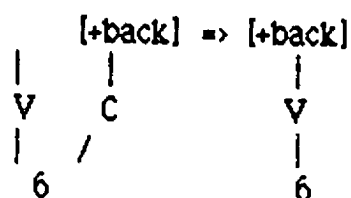
The representation which I propose for /gh/ differs from /x/ only in that /gh/ is not voiceless.

- (116) /gh/: C
 |
 [+back]
 [+cont]

3.3.3.2 Backing Absorption

To account for [a] before /gh/, I propose a rule of Backing Absorption; this rule is like Nasalization, in that the features associated with a syllable coda are spread to the nucleus, and the coda position itself is lost. Backing Absorption is given in (117).

(117) Backing Absorption

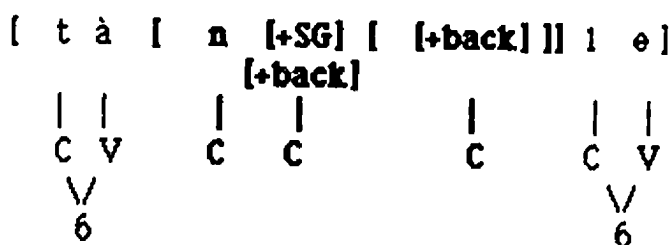


This rule differs from Backing Spread (cf. (112)) in that the former does not include the feature [+SG] and is restricted to tautosyllabic sequences. In addition, (117) is a word level, while (112) applies in conjunct domain phonology.

The derivation for (115), repeated here as (118), illustrates both Back Spread and Backing Absorption.

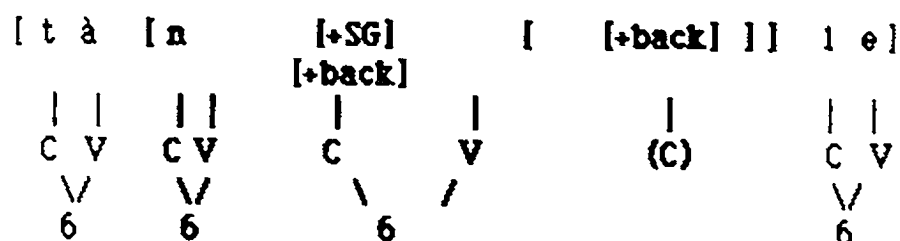
(118) tàanaxale 's/he carries us uphill'
 = tà - nx - gh - le
 1 5 8 stem
 adv 2pO cnj 'handle pl. O'

Input to Conjunct Domain Syllable Mapping²⁸



Conjunct Domain Syllable Mapping

²⁸ In the following representations, I suppress the feature [+cont], as it is not relevant to the application of phonological rules.

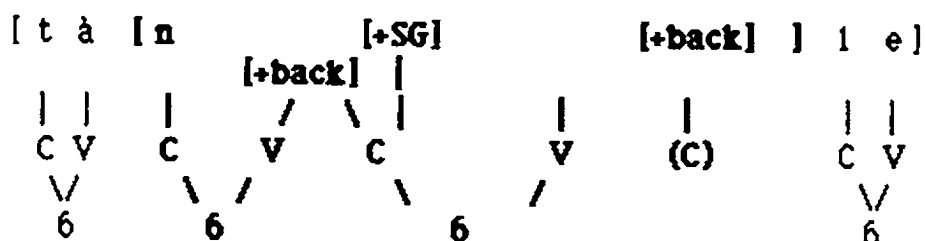


Domain-Sensitive Phonology

Domain 2: no rules apply

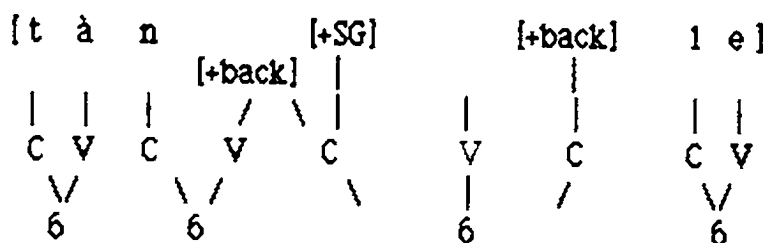
Domain 3

Back Spread



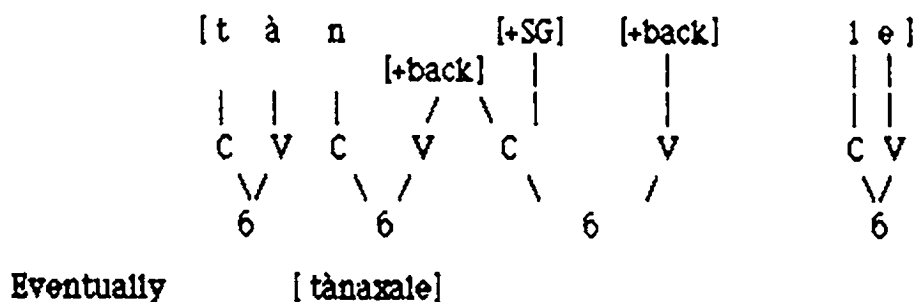
Word Level Phonology

Syllable Mapping



At the word level, extraprosodicity is turned off; consequently, the conjunct-domain-final [gh] becomes visible to syllable mapping and is mapped to the coda of the preceding CV syllable.

Backing Absorption



3.3.4 2pS forms

3.3.4.1 Representation of 2pS

One defining property of 2pS forms is that their stem-initial continuants are always voiceless. An example is given below.

- (119) ?ùya aʔi '2pS are shy'
 ='shy' ___ - li
 10 stem
 2pS 'be'

In this respect, 2pS forms are similar to /h/ classifier forms. The feature which is responsible for stem-initial continuant voicelessness in /h/ classifier forms is [+SG]. It is reasonable to assume that the 2pS morpheme also possesses the feature [+SG] in its representation.

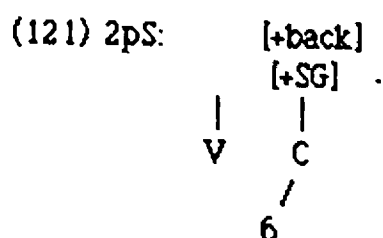
The only other property characterizing 2pS forms is that the 2pS morpheme itself surfaces as the syllable nucleus [a]. Two possibilities for representing this [a] come to mind. The first is a concrete option: 2pS may be represented as in (120).

- (120) 2pS: [+back]
 [+SG]
 |
 V

The [+SG] feature would be delinked and spread to the right, causing stem-initial continuant voicelessness. This representation leads to an overall analysis with

high vowels and [a] in the underlying inventory of conjunct vowels; all other vowels are predictable and not underlyingly represented.

I believe this analysis can be improved on in light of the fact that HRB requires the independently needed rule of Backing Absorption given in (117). If this rule could be used to derive 2pS [a], then we could maintain a simpler underlying inventory of conjunct vowels, where only high vowels (/u/ and /i/) are underlyingly present. I opt for this derived [a] analysis, wherein the representation of 2pS is as in (121).



Let us examine this representation tier by tier, beginning with the feature tier. On this tier, 2pS representation is like that of /x/, having the features [+back] and [+SG]. The motivation for these features is straightforward: [+back] is required in order for Backing Absorption to yield [a] in nucleus position; [+SG], as discussed above, is required in order for Delinking and Association to yield voiceless continuants in the stem-initial position.

On the CV tier, 2pS includes an empty V and a C which fits the structural description of Backing Absorption. This C is prelinked to coda on the syllable tier. There are two reasons for prelinking to coda. First, prelinking to coda is required in order for 2pS forms to undergo Backing Absorption. Secondly, prelinking to coda prevents 2pS from surfacing as a syllable onset when it is the only prefix in the conjunct domain. Recall from Section 2 that, barring special circumstances, a lone consonant in the conjunct domain will be mapped to syllable onset by the E.D.C. Thus, prefixes like /s/-conjugation (position 8), /n/

(any position) and /gh/ (any position) alternate between onset mapping and coda mapping depending on the composition of the conjunct domain. On the other hand, prefixes like 1sS /s/ (position 10), and, as I claim, 2pS, are invariably mapped to coda, and are therefore prelinked to that syllable position.

One may ask why it is necessary to posit a separate V timing slot in the underlying representation, since a V will inevitably be inserted by Stray Epenthesis before the prelinked coda slot. The V slot is necessary to ensure that 2pS is distinctly represented in forms such as (122).

(122) naakwi 'you pl. vomit'
 = na - ___ - kwi
 1 10 stem
 adv 2pS 'vomit'

If 2pS consisted only of a single timing slot prelinked to coda, this coda would be joined to the CV disjunct syllable mapped to /na/:

(123) n a ___ kwi
 C V C
 \ |/
 6

Coda Absorption would result in the incorrect form in (124).

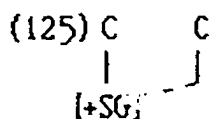
(124) * [nakwi]

The representation of 2pS given in (121) is subject to rules of [+SG] Delinking and Rightward Spread, and Backing Absorption. The application of these rules is looked at in detail in the following section.

3.3.4.2 A 2pS Derivation

Two rules are relevant to 2pS derivations: [+SG] Delinking and Spread, and Backing Absorption. The derivation below shows that Backing Absorption applies straightforwardly. However, [+SG] Spread needs to be examined in some detail.

The facts concerning [+SG] Spread are that whenever two consonants are adjacent after syllabification, the [+SG] feature on the first consonant always spreads to the second consonant. This is shown in (125).



The only context in which this configuration is possible after syllabification is when (a) the first consonant is the final consonant in the conjunct domain, and as such is either extraprosodic or prelinked to coda or (b) the first consonant is /h/ classifier. Only in these two cases is the first consonant both prosodically licensed and adjacent to a stem-initial consonant. Otherwise, the syllable template demands that all CC clusters be broken up by Stray Epenthesis. An exhaustive list of allowable CC clusters occurring in the restricted context defined above is given in (129); these clusters evidence [+SG] Spread.

(126) CC clusters showing [+SG] Spread

(a)	1sS /s/	+	stem-initial continuant
	/s/-cnj	+	" "

(b)	h-cl	+	stem-initial continuant
	2pS	+	" "

The combinations in (a) differ from those in (b) in that in the (a) forms, [+SG] spreads but does not delink; in the (b) forms, [+SG] delinks, leaving the /h/ classifier timing unit featureless and the 2pS timing unit with only the feature [+back], thus prepared to undergo Backing Absorption. Therefore, in one version of the [+SG] Spread rule, the extra features in the representation of /s/ (cf. the (a) forms) block delinking; at present, it is not clear what features besides [+SG] are associated with /s/. When the final C is not /s/, [+SG] is both delinked and spread.

In the remainder of this section I derive the verb form in (119), repeated below in (127).

(127) (?ùya) aŋ | '2pS are (shy)'
 = ___ - ŋ |
 10 stem
 'shy' 2pS 'be'

The derivation is divided into three parts: A. Input to syllable Mapping; B. Syllable Mapping; C. Domain-Sensitive and Word Level Phonology.

A. Input to Syllable Mapping

[	[	[	[+back]]]]]]]]]]]]]]]]]		
			[+SG]																		
		V	C				C	V		(C)											
			/				∨	∨													
			6					o													

B. Syllable Mapping

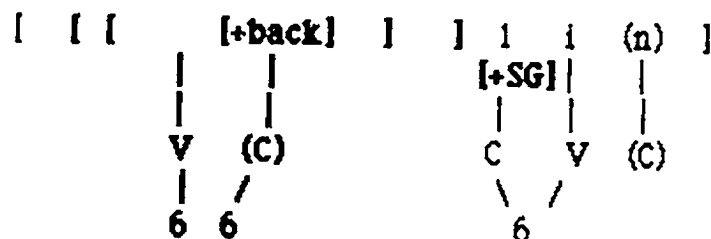
[	[	[	[+back]]]]]]]]]]]]]]]]]]]	
			[+SG]																			
		V	(C)				C	V		(C)												
			/				∨															
		6	6					6														

Stray Epenthesis does not apply because the first timing unit of the 2pS morpheme is V. The rules that follow are [+SG] Delinking (at the domain-sensitive level) and Coda Absorption (at the word level).

C. Domain-Sensitive and Word Level Phonology

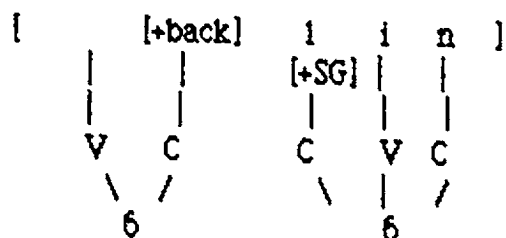
Domain-Sensitive Level

[+SG] Delinking



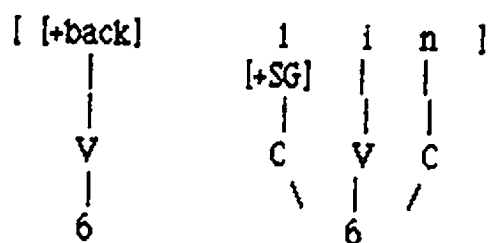
Word Level

Syllable Mapping



At the word level, extraprosodicity is turned off, and the word level template (C)VC is mapped, causing the V and the C of 2pS to be tautosyllabic, and gathering the word-final C into the word-final syllable as a coda.

Back Absorption



Eventually

[aʔ]

3.4 Summary

In this section I have argued that the occurrence of most conjunct vowels is predictable. Specifically, the underlined boldface vowels in (128) can all be derived.

- (128) (a) $nà^{?}adadat'ets$'s/he kicked him/herself'
 = $nà - ?d - d - d - ?ets$
 1 5 7 11 stem
 adv reflO der cl 'kick'
- (b) $sònawadèskat$'s/he yawns'
 = $sòna - w - d - 's - kal$
 1 5 7 8 stem
 adv arlO der cnj 'yawn'
- (c) $sònawadèeskat$ 'I yawn'
 = $sòna - w - d - 's - s - kal$
 1 5 7 8 10 stem
 adv arlO der cnj 1sS 'yawn'
- (d) $degàsh$'s/he is black'
 = $d - h - gàsh$
 7 11 stem
 der cl 'be black'
- (e) $tanaxale$'s/he carries us uphill'
 = $tà - nx - gh - le$
 1 5 8 stem
 adv 2pO cnj 'handle pl. O'
- (f) $ts'esànisat$'s/he woke me up'
 = $ts'e - s - 'n - n - h - zat$
 1 5 8 9 11 stem
 adv 1sO cnj mode cl 'wake up'

The only conjunct vowels whose distribution is unpredictable are position 7 /u/ and position 7 /i/. Examples are given in (129).

- (129) (a) Position 7 /u/
- (i) utwən 's/he holds O'
 = u - twən
 7 stem
 der 'hold O'
- (ii) udassùs 'I whistle/whisper'
 = u - d - sùs
 7 7 stem
 der der 'whistle/whisper'
- (iii) suzèt's'ò 'he heard me'
 = s - u - z - 's - h - ts'ò
 5 7 7 8 11 stem
 1sO der der cnj cl 'hear O'
- (b) Position 7 /i/
- (i) [O] naìschuch 'I always catch [O]'
 = na - ì - s - chut + ch
 3 7 10 stem customary
 cust der 1sS 'handle O'
- (ii) nesì'?'à' 'he wakes me up'
 = ne - s - ì - '?'à'
 1 5 7 stem
 adv 1sO der 'wake up O'
- (iii) yàdìjì 'many are sick'
 = yà - d - ì - jì
 4 7 7 stem
 distr der der 'be sick'

Two arguments can be put forward to support the claim that these vowels are underlyingly present. First, they occur in contrastive distribution with the epenthetic vowel; thus, there is no way to predict the quality of /u/ or /i/ as opposed to [ə]. To exemplify this, compare (129 a i) with (130), (129 a iii) with (131), and (129 b iii) with (132); in these near minimal pairs, [ə] occurs in the same environment as either [u] or [i].

- (130) $\underline{a}jin$'s/he sings'
 = d - yin
 11 stem
 cl 'sing'
- (131) $bi\dot{t}$ $saz\grave{e}xi$ 'I was sleepy' ('sleep killed me')
 ='sleep' s - z - `s - n - h - $gh\grave{i}$
 5 7 8 9 11 stem
 1s0 der cnj mode cl 'kill 0'
- (132) $d\grave{a}ji$'s/he is sick'
 = d - $j\grave{i}$
 7 stem
 der 'be sick'

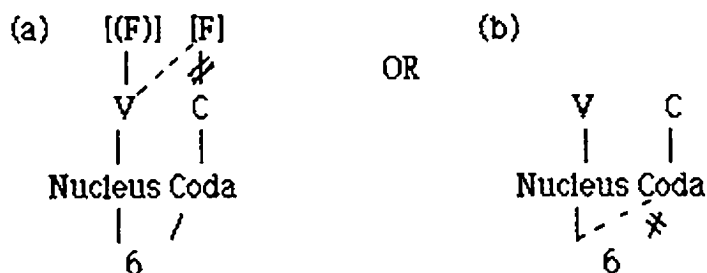
The second argument in support of the underlying presence of /u/ and /i/ is that these vowels can occupy non-epenthetic positions; for example, there is no way, given our account of syllabification, for a V slot to be inserted before the first consonant in the conjunct domain, as in (129 a ii) and (129 b i). Thus, these V slots must be present underlyingly, and must be marked with the features of /u/ and /i/.

Predictably surfacing vowels should be eliminated from underlying representations. This chapter has proposed a set of syllable-based mechanisms which determine the surfacing of these vowels. The chart in (133) shows the ways in which conjunct vowels are eliminated from underlying representation (UR).

(133) <u>Non-final conjunct syllable</u>	<u>Eliminated from</u>	<u>Final conjunct syllable</u>	<u>Eliminated from</u>
	UR by:		UR by:
a	Stray Epenthesis	a	Stray Epenthesis
a	Back Spread	è	Template mapping, L Delinking, L Tensing
		èe	Template mapping, L Delinking, L Tensing, C Deletion, Tensing Assimilation
		e	Compensatory Lengthening
		i̇	Nasalization
		a	Backing Absorption

The final three vowels in column 2, [è], [i̇], and [a], appear to be derived by three different processes. However, Compensatory Lengthening, Nasalization and Backing Absorption are similar in that they effect a change in the coda position of a syllable. I suggest that all the rules involved in deriving [è], [i̇], and [a] can be collapsed into a general rule of Coda Absorption incorporating two types of absorption:

(134) Coda Absorption



(134 a) reads: "A coda position feature is delinked and spread(/"absorbed") to the nucleus position of the same syllable" (the coda position timing unit is

thereafter lost). This rule derives [i] when the coda feature is [+nasal] and [a] when the coda feature is [+back]. (134 b) encodes Compensatory Lengthening as a process of Coda Absorption, whereby a coda position consonant is delinked and spread(/"absorbed") to the nucleus position of the same syllable. This process derives toneless [e]. There thus appears to be some uniformity in the processes which derive conjunct vowels: [e], [i] and [a] are derived by the general process of Coda Absorption in (134), and it may also be that L Tensing, which derives [è], is related to (134 b), Compensatory Lengthening (this possibility awaits further work).

The above analysis, incorporating syllable template mapping and coda position rules, demonstrates the usefulness of applying syllable theory to conjunct domain phonology; the phonetic forms of conjunct domain prefixes can be understood as systematic and largely predictable if viewed in terms of syllabification processes.

AppendixHRB Vowel Phonemes (underspecified representations)

	i	e	a	o	u	ə
[high]	+				+	
[back]			+	+	+	
[round]				+		
[tense]		+				

The feature [+high] is needed to distinguish [i] from [ə].

The feature [+back] is needed to distinguish [a] from [ə] and [u] from [i].

The feature [+round] is needed to distinguish [o] from [a].

The feature [+tense] is needed to distinguish [e] from [ə].

Redundancy and Default Rules

[+high] ----> [+tense]

[+high, +back] ----> [+round]

[] ----> [-round]

[+back, -round] ----> [+low]

[+low] ----> [+tense]

[] ----> [-low]

[] ----> [-high]

[] ----> [-tense]

[] ----> [-back]

CHAPTER FIVE

Conclusion

In this chapter I highlight the main findings of previous chapters and put forward areas requiring further research.

1 Findings of Previous Chapters

In Chapter 2, I discuss HRB verb prefixes with respect to function, discontinuous dependencies, and phonological properties. Through this discussion, I conclude that a more detailed analysis of two problems is required. The first problem involves dependencies between discontinuous elements in the verb, while the second problem involves coalescence occurring in conjunct domain prefixes whose underlying forms are consequently opaque. Discontinuous dependencies force us to recognize an underlying, abstract level of verb structure which is vastly different from the surface ordering of prefixes; the coalescence of conjunct prefixes appears arbitrary when viewed from the perspective of the segmental string alone, and challenges us to find a systematic explanation for alternations in prefix forms.

According to a number of Athapaskan researchers (e.g. Li 1946, Sapir and Hoijer 1967, Kari 1979, Rice 1985a, Speas 1984, 1986, 1987, and Saxon 1986) the underlying structure of Athapaskan verbs consists of a discontinuous lexical entry called the verb theme. Derivational prefixes are added to the theme to form the verb base, and inflectional prefixes are added to the base to form the verb form. In Chapter 3 I apply this model of verb formation to HRB.

The underlying structure of verbs in HRB is therefore that which is given in (1).

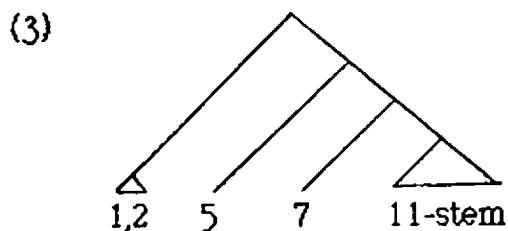
- (1) Underlying structure: inflection - derivation - theme
 Prefix position: 10, 6, 5 8-9, 1, 7, 4, 11, 3, 2 1, 2, 5, 7, 11 - stem

I follow the longstanding claim in the Athapaskan literature that the theme is the lexical entry of the verb, and must form a single constituent in underlying structure. I order derivational prefixes according to conjugation choice facts, where conjugation-choosing prefixes (4, 7 and 1) are added before conjugation and mode (8-9). Although not indicated in (1), positions 2 and 3 in derivation are unordered with respect to each other; the reason for this is that they are not involved in conjugation choice, although they may both choose position 11, and are therefore added before 11. Inflection is added last to the verb because of lexical relatedness arguments.

The surface ordering of prefixes, by way of contrast, is given in (2).

- (2) Surface structure: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 - stem

Assuming (1) as the underlying structure of HRB verbs requires a mapping protocol to arrive at surface structure. In addition to arguing for the theme-base-form model of verb structure, Chapter 3 develops a proposal for mapping the underlying structure of HRB verbs to Phonological Form. Morphemes in underlying structure are inserted into the phonological word, which is a verb template equivalent to the verb theme. Thus, any phonological material outside the verb theme must be mapped into it. Mapping proceeds from right to left because rightmost prefixes are closest to the template and are therefore the first prefixes visible to mapping. The template is structured as in (3).



The branches of the template correspond to the possible positions occupied by thematic prefixes. In addition, the branches correspond to the boundaries of phonological rule domains. I claim that the correlations between theme structure and phonological organization are not serendipitous and merit incorporation into an account of verb morphology and phonology. Mapping to phonology is therefore part of a robust model of morphology, where knowing a little (the structure of the verb theme) results in knowing a lot (the thematic template and the domains of phonological rules).

Mapping proceeds according to insertion frames of which there are only two: an affix is either the head of a domain, in which case it is inserted into the left edge of the domain, or is a non-head, in which case it is inserted into the right edge of the domain. The four domains and their heads are listed in (4).

(4)	<u>Domain</u>	<u>Head</u>
	1	position 11
	2	position 7
	3	position 5
	4	position 1

Chapter 3 concludes with a comparison between the proposed model and two other models: Lexical Morphology as applied to Sekani in Hargus (1988), and a model of phonologically-based insertion as applied to Navajo in Speas (1987). I argue that the proposed model is superior to Lexical Morphology on the grounds that the latter fails to capture important generalizations and stipulates extrinsically ordered word-formation rules which are not required in the proposed model. I show that a model of phonologically-based insertion which could work for a language like HRB is not available at present, and that the model remains unclear in some of its details.

One section of Chapter 4 is devoted to accounting for why disjunct prefixes and the stem have similar phonological properties, while conjunct prefixes, which

on the surface are located between disjunct prefixes and the stem, have different phonological properties. The findings of Chapter 3 are used to show that disjunct prefixes, which are derivational and constitute "chooser" positions, are added to the theme before most conjunct prefixes, the majority of which are "chosen" derivational prefixes or inflectional. Phonology is therefore done on the [disjunct prefix - theme] string before conjunct prefixes, which show different phonological properties, are added to the theme.

The focus of Chapter 4 is conjunct domain phonology. I propose underlying forms for those morphemes which show alternations and I analyze the phonological processes which these morphemes undergo. I argue that the behaviour of conjunct prefixes can be shown to be systematic if most conjunct vowels are considered to be epenthetic. I propose an analysis to account for the predictable distribution of these vowels.

The first part of this analysis uses syllabification to account for why some prefixes alternate in form between [C], where C is a coda, and [CV], where C is an onset. I propose first that a CV template, which forms Onset-Nucleus syllables, is mapped across the phonological string, so that conjunct consonants are typically mapped to onset. The syllable template requires that every onset have a nucleus, so an epenthetic vowel is inserted to complete the syllable when there are stray consonants. Mapping of the CV template and stray epenthesis account for the occurrence of the [CV] form of alternating conjunct prefixes.

It is shown that there are only two environments which allow codas: (i) the final syllable in the conjunct domain, and (ii) the final syllable in the word. I propose that consonants at the right edge of the conjunct and word domains are extraprosodic; extraprosodicity is turned off at the word level, at which point a CVC template, which forms Onset-Nucleus-Coda syllables, is mapped across the word. Formerly extraprosodic consonants are mapped to coda.

Applying extraprosodicity without exception to the conjunct domain overgenerates codas. Therefore, two conditions which restrict extraprosodicity are proposed. The first is the Empty Domain Condition, which blocks extraprosodicity when there is only one consonant in the conjunct domain. The Empty Domain Condition is assumed to be part of Universal Grammar, and is therefore cost-free. The second constraint is that domain heads are always mapped to onset, thus blocking the extraprosodic status of a position 7 C which is final in the conjunct domain. A final restriction on extraprosodicity is that position 6 Cs are never extraprosodic; I suggest that position 6, which is in domain 3, is not at the right edge of the conjunct domain because of the presence of the bracket separating domains 2 and 3 of the conjunct domain.

The epenthetic vowel surfaces as either [ə], [e], [è] or [a]. The distributions of all of these vowels are predictable. [e] and [è] are tense vowels which surface as a result of compensatory lengthening before [h] classifier or as a result of the presence of low tone. [a] surfaces before back consonants as a result of spreading of the feature [+back] to the epenthetic vowel slot. This analysis assumes that the underlying form of the 2pS morpheme includes a back consonant.

The major result of the phonological analysis in Chapter 4 is that conjunct domain vowels are shown to be largely predictable. Therefore, most vowels do not need to be underlyingly represented.

2. Areas for Further Research

One of the intriguing questions posed by the HRB data, as discussed in Chapter 1, is the way in which HRB differs from attested Beaver dialects. In many ways, as I claimed in the first chapter, HRB is more similar to McLeod Lake Sekani than to Doig River Beaver. It is therefore an important, and, in view of the

decreasing numbers of native HRB speakers, urgent, task to survey and document the linguistic patterning of the entire Beaver- and Sekani-speaking region.

One of the themes of this dissertation is the relation of morphology to phonology, both with respect to the correlation in the thematic template between thematic positions and phonological rule domains, and with respect to the phonological similarities of disjunct prefixes and the stem (which are morphologically close together at an early stage of mapping) in contradistinction to the unique phonology of conjunct prefixes. I thus consider the interaction of HRB morphology and phonology to be highly significant. This interaction needs to be explored in other Athapaskan languages. Questions such as the following can be posed regarding these other languages: Is there an equivalence between rule domain boundaries and thematic positions? What evidence is there for other phonological structures such as the foot template proposed for Navajo (Speas 1987)? Would the adoption of such structures provide insight into phonological rule application?

With respect to phonology, I have shown that by adopting a syllable template and extraprosodicity, a set of phonological alternations which are puzzling at first glance are simplified and become less arbitrary. However, as Chapter 2 demonstrates, there are other alternations in both the conjunct domain (e.g. perfective and optative mode allomorphy) and the disjunct domain that require detailed analysis. I suggest that syllable template phonology is a very promising framework for understanding what is going on in these alternations. As a result of this type of research, we can be persuaded that Athapaskan languages need not be characterized as linguistically bizarre, but are rather as systematic and regular in their properties as more familiar and highly researched languages.

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