A Sketch of Slave (Northern Athapaskan)

Keren Rice
University of Toronto
August 1993

Athapaskan languages are of great interest to the linguist concerned with morphology, presenting numerous intricate and complex problems. As a sketch is limited in space, in-depth discussion of all the morphological problems raised by languages of this family is impossible. My goal in this sketch is to focus on some of the problems raised by a single Athapaskan language, Slave, for theories of morphology.[1] I do not present definitive analyses but rather outline analyses which, I hope, will provide linguists interested in the problems of languages of this family with direction for further research.

The structure of words in Athapaskan languages, especially of the verb, is complex, and has received the lion's share of attention in research on the languages from early times (e.g. Golla 1970, Hoijer 1946, Li 1930, 1946, Morice 1932, Sapir & Hoijer 1969) to more recent times (e.g. Cook 1984, 1989, Hargus 1988, 1991, Kari 1976. 1989, 1990, 1992, 1993, McDonough 1990, Randoja 1989, Rice 1989, Speas 1986, 1989, 1991, Tenenbaum 1977, Wright 1983, 1986). In this sketch, I too focus on structural properties, examining some problems of the noun briefly and some problems of the verb in greater detail.

Some of the unusual structural properties of the Athapaskan languages are listed in (1):

(1)   i. A template. or position class analysis, is required. for both the noun and the verb.

ii. Inflectional morphemes appear ordered linearly inside of derivational morphemes in both the noun and the verb.

iii. Phonological rule domains are apparently arbitrary and unrelated to morphosyntactic properties, and must be stipulated in lexical entries.

iv. Discontinuous dependencies between morphemes exist within the verb.

v. Two positions for subject markers are found within the verb.

In the following sections. I examine some of these anomalous structural properties in nouns (section 1) and verbs (section 2), suggesting ways in which they might be resolved.

1 Nouns

The noun system of Athapaskan languages has received remarkably little attention in the literature (for some exceptions, see Hargus 1988, Rice 1989, Young & Morgan 1987), probably due to the extreme complexity of the verb. However, nouns too are interesting in many ways, and are worthy of brief discussion.

1.1 Background

Nouns in Slave can be divided into a number of categories; see Rice 1989. The nouns of concern here are stem nouns and compounds. Stem nouns consist, as their name implies, of a stem alone. These nouns often have related verb stems (2), but need not (3). They are generally monosyllabic (2, 3), although they may have a vocalic suffix -ɛ (4).[23]

(2) dzéh 'gum' -dzégɛ́ 'be gummy, sticky' (H)

    shį 'song' d-shį 'sing' (SS, B)

    seh 'saliva' -seh 'spit'

    t'éh 'charcoal' -t'éh 'cook (imperfective)'

    tsih 'ochre' -tsile 'be red'

    xáh 'club' -xáh 'club'

(3) ʔah 'snowshoe'

    mbeh 'knife' (SS)

    tthah 'carrot' (SS)

    du 'island' (B, H)

(4) t'er-ɛ 'girl' (B, H)

    ts'al-ɛ 'frog'

    lug-ɛ 'fish' (H)

Compounds of two types exist. The first, possessive compounds, have meanings of the following sorts: belonging to, used by, used for, associated with, consisting of. Some examples are given in (5). The second, non-possessive compounds, have a uniform

meaning, N2 made out of N1. This type is exemplified in (6). I have written compounds as two words for ease of distinguishing the morphology.

(5) ta ghú   'white cap'   ta 'water' + ghu 'tooth' + ´ 'possession'

     tɛh t'ǫ   'water lily'   tɛh 'water' + t'ǫ 'plant'

     dlǫ bɛ́rɛ́   'cheese'   dlǫ 'mouse' + bɛ́r 'food' + ɛ́ 'possession' (H)

     tɬ'á ʔe   'pants'   tɬ'á 'bottom' + ʔe 'clothing'

     mɛ́h dǫ   'food bag in grouse'   bɛ́h 'stomach' + dǫ 'storage area' (SS)

     jíyɛ́ tú   'wine, juice'   jíyɛ́ 'berry' + tu 'water' + ´ 'possession'

     sa dzɛ́ɛ   'watch, clock'   sa 'sun' + dzé 'heart' + ´ 'possession'

     tɬį tɬ'ulɛ́   'dog harness'   tɬį 'dog' + tɬ'ul 'rope' + ɛ́ 'possession'

(6) kwe gohkwį   'stone axe'   kwe 'stone' + gohkwį 'axe' (B)

     satsǫ́ xóo   'wire snare'   satsǫ́ 'metal, wire' + xóo 'snare' (SS)

     xa tɛnɛ   'basket'   xa 'root' + tɛnɛ 'container'

     fe shíh   'stone mountain'   fe 'stone' + shíh 'mountain' (H)

     ʔɛdhɛ́h thɛ   'leather belt'   ʔɛdhɛ́h 'hide, leather' + thɛ 'belt' (SS)

     dɛchį łuh   'wooden spoon'   dɛchį 'wood' + łuh 'spoon' (SS)

1.2 A boundaries problem: the distribution of stem-initial fricatives

While the structure of the nouns is generally straightforward and amenable to many theories of morphology, some problems are present. The one that I address concerns the distribution of voiced and voiceless fricatives in noun stem-initial position. Strictly phonological analyses that have been given to account for voicing alternations (e.g. Cook 1984, Kari 1976) are inadequate in that they do not provide empirical coverage of the data. In this section I follow work by Rice 1988, 1991a in suggesting that voicing alternations in nouns are attributable to the presence of a morpheme consisting simply of the feature [voice], a morpheme that indicates that a stem is inflectable.[4]

I begin with a survey of the distribution of voiced and voiceless stem-initial fricatives, leaving aside possessed compounds, which are discussed in section 1.3.

3

It is generally said in the Athapaskan literature that voiceless stem-initial fricatives occur in absolute initial position and following a voiceless segment in Athapaskan languages with voicing alternations; see, for example, Cook 1984, Kari 1976.

The first of these observations is definitely borne out: alternating fricatives are voiceless word initially.[5] This can be seen in (7), forms which contrast stem-initial fricatives in absolute-initial position with stem-initial fricatives following the possessive prefix *sɛ* 'my.'

(7)   non-possessed   possessed

       seh   'saliva'   sɛ-zegé   'my saliva' (H)

       shį   'song'   sɛ-zhiné   'my song' (SS, B)

       thɛ   'belt'   sɛ-dhɛé   'my belt' (SS)

       ɬuh   'spoon'   sɛ-luzé   'my spoon' (SS)

       sa   'sun, month'   sɛ-zaá   'my sun. month' (SS, B)

       xay   'year'   sɛ-ghayé   'my year. age' (H)

The second of these observations is not borne out, however: voiced fricatives occur in noun stem-initial position when the noun follows a voiceless segment, as in (8).[6]

(8)   shį   'song'   sah zhiné   'bear song' (SS, B)

       so   'frost'   dah zo   'frost on tree'

       sah   'bear'   tɛh zaá   'polar bear' (H)

Such forms suggest that voicing alternations are not phonologically transparent in nouns as a voiced fricative occurs whenever a segment precedes regardless of whether that segment is voiced or voiceless. These forms indicate that a solution to the problem of the environment for fricative voicing alternations must be sought other than in the phonology.

Given the surface opacity of voicing alternations in nouns, Rice 1988, 1991a, 1992b proposes that the source of the stem-initial voicing is a morpheme of the form [voice], a morpheme which appears in a branching construction. as a kind of stem joiner. The following examples fully illustrate the distribution of voiced fricatives in Slave nouns.

(9)   The initial fricative of a noun is voiced when preceded by a possessor, pronominal or nominal.

    xay 'winter, year'   sε-ghayέ 'my age'   dεnε ghayέ 'the man's age' (H)

    shi̜ 'song'   sε-zhiné 'my song'   sah zhiné   'the bear's song' (SS, B)

(10)   The initial fricative of a the second noun of a possessive type compound is voiced.

    sah ghú 'bear tooth'   cf. xu 'tooth' (sah 'bear)

    kwí gha 'head hair'   cf. xa 'hair' (kwí 'head') (B)

    tεh zá   'polar bear'   cf. sah 'bear' (tεh 'water') (H)

(11)   The initial fricative of a noun is voiced when preceded by a derivational prefix.

    dah zo 'frost on tree'   cf. so 'frost' (dah 'above')

Rice 1988, 1991a suggests based on data such as that in (9) through (11) that a morpheme [voice] is inserted when the construction is branching. While this explanation provides an account of the data illustrated so far, it is problematic in two ways, one of which will be considered immediately and the second of which will be discussed in section 1.3.

First, consider the second compound type, those with the meaning N2 made of N1. These present a difficulty because, despite the branching construction, they nevertheless have a voiceless fricative beginning the second noun. Examples are given in (12).

(12)   dεchi̜ łuh   'wooden spoon'

    ʔεdhéh thε   'leather belt'

The phonology of this compound type has received some attention in the literature, with attempts made to provide boundary-type accounts for the failure of voicing. Rice 1985a argues that the compound type is phrasal, and thus escapes the criterion of branching construction. However, evidence for the phrasal nature of the compounds is weak. Hargus 1988 argues that compounds are formed at two levels in the Lexical Phonology of Sekani, with this type of compound created after voicing has ceased to apply; this account is problematic in requiring a loop to account for embedding properties of compounds.

These accounts, while providing adequate descriptions, raise theoretical problems

associated with boundaries (e.g. Selkirk 1980) and loops (e.g. Sproat 1985).

An alternative structural analysis is available, one that appeals to the semantics of the

compounds. A systematic semantic difference between the types is found: type one

compounds involve a possessive relationship, with N1 possessor of N2. This is not true

of type two compounds, which have the meaning of N2 made out of N1.

One characteristic often associated with possession is inflection. It is not unreasonable

to think that an inflectional element might be involved in possessive constructions,

including type one compounds. In fact, inflection may be overt in possessive constructions

and can be present in what seem to be compounds rather than phrases. An example is

given in (13), where *go*, glossed 'areal', is required in the possessive construction.

(13)   kóę gofít'a   'roof'   kóę 'house' + go- areal agreement + fí 'head' +

t'a 'top' (H)

Type two compounds do not exhibit a possessive relationship and no reason exists to

think that they involve inflection. For instance, the second noun of a type two compound

is never inflected. This suggests that type one compounds have roughly the structure in

(14a) while type two compounds have the structure in (14b), where I = inflection.[7]

(14)   a.   b.
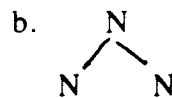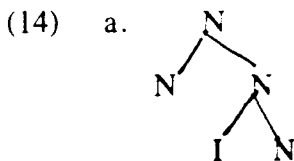
If this is the case, then the morpheme [voice] can be functionally identified: it must be

present when inflection. null or specified. is present. Inflection is required in the

possessive construction. and thus voicing is found in type one compounds; it is not present

in the non-possessive type two compounds.

One type of boundary problem, that which arises from the arbitrary assignment of

structure to compounds. can be solved if [voice] is a morpheme signaling inflection rather

than a morpheme inserted in a purely structurally defined environment. The structures for the two compound types differ, but that difference correlates with meaning differences.

1.3 A structural problem: the marked distribution of fricatives in compounds

In the possessive constructions examined so far a stem-initial fricative is voiced, leading to the generalization that the voicing is produced by a morpheme which represents inflection and associates to a stem-initial fricative When a wider range of possessed forms is examined, there is reason to reconsider this hypothesis about the distribution of the morpheme [voice]. The need for this can be seen by considering the following forms.

(15)   A stem-initial fricative is voiceless when it is the initial consonant of a possessed compound.

łéht'é	'bread'	sɛ-łéht'é	-lézɛ́	'flour' (SS)
sadzéɛ	'clock, watch'	sɛ-sadzéɛ	-zaá	'month' (SS, B)
sahdhɛh	'bearskin'	sɛ-sahdhɛh	-zaá	'bear' (SS)

(16)   A stem-initial fricative is voiceless when it is the initial consonant of a possessed verb.

shéts'ɛye	-shéts'ɛyé		'meal' (cf. shéts'ɛye 'one eats')
shɛ́ 'food (incorporate that does not appear independently)			
xede	-xedé		'word. language' (cf. -de 'talk')

The initial of the noun stems in (15) are subject to voicing, as is shown by the possessed forms in the last column. As the morphemes in the verbs in (16) do not typically appear on their own in an inflected form, it is impossible to know what their patterning would be if they did appear independently of the verb.

The discussion so far would suggest that the stem-initial fricatives should be voiced in the forms in (15) and (16) as the possessive construction is involved.[8] This construction involves inflection, and I have suggested that presence of [voice] correlates with the presence of inflection in nouns. The absence of [voice] is thus surprising.

7

When the forms in which the initial fricative of the inflected noun is voiced are compared with those in which it is voiceless, a striking property stands out: when the fricative is voiceless, the word in question is polysyllabic. In the examples in (15) and (16), the word is also at least bimorphemic. However, this need not be the case. Bisyllabic monomorphemic stems, while rare, exist in Slave. When a bisyllabic monomorphemic noun is possessed, a stem-initial fricative fails to voice, as in (17).

(17) xɛníh   'raft'   sɛ-xɛníh   'my raft'

      xɛwi   'pus'   sɛ-xɛwi   'my pus'

      xali   small sled'   sɛ-xali   'my small sled'

      súhga   'sugar'   sɛ-súhga   my sugar'

A generalization is present: voicing fails to affect the initial of a monomorphemic stem of more than one syllable.

While [voice] marks inflection, occasions arise in which this morpheme is disallowed, namely when the stem is not of the normal monosyllabic shape. This unusual condition makes one suspect that its absence is not random. Instead, it suggests a prosodic condition on the distribution of [voice] in nouns. When the cases in which the stem with the voiced initial fricative appears and those in which the voiceless initial stem appears are compared, a systematic difference is observable: the voiceless initial stem is found whenever more than one syllable is involved while the voiced initial stem occurs when the inflected item is monosyllabic (save the possessive suffix). In Rice 1991a, 1992c I argue on phonological and morphological grounds that this two syllable construction forms a prosodic domain of minimal word. The distribution of [voice] can be stated as follows:

(18)   a. [Voice] is present when inflection is found with nouns (and postpositions).

        b. [Voice] is present only at a juncture within a minimal word.

In the possessive construction, the possessor and noun for a single minimal word and [voice] can be present. In the type two compounds, two minimal words are found, and [voice] does not appear between them. In bisyllabic nouns, the stem itself forms a minimal

8

word, and in the possessed form [voice] cannot be present as it appear only internally to the minimal word, not at an edge.

[Voice] is a morpheme that marks that a stem is inflectable; it is not present under the prosodic conditions that the unit with which it is associated forms a minimal word. It thus occurs at a juncture within a minimal word but not at the edge of a minimal word.

1.4 An ordering problem: diminutive/augmentative and possession

A claim that is often made is that inflection is ordered outside of derivation in word formation. In Slave, a striking counterexample is found in the noun system, with an inflectional suffix that marks a possessive construction appearing linearly inside of the diminutive and augmentative morphemes. Slave nouns have diminutive and augmentative forms, as in the examples in (19).

(19) ?ah   'snowshoe'   ?ahcho   'hunting snowshoe' (B, SS)

      téh   'mat'   téhzha   'small mat'

The diminutive and augmentative morphemes follow the noun stem.

The problem arises when possessed diminutives and augmentatives are considered. These forms include an inflectional possessive marker -é, which is ordered linearly inside of the diminutive and augmentative markers, as in (20).

(20) -?ahécho   'hunting snowshoe, possessed form' (SS)

      -télézha   'small mat, possessed form'

These constructions appear to be highly problematic since inflection is ordered linearly inside of derivation.

Facts indicate that the diminutive/augmentative are not part of the minimal word. Recall that when a minimal word is possessed, voicing of a stem initial fricative fails to occur. In possessed diminutive and augmentative forms. voicing is found, as in (21).

(21) shįah   -zhinéah   'small song, ditty' (SS)

      łuhcho   -luzécho   'table spoon' (SS)

9

Assuming the conclusion of the previous section, that voicing is prohibited when the stem is a minimal word, the suffixes in question cannot form part of the minimal word.

The minimal word provides an elegant solution to this problem. It appears that the possessive suffix has a bipartite environment. First, it attaches to a noun that is inflected. This condition, while necessary, is not sufficient, since it would place the suffix on the outside of the diminutive and augmentative. The prosodic condition corrects this: in addition to attaching to an inflected noun, this suffix must attach to the minimal word. The inflectional suffix then has a well-defined position environment. While it normally appears at word-edge, in those cases where a derivational suffix that is not integrated into the minimal word with the stem occurs, the inflectional suffix appears to be infixed between the stem and the augmentative/ diminutive. The infixation is not genuine, however, but merely a consequence of suffixation to the prosodic word.[9]

1.5 Summary

While the noun has not been the object of intensive study, it has properties of interest. It indicates that the notion 'inflectable' is important in the language for determining the distribution of a morpheme, second it shows that in addition to morphosyntactic conditions on morpheme placement, prosodic conditions may also be required.

2 The verb

2.1 Background

The structure of the Athapaskan verb has been the topic of enormous study (see references in the introduction). The verb is complex, and presents a myriad of problems for most theories of word structure. In this section I summarize a traditional view of the verb; this serves as a background against which to examine a number of the areas of study.

The Athapaskan verb is traditionally thought to consist of a single word, composed of a stem and a number of prefixes. The stem itself is complex. consisting of a root followed by a suffix that indicates mode and aspect.[10] The order of prefixes is determined by a template, or position class model. Thus, morphemes occur in a fixed order and are

lexically marked for the position in which they occur. In addition, each morpheme is lexically marked for phonological boundary type. A template for Slave is given in (22). The template includes verb prefix positions, boundary types, and a labelling of the traditional inflection/derivation categorization of morphemes in the position.

(22) preverb#distributive #iterative#incorporate#direct object %deictic subject %

    D   D   D   D   I   I

gender-secondary aspect+primary aspect+subject=voice+stem

    D   D   D/I   I

A brief description is in order. Several phonological boundaries are indicated. The symbol '#' represents a strong boundary type. It marks what are traditionally called disjunct morphemes.[11] The second symbol '+' indicates a regular boundary type. It separates what are traditionally called conjunct morphemes, a span that includes some items considered to be derivational and others considered to be inflectional. The third symbol '%' is associated with the direct objects and deictic subjects. These morphemes are intermediate in phonological patterning between the disjunct and the conjunct. Finally, the symbol '[' separates the voice morpheme and verb stem from the remainder of the verb.

I will briefly describe the content of each position, beginning at the right edge.

The stem is obligatory, supplying the major event, state, or whatever.

The morpheme labelled 'voice' is traditionally called the classifier. It actively marks voice or valency, but is lexicalized in many cases. For example, while transitivity is often marked by a morpheme h- (*ł) in this position (e.g. łánįwɛ 's/he died' with a null voice marker vs. O łánįhwhɛ 's/he killed O' with the h- voice marker (B)), there are transitive verbs that do not include this morpheme (e.g. ráyɛrɛyįtá 's/he kicked him/her', with a null voice marker (H)) and the morpheme may be present in intransitives (e.g. k'ɛhtłóh 'it (meat, fish) is soft', with h- (SS), thɛhchú 'clothlike object is located' (SS)).

The subject position contains overt morphemes marking first person singular, second person singular, first person duo/plural, and second person duo/plural.

Primary aspect indicates the primary aspect of the verb, imperfective, perfective, or optative, while secondary aspect marks aspects that combine with the primary aspects; these include inceptive, semelfactive, conative, transitional, and others. What I term 'primary aspect' is often divided into two positions, conjugation and mode (e.g. Rice 1985b, Rice & Hargus 1989). Perfective and optative are overtly marked in primary aspect position, while imperfective is unmarked. The morphemes called conjugation markers are found in every verb form (they have overt forms *y*, *n*, *w*; a null form is considered present if there is no overt morpheme present). Each verb requires a particular conjugation pattern, or set of conjugation markers, for the imperfective, perfective, and optative. Conjugation pattern is determined in two different ways, both of which are linked to semantic properties of the verb. First, verbal lexical entries fall into a range of semantically defined classes called verb theme categories (i.e. categories that unify the verb themes, or underlying lexical entries; see below). If the verb surfaces as an inflected lexical entry, the conjugation pattern is decided by the semantics of the verb theme category. For instance, verbs of motion require the conjugation pattern *n* imperfective, *n* perfective, *n* optative, while those involving sustained actions over time require $\emptyset$ imperfective, *y* perfective, $\emptyset$ optative. Second, preverbs and secondary aspectual morphemes are conjugation choosers, and determine the conjugation pattern for a verb. Again, the semantics of the conjugation chooser is linked to the particular choice of conjugation marker. For example, the adverb *dah* 'up onto a horizontal surface' requires *w* imperfective, *w* perfective, *w* optative conjugation marking, the adverb *ká* 'out from inside' requires $\emptyset$ imperfective, *y* perfective, $\emptyset$ optative conjugation marking, and the secondary aspectual marker *d* 'inceptive' requires $\emptyset$ imperfective, *w* perfective, $\emptyset$ optative conjugation marking. The iterative and distributive also select conjugation patterns.

The conjugation-primary aspect-subject portion of the verb combines in ways that are not always predictable. For instance, the first person singular subject has the form *h* except in the perfective of $\emptyset$ and *h* voice element verbs, where it is *i*. While it is possible to assign

12

the morpheme *h* the meaning 'first person singular subject', the morpheme *i* includes more

than one meaning, namely first person singular subject/perfective primary aspect. The

optative is predictably *u* or *wo-* except when the conjugation marker is *n* or *w*, when it is

'wo or *wo* (the acute accent indicates that a high tone falls on the vowel of the preceding

syllable). Other morphemes show similar patterns. While the second person singular is

regularly nasalization in certain environments, in *Ø* and *h* voice element perfectives it has

the form *ne* in these environments. The third person exhibits similar allomorphy, with an

unusual form in the perfective of *Ø* and *h* voice element verbs. *n* and *w* conjugation

optatives also display unexpected patterns. The nonsystematic combinations of

conjugation-primary aspect-subject suggest that in at least some cases this stretch of the

verb should be treated as a single unit, or portmanteau morph, with complex meaning, as

proposed, for instance, by Anderson 1982 for Georgian and by Williams 1981 for Latin.

Gender morphemes, generally viewed as derivational prefixes, include *d* 'fire,' *d*

'benefactive,' *d* 'by mouth,' *n* 'mind, feeling,' *n* 'water,' *y* 'dual subject.' These

morphemes marked gender historically. Some are productive; for instance, *d* 'by mouth'

occurs in a wide range of verbs having to do with noise; examples include 'whistle,'

'snore,' burp, 'sit,' 'bark,' 'cough,' 'squeak,' 'ask', 'whine, fuss,' 'argue,' 'defend (help

with words),' 'walk laughing, crying. etc.' 'joke (tease with words),' 'win with words.'

Others occur in restricted circumstances. For example, *n* occurs in verbs meaning 'handle

unspecified object (water) on object; wash' and 'handle in water.' Without *n*, the meaning

of the verb does not include the concept of water. The prefix *y* is found in certain verbs

with a dual subject (e.g. 'dual arrive'); however, it is not generally found even when the

stem requires a dual subject. I also include under the rubric of 'gender' morphemes which

always occur with a particular verb stem; these are usually termed thematic in the

Athapaskan literature and are part of the underlying representation of the lexical item. For

instance, the basic lexical entry for the verb 'handle singular object (uncontrolled)' includes

the morpheme *y*, with every derivative based on this lexical entry requiring this morpheme.

13

While in general, gender precedes secondary aspect, as in (22), the ordering may be overridden by phonological constraints. In Slave, the ordering of these morphemes is: *u- y* gender , *d, n, y* secondary aspect, *i.* See Hargus 1988 on Sekani, Kari 1989 on Ahtna, Kari 1993 on several Alaskan languages, Rice 1989 on Slave, and Speas 1986, Wright 1986, and McDonough 1990 on Navajo.

The deictic subject morphemes are two in number. The morpheme *ts'e-* indicates an unspecified subject while the morpheme *ke-/ge-* (the form varies depending on dialect) is a third person human plural.

Direct object morphemes mark the person and number of the direct object.

The disjunct complex consists of three major categories. Incorporates are of two types: internal arguments, including both objects and subjects of unaccusative verbs (Rice 1991c) and some adverbials are candidates for incorporation. The meaning of the verb with an incorporate differs in systematic ways from the meaning of the verb without it; see Axelrod 1990 and Rice 1991c for discussion.

Two quantificational adverbs are found in Slave. The distributive can quantify the subject, the object, the location, or the event. The iterative quantifies the event or object, indicating that an action is habitual or repeated, depending on other morphemes present within the verb. These are divided into two positions in most Athapaskan literature.

Preverbs, traditionally called incorporated postpositions and adverbs, represent oblique relations and manner. See Kari 1989, 1990 and Rice 1991b for details. Typical meanings of preverbs include 'around, away, up onto, out of. across, to a point, into fire, into air, in half. to pieces, excess.' While the meanings of many of these morphemes are transparent, with some the meaning is defined only in combination with the verb stem. Preverbs can be intransitive or transitive and more than one is possible in a particular verb word.

The minimal lexical entry of a verb is generally considered to be a 'verb theme' rather than a stem (or root). 'Verb theme' is a technical term referring to the stem, a voice element

(perhaps null), and whatever other morphemes are required with that stem; these may be preverbs and gender morphemes. Some verb themes are given in (23).

(23)   a.   d-dǫ   'drink'

            voice-stem

       b.   d-l-wɛ́   'sg. fall' (H)

            gender-voice-stem

Word formation involves several distinct stages. In the first stage, a level called the verb base is formed. At this level, derivational affixes are added to the verb theme. These include preverbal, gender, and secondary aspectual items. Some sample bases formed on the themes in (23) are given in (24). Verb words are also shown; this is the base plus inflectional items; see the discussion below.[12]

(24)   a.   verb theme   d-dǫ   'drink (object)'

            verb word   hɛdǫ   s/he drinks (object)'

            verb base   tɛ-d-d-dǫ   'drink to excess'

                          preverb-sec asp-voice-stem

            verb word   tɛdɛ́hdǫ   's/he drank to excess' (H)

            verb base   n-d-dǫ   'get full of (food)'

                          sec asp-voice-stem

            verb word   ʔɛnɛ́hdǫ   's/he is full (of food)' (SS)

       b.   verb theme   d-l-wɛ́   'fall'

                          gender-voice-stem

            verb base   ká-d-d-l-wɛ́   'fall out'

                          preverb-gender-asp-voice-stem

            verb word   kádɛdɛ́hwɛ́   'she/he/it fell out' (H, B)

            verb base   tɛh-d-l-wɛ́   'fall into water'

                          preverb-gender-voice-stem

            verb word   tɛdɣ̧wé   's/he fell into water' (H, B)

15

verb base	ch'a-tthí-d-l-dhé	'fall and bump on head'
	preverb-'head'-voice-stem	
verb word	zhech'atthídédhé	's/he$_i$ fell and bumped his/her$_i$ head' (SS)

At the final stage of word formation, the verb word is produced. At this level, inflectional affixes are present (e.g. subject, object markers, conjugation and primary aspect[13]) and the formation of the verb word is complete. (See Kari 1979, 1990, 1992 for a far more highly articulated model of word formation in Ahtna, an Athapaskan language of Alaska.)

This model of word formation includes three levels commonly assumed in word formation (although with rather unusual names in the Athapaskan literature), verb theme (basic lexical entry), verb base (verb minus inflection), and verb word (inflected verb). Such a model of word formation is proposed to account for paradigmatic properties of the Athapaskan verb. It results in making Athapaskan verb formation like word formation in other languages, with derivational morphology preceding inflectional morphology.

Given this model of word formation and the boundaries in (22), it is evident that word formation and phonology do not take place in tandem as the phonological domains are not defined until the verb word is formed (see Hargus 1986 for comments). Because of this lack of isomorphism between word formation and phonology, the Athapaskan literature recognizes two models of the verb. One (theme, base, word) accounts for morphological structure, allowing for derivation to precede inflection. The second (boundaries) accounts for the phonological structure of the verb. This second type of structure is coded as boundary symbols (or some other diacritic) on the lexical entry of the affixes.

With this background, I am ready to turn to some of the theoretical problems posed by the Athapaskan verb. The issues that I raise are, I believe, problems that must be dealt with by any theory of morphology. However, the solutions that I frame are basically within a government-binding framework, and rely heavily on incorporation theory (Baker 1988).

2.2 An ordering problem: the ordering of inflection and derivation

It is often proposed as a linguistic universal that inflection, defined as what is relevant to the syntax, appears outside of derivation (e.g. Anderson 1982, 1988, etc.). Athapaskan languages are often cited as counterexamples, with derivation appearing outside of inflection. In this section I examine this problem, suggesting that the concern is misplaced with respect to Slave. When the overall structure of the verb is considered, the generalization can be drawn that clearly inflectional material does occur outside of derivational material. In this section I restrict discussion to the traditional conjunct morphemes, ignoring disjunct material (see section 2.6).

To reiterate, the conjunct portion of the verb is generally assigned a structure similar to that in (25). The labels I (inflectional) and D (derivational) represent the word formation category in which the position class is usually thought to fall.

(25)   direct object - deictic subject - gender - secondary aspect - primary aspect - subject

         I   I   D/I   D   D/I   I

Given the labels in (25), inflection and derivation appear to be hopelessly intermingled, with apparently no generalizations about their ordering available.

While (25) appears to present an insoluble ordering problem, the criteria used for labelling morphemes as inflectional or derivational are not generally addressed in the Athapaskan literature. Thus, before turning to the details of the Slave verb, I establish criteria to distinguish inflection. Morphemes can be established as inflectional in several ways. First, inflectional items are syntactically active while lexical items are not. In determining which items are syntactically active, I follow Anderson 1982, 1988, who argues that syntactically active items show configurational, agreement, inherent (e.g. gender), and phrasal properties. Second, inflectional items are obligatory, or paradigmatic, being marked each time a category to which they apply appears (Anderson 1982, Bybee 1985: 27). Lexical items, on the other hand, are not obligatory in this sense. Third, inflectional items can combine to form portmanteau morphemes with more than one element

17

of meaning in a single entry. Lexical items do not combine with each other or with inflectional items; see Anderson 1988. Finally, inflectional classes are normally closed classes while lexical classes tend to be open.

These criteria can be used to establish the following categories in Slave: the traditional disjunct morphemes are lexical items (I call them this rather than derivational as I suggest that the verb is a syntactic phrase rather than a lexical word; see section 2.4), the traditional conjunct morphemes are inflectional items, and, finally, the direct object and deictic subject morphemes, which fall between the disjunct and conjunct in their phonological patterning, are lexical items as well, but lexical items that cliticize to the verb.

In the following discussion, I review the evidence for this categorization.

i. pronominal subject agreement. Saxon 1986 argues that the pronominal elements of Dogrib, a language closely related to Slave, represent agreement between a noun phrase and the clausal element upon which it depends syntactically. The primary evidence for this is that subject marking is obligatory, being present whether a specified noun is present or absent. The evidence adduced by Saxon for pronominal subjects representing agreement in Dogrib is found in Slave: these morphemes are obligatory and function paradigmatically. In addition, as discussed in section 2.1, the subject markers combine with aspect morphemes to yield portmanteau forms, another diagnostic of their inflectional nature.

ii. primary aspect. Anderson 1982 points out that tense/aspect play an important role syntactically, so one might expect these morphemes to be of syntactic relevance. There are reasons in Slave to consider primary aspect morphemes as inflectional. First, co-occurrence restrictions exist between primary aspect and aspectual category-assigning morphemes which follow the verb: if the verb stem is optative, then the optative morpheme must be present in primary aspect position and so on. Second, co-occurrence restrictions exist with other postverbal material. For instance, an imperfective verb combines with the postverbal particle *gha* to yield a future. The optative combines with the postverbal *sáná* to give a prohibitive meaning. If the postverbal particles are higher predicates (Rice 1989), it

18

is possible to view this as selection of primary aspect by a higher verb, a configurational property. Third, primary aspect is an obligatory part of the verb, again an indication that it is inflectional. Finally, the subject and primary aspect morphemes combine to form portmanteau morphs, suggesting that each of the components is inflectional.

iii. conjugation. Although I have treated primary aspect and conjugation together, I will briefly discuss the inflectional status of conjugation. Two facts suggest the inflectional nature of these morphemes. First, they are obligatory. Second, they combine with primary aspect and subject in unpredictable ways, suggesting that a single morpheme may include the meaning conjugation, primary aspect, and subject. Again, since inflectional morphemes form portmanteaus only with other inflectional items, this suggests that these morphemes must be inflectional.

iv. secondary aspect. These morphemes show cooccurrence restrictions with temporal adverbs that are clearly outside of the verb and they are required in order to yield the particular meaning. For instance, the inceptive, which marks a point in time, does not occur with an adverb indicating a span of time. In addition, some of these morphemes combine in unexpected ways phonologically with the conjugation markers and subject pronouns. These combinations can be treated as portmanteau morphemes, providing evidence for their inflectional nature.

v. gender. The morphemes that I have labelled gender are normally considered to be derivational. These items have some nonlocal correlates, as discussed in section 2.1, in that dependencies between them and verbal arguments exist. Given this, they appear to be inflectional. In addition, they show the same unpredictable patterns of combination with subject, conjugation, and primary aspect as secondary aspect morphemes. While these morphemes have nonlocal properties, they are not found with every verb that has a particular item as an argument. The gender morphemes appear to have been productively inflectional historically, showing regular agreement with a verbal argument; however, it is

not clear that this is the case synchronically. I consider gender morphemes to be inflectional, understanding that problems exist with this definition.

The two non-disjunct classes yet to be discussed are deictic subjects and direct objects. These morphemes have properties that suggest that they are not inflectional, and I postpone discussion of them until section 2.5. Additionally, there are two disjunct morphemes that might appear to have inflectional properties, the distributive and the iterative. These do not meet the criteria for inflection; see section 2.6. Finally I have not discussed the voice morphemes. In their productive use, these supply argument structure; in their non-productive use they are listed as part of the lexical entry. As argument structure is determined by the verb, they appear to be part of the lexical entry in this way as well.

If the conclusions of this section are correct, the problem that I began with, that inflection and derivation are intermingled in the conjunct span of the verb, disappears: the morphemes in this portion of the verb function inflectionally.

2.3 An ordering problem: the need for a template for the conjunct morphemes

I have suggested that the conjunct morphemes (minus deictic subjects and direct objects) are inflectional. I now address the ordering of these elements, examining whether their ordering is a language-particular property or follows from more general principles.

Two perspectives have been proposed in the Athapaskan literature on the ordering of the conjunct morphemes. One, elucidated in the greatest depth by Kari 1989, 1990, 1992, 1993, is that the ordering of elements is stipulated by a template. Kari argues that a template accounts for the rigidity of the ordering and the idiosyncrasies of ordering of gender and aspect. He argues that the conjunct morphemes divide into three major zones, a qualifier zone, a conjugation zone, and a subject zone. The first two of these zones are complex in structure, containing several positions whose ordering is again a consequence of the template. The second proposal, that of Speas 1991 and Rice 1993, attempts to provide a semantically based account of the ordering of conjunct morphemes for Navajo

and Slave, respectively. It is this model that I shall pursue; however, see note 14 for discussion of how the models may be more compatible than originally appears.

If the ordering of morphemes is predictable, there must be a principle that determines that ordering. In this section I assume that the order of morphemes is a reflection of scopal properties (e.g. Baker 1988, Speas 1991, Rice 1993). I return to discussion of this in more detail in section 2.6.

With this hypothesis in mind, I turn to an examination of the ordering of the inflectional elements in Slave. I use the term 'scope' in the following discussion; by this I mean something similar in nature to Bybee's 1985 term 'relevance to the verb.'

When the position of the verb stem (as well as the direct object and the deictic subject) is ignored, the following order of conjunct morphemes is found.

(26) ≈ gender-secondary aspect-conjugation/primary aspect-subject

The subject morpheme, which occurs on the right edge of the inflectional complex in Slave, can be viewed as being relevant to an entire sentence (e.g. Speas 1991); if ordering is a consequence of scope, one might expect to find it appearing on an edge. It is also not relevant to the verb (see Bybee 1985), another reason why it might be at an edge away from the verb (see below).

Aspect may be seen as having scope over the verb, being relevant to the verb in a way that subject generally is not. Properties of the predicate can affect primary aspect and conjugation; for instance preverbs and quantificational adverbs play a role in conjugation choice, some verb stems include inherent number, which can have an affect on conjugation choice as well.

Primary aspect is required while secondary aspect is not and some secondary aspects occur with a restricted range of primary aspects; it thus appears that primary aspect has scope over secondary aspect. Secondary aspect, like primary aspect, has relevance to the verb; for instance, adverbial and preverb types can affect secondary aspect.

21

Gender generally represents concord with non-agentive thematic roles, or nonsubjects, so it is not unreasonable to think of this morpheme as having scope over the direct object, but not over other inflectional material.

Based on these criteria, the overall ordering of the Slave inflectional morphemes appears to be a consequence of their scopal properties.[14] Strikingly, the order of elements found in Slave does not appear to be unique to Slave, or to the Athapaskan family. In work on the ordering of inflectional elements, Speas 1991 examines six languages (English, French, Modern Greek, Finnish, Basque, Navajo), finding the morpheme order in (27) to be similar across languages.[15]

(27) subject agreement - tense - aspect - object agreement - voice - verb

The languages discussed by Speas do not have gender, so the models are not directly comparable. However, it is notable that the order of inflectional elements in Slave may not be unique to this language, but may be found cross-linguistically. If this is true. a language-particular statement of scopal relationships is unnecessary and the order of inflectional items in Slave can be seen to follow from a theory of scopal ordering that is part of universal grammar.

2.4 A structural problem: The structure of the inflectional complex

I now turn to the structure of the verb in Slave. A controversial question concerns the structure of the inflectional complex and the position of the verb stem. Speas 1991 and Rice 1993 argue that the inflectional categories project phrasally for Navajo and Slave respectively, following work by Chomsky 1988 and Pollock 1989. The reasoning behind this assumption is that as the inflectional morphemes are syntactic in nature, they should be accessible to the syntax; this is achieved through making them syntactic rather than lexical objects. Most others in the field of Athapaskan linguistics (e.g. Hargus 1988. Kari 1990, 1992, McDonough 1991, Randoja 1990) propose that all word formation is lexical. This hypothesis has to deal with the syntactic accessibility issue; access to inflection can be

22

achieved in other ways than through phrasal projections; an alternative involves percolation conventions; see for instance Lieber 1992.

I assume that the gender-aspect-subject morphemes form a lexical rather than syntactic unit. Some evidence suggests that this complex should be formed lexically despite its syntactic consequences. First, as discussed in section 2.1, morphemes within this domain can either consist of a single component of meaning (e.g. first person singular) or more than one component of meaning, a portmanteau (e.g. first person singular perfective). This patterning is perhaps suggestive of lexical status as items that are concatenated syntactically tend to be more transparent in their combinations. Second, the fact that there are phonological or templatic criteria that override the basic semantic ordering of gender and secondary aspect morphemes also suggests that principles of syntax alone are not at work. Ordering in syntax tends to be determinable by a set of principles, principles that do not predict the actual orderings of the gender and secondary aspect morphemes that are found. Third, phonological properties, discussed briefly in section 2.1, indicate idiosyncrasies in this span of the verb that are characteristic of lexical rather than postlexical rules.

Given this, I propose that the inflectional complex has the structure in (28).

(28)

I=inflection
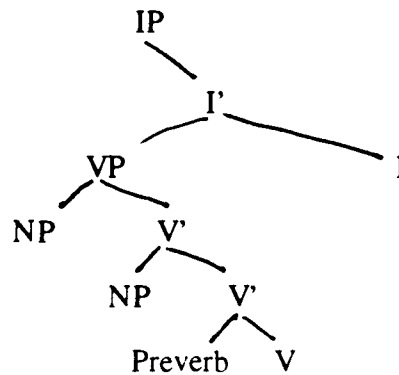
PA=primary aspect. SA=secondary aspect
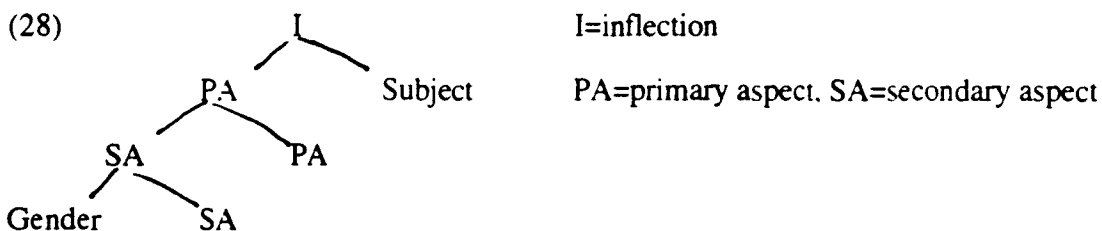
While I have spelled out full structure for this complex, in some cases two positions combine into portmanteau morphemes (e.g. subject and primary aspect). The portmanteau morphemes involve strictly adjacent positions (e.g. primary aspect-subject) and never non-adjacent positions (e.g. subject-secondary aspect when there is an intervening overt primary aspect).[16]

Having examined the internal structure of the inflectional complex, I now focus on sentence-level structure. I suggest that a Slave sentence has the structure in (29), ignoring

lower levels of structure. This structure is consistent with the theoretical claim that inflection is syntactic in nature in that it is outside of the verb phrase and with the empirical observation that the inflectional component is lexically rather than syntactically formed.

(29)

```
            IP
              \
               I'
             /    \
           VP       I
          /  \
        NP    V'
             /  \
           NP    V'
                /  \
          Preverb   V
```

The inflectional component, whose internal structure is defined within the lexicon, serves as the head of IP. I assume that it is indexed for the inflectional features of the morphemes that it contains lexically.

The major discrepancy between (22) and (29) is in the position of the verb stem, labelled V in (29). I have placed the stem within a VP which includes within it all non-inflectional items of the traditional verb word as well as verbal arguments. This structure seems appropriate. Arguments exist for the subject and object noun phrases originating internal to the VP; see section 2.5. Assuming that the NPs are arguments of a head, the verb should be included within the VP to provide that head.
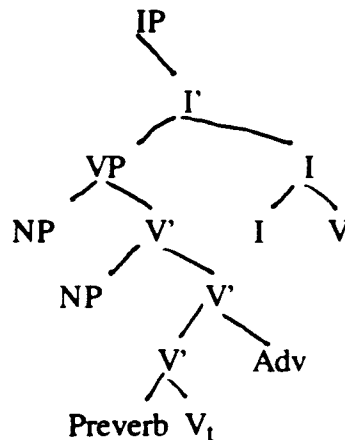
While the verb originates within the VP, this is not its surface position: it must move out of the VP into final position. I suggest the following. In (29) the inflectional unit, while a word, is an affix. The verb raises, moving from its position as head of VP to adjoin to I, providing a host for the affix. An X° level element composed of an affix, inflection, and a stem, the verb, is created. This derived structure is shown in (30).

(30)

```
            I
          /   \
        I       V
```
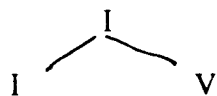
The structure derived by verb raising is given in (31), where the verb is in final position.

(31)

```
                        IP
                         \
                          I'
                        /    ‾‾‾‾
                      VP        I
                     /  \      / \
                   NP    V'   I   V
                        /  \
                      NP    V'
                           /  \
                         V'    Adv
                        / \
                  Preverb  V_t
```

2.5 A duplication problem: two subject positions

So far, I have ignored two morpheme types, direct object and deictic subject. In this section, I attempt to deal with these through an examination of another problem, the need for two subject positions. labelled 'subject' and 'deictic subject' in (22).

2.5.1 Inflection revisited

A major area of debate in the Athapaskan literature concerns whether pronominal elements have the status of agreement (inflection) or of arguments. Saxon 1986 argues that all pronominals represent agreement, while nouns are arguments. Sandoval and Jelinek 1989 argues that all pronominals are arguments, while nouns are adjuncts. Speas 1989 argues that most pronominal elements are agreement, but that at least one object pronoun is an argument. Tuttle 1993 proposes that object pronominals are arguments; she takes no position on subjects. Thus, a wide range of opinions is represented in the literature.

In this paper, I take the view that the pronominals fall into two classes. The subjects discussed in section 2.2 are agreement while the objects and the deictic subjects are arguments. I suggest that with this distinction the need for two subject positions within the verb becomes explicable.

As discussed in section 2.2, subject morphemes are best viewed as agreement since they meet criteria for inflection: they are obligatory and have syntactic consequences.

Deictic subjects have rather different properties. They are not obligatory; for instance, a human plural reading can be obtained whether the morpheme *ke/ge* is present or not, as illustrated in (32).

(32) a. dɛzǫa-kɛ karɛ   nágogɛzhɛh   'the children are playing outside' (SS)

          child-pl outside 3 play

      b. dɛzǫa-kɛ karɛ nágozhɛh   'the children are playing outside'

      c. dɛzǫa karɛ nágogɛzhɛh   'the children are playing outside'

      d. dɛzǫa karɛ nágozhɛh   'the children are playing outside' OR

                                          'the child is playing outside'

In (32a) both a nominal affix *kɛ* 'group plural' and the morpheme *gɛ* 'human plural' are present; in (32b) only the nominal suffix is present; in (32c) just the verbal morpheme is present, and in (32d) neither are present. The sentence in (32d) is ambiguous, with a meaning of a single child is playing also.

The human plural is optional in another sense. If the verb stem has plurality of theme inherent in its meaning, then again a human plural reading is attainable with or without the presence of the deictic subject, as in (33).[17]

(33) ríkɛrénįde   'they landed (human)' (H)

      rírénįde   'they landed (human. nonhuman)' (H)

The verb theme *de* requires a plural subject; when *kɛ* is present the subject must be human, but a human subject is still possible when it is absent.

So far I have discussed the human plural morpheme, neglecting the unspecified subject *ts'ɛ*. This too can be viewed as optional. For instance, while nominalizations often have this subject morphemes present, it need not be, as in (34).

(34) zhú bɛt'áh k'ɛnáɛʔɛts'ɛnɛtsi   'washing machine' (literally: one handles

      clothes 3.with one handles water on water on clothes by means of it) (B, SS)

      zhú bɛt'áh k'ɛnáʔɛnɛtsi   'washing machine'

Note that in the second instance, the morpheme *ts'ɛ* is absent, yet the same reading attains.

See work by Cook 1993 for further justification of the non-inflectional status of the deictic subjects in a range of Athapaskan languages.

Objects do not illustrate the same inflection-type properties that the subjects do. While subjects are obligatory, this is not true of objects. In particular, an object pronoun and a noun are in complementary distribution, with the pronoun appearing just in case no noun is present, as in (35). In the first form of each data set, as object pronoun is present; in the second form a nominal object is present and there is no object pronoun. The object pronoun is in italics.

(35)   a. Mary ná*ʒhɛ*niịtá   'Mary kicked him/her/it' (SS)

             Mary John nániịtá   'Mary kicked John'

       a. Mary *yɛ*gháyɛyịdá   'Mary saw him/her/it' (H, B)

           Mary gah gháyɛyịdá   'Mary saw the rabbit'

Object morphemes do not have the typical property of agreement of obligatoriness.

If deictic subjects are arguments while subjects are inflection, the existence of two subject positions in the verb word ceases to be a surprise: these positions, are only both superficially subjects; in reality they represent instances of very different categories.

2.5.2 An ordering problem: the position of the deictic subjects and direct objects

I have suggested that the deictic subjects and the direct objects are not inflectional items, but have not yet discussed their positioning within the verb. Suppose that the verb phrase has the structure in (36), adopting the internal subject hypothesis proposed in Kuroda 1988, Sportiche 1988, and others and argued for for Athapaskan languages in Saxon & Rice 1992. The remainder of the structure of the VP is discussed in section 2.6.

(36)

```
                  VP
                 /  \
            NP        V'
                     /  \
 internal subject   /    \
 position          /      \
               NP          V'
          object position
```

27

In this structure subject and object arguments originate within VP. Generally the subject moves out of VP into canonical subject position, as the specifier of IP. The need for base-generated internal subjects and movement in Athapaskan languages is argued for by Rice & Saxon 1991 based on a range of syntactic evidence including incorporation and idioms.

Rice & Saxon 1991 argue that conditions exist under which subjects move in Athapaskan languages, with salient, human subjects being the most likely to move. In some languages (e.g. Ahtna, Koyukon), anaphoric properties suggest that subjects fail to move under some conditions. Slave is characterized by Rice & Saxon as a language in which the subject must always move. While this hypothesis seems basically correct, I suggest that occasions under which the subject fails to move out of the verb phrase exist: non-emphatic pronominal subjects do not move.[18] If a subject does not move into external subject position in Slave, it nevertheless must move by incorporating into I, yielding (37).

(37)

```
          I
         /  \
    Subj      I
            /  \
           I    V
```
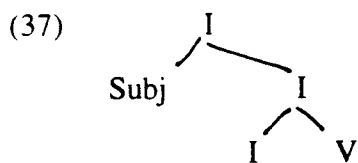
The verb-word-internal subjects thus are instances of subjects that remain within VP rather than moving into canonical subject position.

Movement from internal object position differs in that there is no firm evidence that objects move from their base generated position within VP.[19] However, as discussed in section 2.1, some objects do appear within the verb word, namely nominal objects in the position labelled incorporate and pronominal objects. Just as subject pronouns that remain VP-internal incorporate into I, I suggest that pronominal objects and some nominal objects incorporate by adjoining to I. The resulting structure is given in (38).

(38)

```
          I
         /  \
     DO       I
            /  \
           I    V
```
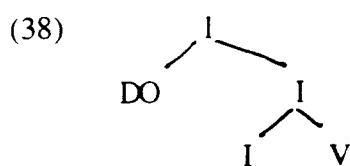
If both a subject and object incorporate, the structure in (39) results.

28

(39)
```
         I
        /‾‾~
    DO  /‾~
       /   \ I
    Subj    /‾~ I
           /    /‾~
          I       V
```
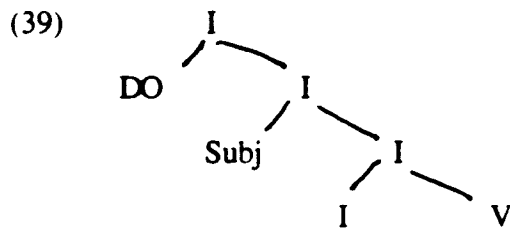
The adjacency of direct objects and incorporates is not surprising if both result from incorporation from argument positions in the structure in (36). The different phonological patterning of nominal and pronominal objects is a consequence of one being a full lexical category (N) and the other being a pronoun; see section 2.9.

The ordering of objects and subjects remains unaccounted for. I have no arguments to offer for why they are ordered this way; however, this is a cross-family property, and as such requires an account. In section 2.7 I suggest that in addition to incorporation of arguments, there is cliticization of verbal adjuncts: the derived ordering is the mirror image of the underlying ordering and retains the scopal relations, but in reverse order.

2.6 An ordering problem: the need for a template for the disjunct morphemes

So far I have discussed the conjunct complex. I have suggested that (i) the traditional divisions of morphemes into categories of inflection and derivation requires rethinking, with some of the traditional derivation being considered as inflection, (ii) pronouns do not form a single category, but subject pronouns represent agreement while deictic subjects and direct objects are arguments, (iii) deictic subjects and direct objects originate within the verb phrase, along with nominal subjects and direct objects, and incorporate into I, and (iv) the verb originates as head of the VP and moves to provide a host to the inflectional complex. Given this view of the verb, several traditional problems receive an explanation.

In this section I turn to the need for a template within the remaining portion of the verb. the disjunct complex. I suggest that the need for a template is again overstated, and that basic principles of semantics provide a means of predicting the order in which disjunct morphemes appear. I begin by proposing an overall structure for the verb phrase.

The verb phrase has the structure in (40), expanded from (29).

29

(40)

```
              VP
          /       \
        NP          V'
            NP    /    \
           /     /      V'
     Quantificational Adverb  / \
                          Preverb  V
```
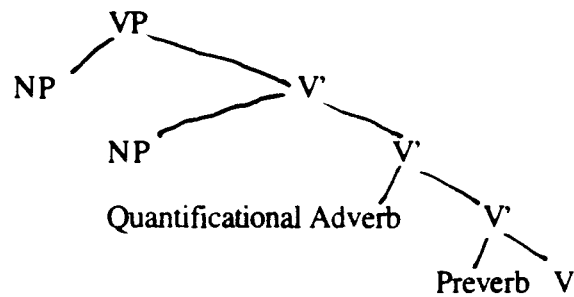
Some of this structure has been introduced. I suggested that the subjects and objects originate internal to the verb phrase as reflected. I also suggested that the verb stem, while originating within VP, moves. The primary purpose of this section is to discuss the overall ordering of the remaining positions.

Before turning to this, it is necessary to address briefly two other issues. First, the inflectional/derivational status of VP-internal elements has not been established. The lexical status of all VP-internal material is obvious with the exception of the quantificational adverbs. These elements are aspectual in nature, and one might think that they should be regarded as inflectional. However, they fail the test of obligatoriness, as is shown for the iterative in (41) and the distributive in (42).

(41)   nid{dhah   's/he picked up plural objects' (SS)

        ninad{dhεh, nid{dhεh   's/he picked up plural objects repeatedly'

(42)   náneyihkwa   'I whipped it' (y conjugation) (B)

        náyánεhkwa, nánεhkwa   'I whipped it repeatedly' (w conjugation)

On the first line of each data set, a form without a quantificational adverb is shown. On the second line, two forms are given, one with the adverb and the other without it, but with the same meaning. In both cases, there are further differences between the forms on the two lines. With the iterative, a different stem form is required and this is the major signal of iterativity. In the distributive form, the change in conjugation and aspect is the primary signal of distributivity; the distributive morpheme serves only to reinforce this. The morphemes themselves then are not paradigmatic.

Second, in (40) the adverbs and preverbs are daughters of V' rather than of V. This syntactic status is clearest for the quantificational adverbs. The iterative quantifies the action with many verbs; for instance, with the stem 'go' it mean 'go again.' However, it can also quantify an object. In a predicate such as 'I ate an apple' if the iterative is present, it refers to the apple, specifying that the speaker ate another apple. Thus, depending on the semantics of the predicate, the iterative can refer to material outside of the verb word itself. This is different from the semantics of a prefix such as *re-* in English, which refers just to the verb. Arguments are more difficult to establish for the preverbs, but do exist. Many of the preverbs need not be part of the verb word but can be independent of it, being included within the verb word when they are strictly subcategorized for. This might suggest that they are phrasal rather than word level elements. In addition, preverbs can be transitive. A phrasal structure perhaps better allows for this property than a lexical structure would.

Having established these preliminaries, I turn to the ordering of elements within the disjunct portion of the verb. The common analysis of the disjunct complex, like the rest of the verb, proposes that a template orders the morphemes. While templates, or position classes, have been proposed traditionally (e.g. Lounsbury 1953 on Oneida, Sapir & Hoijer 1967 on Navajo) and recently (e.g. Bessler et.al. 1993 on Romance, Bonet 1991 on Romance, Kari 1989 on Ahtna and Navajo, 1992 on Ahtna, 1993 on Tanaina, Simpson & Withgott 1986 on Central Australian languages), they have also been the target of criticism (e.g. McDonough 1990 on Navajo, Myers 1987 on Shona, Rice 1991b, 1993 on Slave, Speas 1989, 1991 on Navajo, etc.). In this section I suggest that evidence for position classes in the disjunct complex of the Slave verb is weak, just as the need for position classes in the conjunct portion of the verb is. Rather the basic ordering follows from the semantic principle of scope discussed in section 2.3, where morphemes of greater scope appear higher in the tree than morphemes within their scope. While the template is a useful heuristic, it has little reality beyond this.

Recall that in the Slave verb template, the morphemes of the disjunct complex occur in a fixed order, summarized again in (43).

(43)   preverb - quantificational adverb - incorporate

If the morphemes are ordered by a template, one might expect to find random variation in the ordering of the position classes across the languages of a family; one would additionally expect that there would be no general principle that orders the morphemes. These predictions are not borne out when the languages of the Athapaskan family are examined. I will concentrate on the evidence that can be garnered from Slave alone; see Rice 1991b for discussion of comparative evidence.

One prediction of a template is that position classes should be rigidly ordered within a language, with no variation allowed, except by phonologically motivated metathesis. Unexpectedly for this hypothesis, some variability in the ordering of position classes is found in several Athapaskan languages, see Rice 1991b. This variability is seen in Slave when the position of the iterative with respect to incorporates is examined. While generally incorporates appear at the right edge of the disjunct complex, this is not invariably the case: there are some verbs in which the position of the iterative is variable, being allowed to the right or the left of the incorporate. Some examples are given in (44). *na* is the iterative; it precedes or follows the incorporate (*dze* 'heart' in (44a) and *ła* 'rope' in (44b)).

(44)   a.   dahdzenałéts'edɛtthɛ   'start in fright, be startled repeatedly'

              dahnadzełéts'edɛtthɛ

         b.   nałana?ɛts'edɛtłɛ   'drag, lead (rope, animal on leash) repeatedly'

              nanała?ɛts'edɛtłɛ

The existence of a template presupposes a rigidity of ordering that should not be violable; the examples in (44) show that this absolute ordering is not actually found.[20]

Perhaps a more important reason for rejecting a template is the fact that the ordering both within and between constituents within the disjunct complex appears to correlate with semantic properties of the morphemes involved. In the remainder of this section, I suggest

that the major ordering properties of disjunct morphemes need not be stipulated, but are a consequence of semantic properties. I suggest the following principle, a principle alluded to in the discussion of the ordering of inflectional elements in section 2.3.

(45)   When one morpheme is in the scope of another, the morpheme of greater scope must be higher in the tree than the morpheme within its scope.

By this, I mean that given two morphemes that can be construed as being related in some way, the more general one will appear higher in the tree than the more specific one.

While I am making this proposal with respect to ordering in Slave, it is perhaps a particular instantiation of a general principle, that d-structure hierarchical relations are a reflection of scope; cf. Baker 1988, Brunson 1989, Jackendoff 1972, McCawley 1988, Speas 1984 for discussion of the relationship between scope and word order.

Having set out the basic proposal, I turn to the facts of Slave, beginning with a discussion of the treatment of the preverb-verb as a unit and then examining higher level ordering. The preverb-stem unit is often considered to be a lexical entry or a result of an early level of word formation (see, for instance, Kari 1979, 1990, 1992, Randoja 1989, Sapir & Hoijer 1969, Speas 1984 and discussion in section 2.1). This is because the preverbs modify the meaning of the stem, providing either a systematic or idiosyncratic change in meaning to the stem. Consider, for example, the preverb in (46).

(46)   kádįtɬa   'you sg go out'

        ká   'out' (preverb)

        tɬa   'sg., dual go on land' (stem)

In this example, the preverb restricts the meaning of the verb stem, expressing something about the direction of movement.

Another indication that the preverb-verb form an integral unit is that modification of the preverb alone is not possible, but the preverbs modify the meaning of the verb stem alone. A parallel argument has been used in English to argue for verb-particles as units in a phrase like 'strike out the batter', were the particle 'out' can be viewed as incorporated into the

verb as it cannot be modified. When the particle appears after the object, it can be modified, as in 'strike the batter right out.' The difference between Slave and English is that morphemes in preverb position are always incorporated in Slave while in English incorporation is optional. The fact that the preverb is the closest item to the stem is consistent with its patterning.

Assuming that the preverb and verb form a unit, the ordering of preverbs and quantificational adverbs is predictable: quantificational adverbs are higher than preverbs.

The adverbs modify the preverb-verb complex, not just the stem, as argued for explicitly in Kari 1979, 1990, 1992 and Randoja 1989 and widely assumed in the literature. For instance, consider the Slave iterative form in (47).

(47)   koditła   'you sg. go back out'

In this example, the iterative morpheme, which surfaces here as nasalization and raising of the vowel of the preverb ká, indicates that the entire action of going out is repeated, suggesting that the iterative has scope over the action as a whole, not just over the verb stem. The example in (48) illustrates this with the distributive adverb.

(48)   tehętła   's/he went into water'

        teyáhtła   's/he went into water over and over'

The entire action of going into water is repeated, not just the going.

The adverbs thus have scope over the preverb-verb in that they modify the meaning of the complex, not just the meaning of the stem. Given scopal ordering, one expects the adverbs to appear higher than the preverbs.

Combinations of preverbs within a single verb word are possible in Slave, as shown in (49). Numbers following a gloss refer to page numbers in Howard 1990; other data is from Rice 1989.

(49) a. tɛkáyiya   's/he got out of water' (tɛh 'water' + ká 'out of') (H)

         -t'áhkáts'ɛdíle   'unharness, take out of harness (e.g. dog team)' (315) (t'áh
                              'into' + 'ká 'out of')

tɛhk'ɛts'ɛnɛtah	'look around in water, feel around in water w. stick' (393) (tɛh 'water' + k'ɛ 'on')
b. O k'ɛnín̨dhah	's/he put pl. O back together (k'e 'on' + ní 'terminative')
ɬénits'į̨ʔa	'fold' (9) (ɬé 'in half' + ní 'terminative')
-k'ɛnídagodén̨ʔǫ	's/he accused, blamed' (34) (k'ɛ 'on' + ní 'terminative')
-dáhkáʔɛts'ɛdɛchu	'open (e.g. container) (67) (dáh 'close' + 'ká 'open')
sɛ́ɛ́nɛ́nits'į̨hthi	'think over, get straightened out in mind' (148) (sɛ́ɛ́ 'good, right' + ní 'terminative')
xǫníagots'į̨hthi	'get married, establish home' (182) (xǫ 'spouse' + ní 'terminative')
ɬaánits'į̨tsɛ́h	'kill with spear' (567) (ɬáá 'dead' + ní 'terminative')
c. kátáhtɬah	's/he got out on shore (ká 'out of' + tá to shore') (SS)
ɬǫdahɛtɬɛ	's/he is dancing in circle' (ɬǫ 'circle' + dah 'up and down')
naɬǫts'ɛdʔéh	'turn in circles on water' (42) (na 'continuative' + ɬǫ 'circle')

Within the preverbs too, the ordering of morphemes appears to be predictable. The forms in (49a) show that preverbs specifying location precede those specifying direction, source, and position. For example, *tɛh* 'water' is a location and *ká* 'out (of)' specifies a direction, *tɛh* specifies the location and *k'e* the location. The relational items share properties with postpositions, following their object.

The forms in (49b) suggest that a more specific preverb precedes a more general preverb. For instance, in 'kill with spear' the second preverb indicates termination of an activity and the first indicates the manner of termination, namely termination in death. The same pattern is found in 'think over'; here the second preverb again indicates termination while the first specifies the type of ending, namely ending in something being good or straightened. The example 'accuse, blame' is similar: the verb without *k'ɛ* indicates coming to an end of a verbal action; the preverb *k'ɛ* then indicates the goal of this activity. In these cases then, the first preverb delimits the domain defined by the second.

Some verbs show somewhat different patterning. In some cases, it is difficult to identify whether one of the preverbs is more general than the other. Examples in (49c) include 'out to shore' and 'circle up and down'. More work on the semantics of such constructions is required. If the preverbs are equivalent in scope or generality, bearing no particular relationship to one another, their ordering properties must be determined by other factors (e.g. is the reverse ordering possible, if so, are the interpretations identical?).

The order of preverbs does not appear to be random, but is a consequence of general semantic properties, where a more specific preverb precedes a more general preverb.

The placement of quantificational adverbs shows the greatest variability across the family. This is perhaps not surprising, given the considerable variation in the placement of adverbs cross-linguistically. For instance, Jackendoff 1972 notes that an English adverb such as 'frequently' may occur in a range of positions without having discernible effect on the meaning of a sentence. Jackendoff suggests a possible account of the variable placement of sentential adverbs: such adverbs are transportable, or can be placed in various positions in the sentence. Jackendoff shows that VP adverbs do not show the same privileges of occurrence as sentential adverbs.

This analysis of transportability may provide insight into the position of the iterative. As shown in (44), the iterative exhibits some freedom in its position. In fact, it may even occur more than once in a particular verb, as (50) illustrates.

(50)   góhdǫkǫʔɛts'ɛdetsɛ   'break into, through, repeatedly' (574) (SS)

In this case, the nasalization on *dá* and *ká* are the surface realization of the iterative. The adverb 'sprinkles' itself over the preverbs.

While the iterative is variable in position, it occurs to the right of the preverbs. Perhaps it can be considered to be a transportable adverb, and thus can be found in more than one position within the VP. It is subject however to the constraints of scopal ordering, meaning that it must be to the right of the preverbs.

Within the adverbs themselves, I have suggested that the ordering is distributive-iterative. I make this suggestion based on forms such as (51), where *yá* distributive precedes *nǫ* iterative.

(51)　　ɬéyánǫhtsɛ　　　　　　'I break each customarily' (B)

　　　　O yánaníhshe　　　　　's/he grows pl. O again' (B)

　　　　sɛyiyánǫwɛta　　　　　's/he kicked me customarily' (H)

　　　　níyánǫgokɛhwhɛ　　　　'they each returned' (B)

In fact, the ordering of the distributive and iterative is not straightforward in Slave. While *na* iterative clearly follows *yá* distributive in the examples in (51). a closer examination indicates that not only the iterative *na* follows the distributive. More generally, any low toned disjunct morpheme *na* must follow the distributive. This is shown in (52).

(52)　　nahk'á　　　　　　　　'I sharpen it' (B, SS)

　　　　yánǫhɛhk'á　　　　　　'I sharpen each' (B)

Assuming that *na* here is a preverb and not the iterative, any disjunct morpheme of the form *na* follows the distributive, making it difficult to determine if there is a semantically-based ordering relationship between the distributive and iterative. They are clearly adjacent, but their overall ordering is possibly determined by phonological rather than meaning factors.

2.7　An ordering problem: deriving the surface order

The structure for the verb phrase that I have proposed is a left-branching one, with the hierarchy of constituents related to their scope. The result of this structure is that the underlying order of morphemes is the mirror-image of their actual surface ordering. This can be seen by comparing the underlying order in (53a) with the surface order in (53b).

(53)　　a. underlying order

　　　　[[NP$_S$ NP$_O$ Adv Preverb V]$_{VP}$ I]

　　　　b. surface order

　　　　Preverb Adverb [NP$_O$ [NP$_S$ [I V]]]

I have suggested that the verb receives its position by verb raising and that the nouns and pronouns that appear within the verb word achieve their position by incorporation. I suggest that this analysis extends to the adverbs and preverbs as well: these too attain their surface positions by cliticization to I. The surface ordering thus is a reflection of the underlying ordering, but with the scopal relations reversed: morphemes of greater scope are lower than those of higher scope.[21]

2.8 A locality problem: discontinuous constituents

Athapaskan languages illustrate another problem: they are rife with discontinuous constituents. As discussed in section 2.1, the basic lexical entry of a verb obligatorily includes a voice element and a stem. I assume that the voice element combines with the stem lexically, with voice and transitivity alternations determined in the lexicon; see section 3.1. The minimal lexical entry of a verb is thus as in (54).

(54)   voice - root $]_V$

More complex lexical entries exist, as illustrated in section 2.1, with other morphemes occurring within a verb theme. In such cases, the meaning is defined on the entry as whole, not on individual morphemes. For instance, in the theme *n-h-ji* 'scare' it is not possible to assign meanings to the individual elements of the theme. In such structures, the assumption made in the Athapaskan literature has been that these are single words (see, for instance, Kari, Randoja, Rice, Speas, Wright, Speas, and many others). However, an alternative solution is available. DiSciullo & Williams 1988, in a study of English phrasal idioms, suggest that these idioms are syntactic objects that are listed in the lexicon. The idioms are like words in that their meanings are noncompositional, but differ from words in being phrasal. I propose that the discontinuous verb themes in Slave entries should be considered as comparable to English phrasal idioms. (55) gives an example.

(55) $[[h]_{voice} [ti]]_V [ya]_N$ 'preach, bark'

Each morpheme is labelled for category. When this phrasal unit is inserted into the larger syntactic structure, the morphemes are correctly placed. No further stipulation of position

38

is required, as it is a consequence of the phrasal structure, which in turn follows from scopal properties.

Lexical entries can also include gender material and direct objects. For instance, the verb 'scare' has a gender morpheme and 'tell a lie' a direct object that must occur with the stem. I have labelled the direct object as a pronoun. The fact that the verb is transitive determines that the pronoun is an object rather than a subject.

(56) $[h]_{voice}$ $[ji]_V$ $[n]_{gender}$ 'scare'

       $[ts'i]_V$ $[go]_{Pro}$ '(tell a) lie'

By treating discontinuous verb themes as idioms, the benefits achieved by the analysis proposed here can be maintained. Slave may be unusual in the number of phrasal idioms it has, but the construct is not in and of itself unexpected. Adverbial material and gender-type classes often are lexicalized. The apparent discontinuous dependencies are. I suggest, historically motivated, but synchronically frozen, with the forms listed as phrasal idioms.

2.9 An isomorphism problem: deriving the phonological structure

So far I have addressed issues of morphosyntactic structure rather than phonological structure. The interface between these two components is an important one to consider for Athapaskan languages. In most accounts of languages of this family, it is assumed that a boundary is associated with each lexical entry, with the morphosyntactic structure and the phonological structure being autonomous. Kari 1990 for instance, proposes that a boundary is associated with each lexical entry. The entire string of lexical items is formed through processes of derivation and inflection, with morphemes being interdigitated amongst each other. At the end of the morphological derivation a form that serves as underlying representation is produced.

I suggest an alternative, that boundaries are not listed lexically, but rather the phonological structure derives from the morphosyntactically given structure by a simple mapping algorithm. In this I follow a rich literature in the phonology/syntax interface (e.g.

Hayes 1989, Nespor & Vogel 1986, Selkirk 1986) which suggests that syntactic structure provides the basis for the derivation of phonological structure.

The phonology of Slave divides the verb word into several distinct units, as indicated by the boundaries in (22). Limitations of space prevent me from presenting arguments for the boundaries; see Hargus 1988 on Sekani, Kari 1976 on Navajo, Kari 1975 on Navajo and Tanaina, Kari 1990 on Ahtna, Li 1949 on Chipewyan, McDonough 1990 on Navajo, Randoja 1989 on Beaver, Rice 1989, 1992a, 1993 on Slave, and many others for justification of these domains within the verb word in a number of Athapaskan languages.

The following phonological domains are required.

(57) a. The traditional verb word is a domain for the purposes of the phonology.

   b. Each morpheme traditionally identified as a disjunct morpheme forms a domain.

   c. The traditional conjunct items form a domain.

   d. The direct object and deictics are intermediate in patterning. sometimes patterning with conjunct morphemes, sometimes with disjunct morphemes, and sometimes on their own.

I suggest that these phonological domains are derived by the end-based algorithm of Selkirk 1986. This algorithm maps a syntactic representation into a prosodic structure by seeking out edges of constituents of the X' hierarchy. A tripartite algorithm is required to define the domains required in Slave. First, each word in the lexicon is marked as a lexical word, defining each preverb, adverb, noun, pronoun, verb stem, and the inflectional component as words. Second, prosodic words are formed by marking the edge of $X°$, where X is a major category lexical item (noun, verb, preverb, adverb). The pronouns and the inflectional component are part of the same prosodic word as the verb. while the other constituents form prosodic words on their own. Finally. the entire verb is marked as a domain for the purposes of the phonology. a domain which I will call the phonological phrase. by locating the right edge of X^{max}. This algorithm is summarized in (58).

(58)   lexical word: X], where X is lexical

phonological word: X], where X is a N, V, Adv, Preverb

phonological phrase X^{max}

The working of this algorithm are illustrated below. Consider first the structure in (59), a form with a preverb but no incorporated arguments.

(59)

```
              I
            /   \
     Preverb     I
                / \
               I   V

     ]          ]   ]   lexical word

     ]              ]   phonological word

                    ]   phonological phrase
```
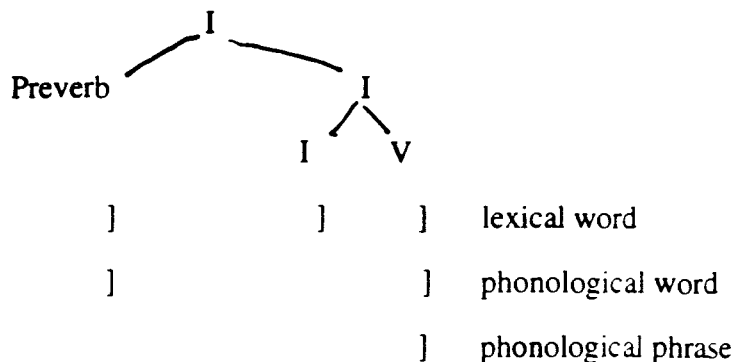
This yields the bracketed structure in (60).

(60)   [[[Preverb]] [[I] [V]]]

The preverb is in its own domain and the I and V form a single domain composed of two lexical words. The entire string is also a domain.

Now consider the somewhat more complex structure in (61), representing a verb with an incorporated nominal direct object.
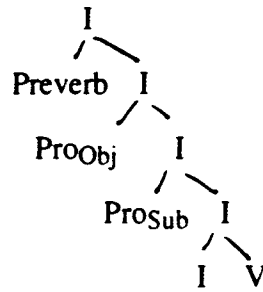
(61)

```
              I
            /   \
     N           I
                / \
           Preverb  I
                   / \
                  I   V
```
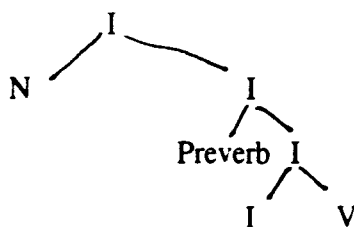
Application of the phrasing algorithms in (62) produces the following structure.

(62)   [[[Preverb]] [[N]] [[I] [V]]]

This is the appropriate structure for the phonology. The phonological phrase consists of three phonological words, the preverb, the incorporate, and the inflection-verb complex.

Finally, consider a structure with pronominal subject and object.

(63)

```
                    I
                  /   \
            Preverb    I
                     /   \
                ProObj    I
                        /   \
                   ProSub    I
                           /   \
                         I      V
```

The entire string is a phonological phrase. Each lexical item, the preverb, the pronominal morphemes, and the verb also define their own domains. Finally, the pronominals, inflectional complex, and verb are defined as a domain, the phonological word.

(64)

Preverb	ProObj	ProSubj	I	V	
[ ]	[ ]	[ ]	[ ]	[ ]	lexical word
[ ]	[			]	phonological word
[				]	phonological phrase

While this discussion of the phonology is brief, and the need for the phonological domains described must be accepted on faith, the approach to the phonological domains is one that promises to be revealing, leading, if successful, to the elimination of boundary type as part of the underlying entry of a Slave word. It appears that while the boundary types are a useful descriptive device, they have no linguistic reality.

3.0 Summary

In this sketch I have touched briefly on a range of problems introduced by the noun and verb in Slave. I have suggested that in both cases, analyses that are more in keeping with those of other languages may be more appropriate than has often been believed to be the case. In the noun, the apparent ordering paradox of inflection inside of derivation disappears when prosodic information as well as morphosyntactic information is allowed as part of a lexical entry. In the verb, the major ordering of constituents can be determined through an appeal to a principle that derives ordering through scopal relations between morphemes. The surface ordering, which is basically the mirror image of the proposed underlying ordering, is attained by incorporation. a process which also derives a single

42

word from an underlying phrasal unit. I have also suggested that the apparently anomalous two subject positions in the Slave verb are not arbitrary, but are a consequence of the fact that one type of subject is inflectional and the second type is an argument. Finally, I have suggested that the frequently proposed lack of isomorphism between the model required for word formation and the model required for the phonology is an artifact of the analysis rather than a true fact of the language; the phonological domains derive in a straightforward way from the morphosyntactic structure, referring only to information that is independently required for the morphology and the syntax.

---

[1] Languages of the Athapaskan family are found in three discontinuous groups; Apachean, spoken in the southwest of the United States, Pacific Coats Apachean, consisting of a number of languages (many now extinct) spoken on the Pacific Coast of the United States, and northern Athapaskan, consisting of a number of languages spoken in Canada and Alaska. The spelling 'Athapaskan' is the official spelling of the language family adopted by the Canadian government, while the spelling Athabaskan is suggested by the Alaska Native Language Centre. The word Slave is pronounced [slévi]. This language is composed of a dialect complex, with the major dialects being South Slavey, Bearlake, Hare, and Mountain. Data in this paper is drawn from South Slavey (SS), Bearlake (B), and Hare (H) [hær]) and is, where appropriate, labelled as to dialect when the particular phonological form represents a single dialect. The major dialect differences are phonological; the facts discussed in this paper are the same across the dialects. See Rice 1989 for discussion of dialect differences.

[2] I use the standard orthography for Slave with one exception. I use <e> to represent [e] and <ɛ> to represent [ɛ]; the orthography employs <ə> and <e> respectively. The following correspondences should be noted: sh=[ʃ], zh = [ʒ], gh=[ɣ], th=[θ], dh=[ð],

43

wh=[w̧]. An acute accent marks high tone; absence of an accent indicates low tone. A

hook under a vowel represents nasalization. The symbols d, dz, dl, g, etc. represent

voiceless unaspirated stops; t, ts, tł, k represent voiceless aspirated stops, following

Athapaskan tradition. C' is an ejective consonant. The laterals pattern with the fricatives in

Slave. The symbol ł thus is a voiceless lateral fricative and l a voiced lateral fricative.

3 A small number of bisyllabic monomorphemic nouns exists; see section 1.3.

4 See Cook 1984 on Sarcee, Hargus 1988 on Sekani, Kari 1976 on Navajo, Kari 1990 on

Ahtna, Krauss 1965, 1969 on Proto-Athapaskan, Leer 1979 on Proto-Athapaskan, Rice

1988, 1991a, 1992b on Slave for various perspectives on voicing alternations.

5 There are some stems with nonalternating voiced fricatives, as illustrated in (i).

(i)   zhah   'snow'

         la   'hand'

         zo   'marten' (H)

6 In verbs, stem-initial fricatives are voiceless following a voiceless segment and voiced

following a voiced segment, hence showing phonological transparency.

7 Controversy exists in the Athapaskan literature as to whether pronouns are inflectional

(e.g. Saxon 1986) or arguments (Sandoval and Jelinek 1989). If they are inflectional, then

[voice] can be thought of as being inserted in the construction [I N]; if they are arguments,

then [voice] can be thought of as being the inflectional component. The arguments required

to establish the status of pronouns is beyond the scope of this paper, but an analysis with

[voice] being identified in some way with inflection is compatible with either analysis. I

will assume that the pronouns are inflectional for the purposes of discussion here.

8 In some Athapaskan languages (e.g. Carrier, Koyukon), noun stem initial fricatives are

voiced in possessed compounds as well as in the other environments in which the voiced

alternant occurs in Slave.

9 In some forms, a diminutive or augmentative has become lexicalized and forms part of
the minimal word with the stem. This can be seen in two ways. First, the inflectional
suffix is on the right edge rather than internal and second, the voiceless form of a noun
stem initial fricative occurs. These effects can be seen in the following forms.

(i)   tłị   'dog'

        -lįɛ́   'dog, possessed form'

The uninflected stem historically began with a voiceless lateral fricative. While
restructuring to a lateral affricate has occurred, the possessive form reflects the old
alternation. In possessed compound forms, the initial of this stem fails to voice.

(ii)   -tłįtł'ulɛ́   'dog harness, possessed form'

An augmentative form of this word exists which has not the expected meaning of 'large
dog', but rather an idiosyncratic meaning, 'horse.' In this form, the inflectional suffix is
exterior to the augmentative and the affricate rather than the voiced fricative appears.

(iii)   tłįcho   'horse'

        -tłįchoɛ́   'horse, possessed form'

10 These terms are used idiosyncratically in the Athapaskan literature, and should not be
equated with the usual definitions. Mode refers to morphemes which mark aspectual
categories of imperfective and perfective, the modal category of optative, and the tense
category of future. Aspect also refers to what is traditionally thought of as aspect;
morphemes marking concepts such as inceptive, terminative, semelfactive, and conative.

11 The template in (22) is somewhat different than that proposed by Kari 1976, 1990.
Kari places a single disjunct boundary between the incorporate and the direct object as part
of the template, and uses + boundary between the disjunct morphemes themselves.

12 It is claimed that themes can include disjunct as well as conjunct morphemes (e.g. Rice
1989 on Slave). However, a search of the South Slavey verb lexicon (Howard 1990) fails
to reveal any real cases of this. A commonly cited example is the form ya-ti 'preach, bark.'

However, *ya*, an incorporate meaning 'word,' does not appear in all bases involving this root, suggesting that the theme does not include this morpheme.

[13] There is dispute about where conjugation and primary aspect are added.

[14] As discussed in section 2.1, phonological properties also enter into the ordering of gender and secondary aspect. Interestingly, there may be less of a difference between the two hypotheses for ordering of conjunct elements than it initially appears. Under both hypotheses, the ordering qualifier (gender/secondary aspect) - conjugation (primary aspect) - subject is found. This overall order, I have argued, is established by semantics. The difference between the hypotheses comes in the subordering within the qualifier zone, where Kari orders that the ordering is strictly by template while I have suggested that the ordering is a combination of semantics factors with a template. It thus seems that a hypothesis that combines features of the two hypotheses, with semantics providing first degree ordering and a template providing second degree ordering, would be in order.

[15] This ordering is similar to that found by Bybee 1985 in her survey of morpheme ordering in fifty languages; however, Bybee's survey is based on surface morpheme order and Spea's on a more abstract underlying order, so they are not directly comparable.

[16] McDonough 1990 proposes a similar analysis for Navajo, suggesting that the conjunct component is formed in the lexicon; however, she proposes that subject and primary aspect a portmanteau morpheme, an inflectional stem; the positions that I have labelled secondary aspect and gender (as well as deictic subjects and direct objects) are prefixed to this unit. The inflectional stem and verb stem compound in the lexicon, forming a verb word. Her hypothesis is overly restrictive in forcing regular as well as irregular morphology to be considered as single morphemes and faces several phonological problems in that predicted phonological characteristics are not always found and non-predicted ones are.

[17] One problem for this analysis is that, while the deictic subjects need not occur with specified subjects, they are possible with specified subjects. See section 2.5.

[18] There is controversy about whether independent pronouns must occur in topic position or whether they can be found in argument position as well (see Rice 1989, Saxon 1986 for discussion). If they are possible only as topics, then the claim can be made that all nouns move while pronouns fail to move.

[19] The semantic differences between a verb with an incorporate as object and the same verb with the noun outside of the verb may provide evidence for movement of direct objects under certain semantic conditions and incorporation when those semantic conditions do not attain, making the objects more parallel to the subjects. A deeper understanding of the semantics of the objects is required; see Axelrod 1990 for discussion of this topic for the Alaskan language of Koyukon.

[20] These examples are potentially troublesome for the incorporation analysis as that analysis predicts that objects will be to the right of adverbs. Two possible avenues for exploration present themselves. First, the iterative is fairly free in where it can appear and its variable placement might be a consequence of alternatives in basic phrase structure position of adverbs. Second, the items identified as incorporates in (44) may better be treated as preverbs. Consider (44a). The verb literally means something along the following lines: 'one goes up in heart.' The noun does not seem to be a direct object. The verb in (44b) contains a noun which is not found independently. This verb also may contain the morpheme ?e 'unspecified object', something that is unexpected if a nominal direct object is present since argumental incorporates and direct objects are in complementary distribution in Slave (Rice 1989), although the presence of this morpheme appears to be variable from the forms in Howard 1990. It appears that the morpheme ła is variably treated as a preverb or as an object.

[21] If a right-branching tree were used, the surface order would be a direct reflection of the underlying order: however, other problems arise from such a tree.

References

Anderson, S.R. 1982. Where's morphology. Linguistic Inquiry 13:571-612.

Anderson, S.R. 1988. Morphological theory. In F.J. Newmeyer (ed.) Linguistics: The Cambridge Series. Volume I. Linguistic Theory: Foundations. Cambridge: Cambridge University Press. 146-191.

Axelrod, M. 1990. Incorporation in Koyukon Athapaskan. IJAL 56:17-195.

Baker, M. 1988. Incorporation: a theory of grammatical function changing. Chicago: University of Chicago Press.

Bonet, E. 1991. Morphology after syntax: pronominal clitics in Romance. Ph.D. dissertation, MIT.

Bessler, P., S. Cummins, T. Nadasdi, & Y. Roberge. 1993. The lexicon-syntax interface. In C. Dyck (ed.) Toronto Working Papers in Linguistics 12.1:1-12.

Brunson, B. 1989. Thematic dependencies and government. Paper presented at ESCOL.

Bybee, J.L. 1985. Morphology, a study of the relation between meaning and form. Philadelphia: John Benjamins Publishing Company.

Chomsky, N. 1988. Some notes on economy of derivation and representation. MIT Working Papers in Linguistics 10.

Cook, Eung-Do. 1984. A Sarcee grammar. Vancouver: University of British Columbia Press.

Cook, E-D. 1989. Chilcotin tone and verb paradigms. In E-D Cook and K. Rice (eds.) Athapaskan Linguistics. Current perspectives on a language family. Trends in Linguistics, State-of-the-Art Reports 15. 145-198. Berlin: Mouton de Gruyter.

Cook, E-D. 1993. Third person plural subject. ms. University of Calgary.

DiSciullo, A-M & E. Williams. 1988. On the definition of word. Linguistic Inquiry Monograph 14. Cambridge: MIT Press.

Golla, Victor. 1970. Hupa grammar. Ph.D. dissertation, University of California, Berkeley.

Hargus, S. 1986. Phonological evidence for prefixation in Navajo verbal morphology. Proceedings of WCCFL 5: 53-67.

Hargus, S. 1988. The lexical phonology of Sekani. New York: Garland Publishing. (revised version of 1985 Ph.D. dissertation.)

Hargus, S. 1991. The disjunct boundary in Babine-Witsu Wit'en. International Journal of American Linguistics 57:426-445.

Hayes, B. 1989. The prosodic hierarchy in meter. In P. Kiparsky & G. Youmans (eds.) Perspectives on meter. Orlando, Florida: Academic Press.

Hoijer, H. 1946. Chiricahua Apache. In H. Hoijer (ed.). Linguistic structures of native America. 55-85. New York: Viking Fund.

Howard, P. 1990. A dictionary of the verb of South Slavey. Department of Culture and Communication, Government of the Northwest Territories, Yellowknife, Northwest Territories, Canada.

Jackendoff, R. 1972. Semantic interpretation in generative grammar. Cambridge, Mass.: MIT Press.

Kari, J. 1975. The disjunct boundary in the Navajo and Tanaina verb prefix complexes. IJAL 41:330-345.

Kari, J. 1976. Navajo verb prefix phonology. New York: Garland Press.

Kari, J. 1979. Athabaskan verb theme categories: Ahtna. Alaska Native Language Center Research Papers No. 2 Fairbanks: Alaska Native Language Center.

Kari, J. 1989. Affix positions and zones in the Athapaskan verb complex: Ahtna and Navajo. IJAL 55.4:424-454.

Kari, J. 1990. Ahtna dictionary. University of Alaska Press.

Kari, J. 1992. Some concepts in Ahtna Athabaskan word formation. In M. Aronoff (ed.) Morphology Now. Albany: State University of New York Press. 107-131.

Kari, J. 1993. Paper presented at the Berkeley Linguistic Society. February 1993.

Krauss, Michael. 1965. Eyak: a preliminary report. Canadian Journal of Linguistics 10:167-187.

Krauss, Michael. 1969. On the classification in the Athapascan, Eyak, and the Tlingit verb. Supplement to International Journal of American Linguistics 35.4:49-83.

Kuroda, S-&. 1988. Whether we agree or not: a comparative syntax of English and Japanese. Lingvisticae Investigationes 12:1-47.

Leer, Jeff. 1979. Proto-Athabaskan verb stem variation, part one: phonology. Alaska Native Language Center Papers No. 3. Fairbanks, Alaska: Alaska Native Language Center.

Li, Fang-Kuei. 1930. Mattole, an Athapaskan language. University of Chicago Publications in Anthropology, Linguistics Series. Chicago: University of Chicago Press.

Li, F-K. 1946. Chipewyan. In H. Hoijer (ed.) Linguistic structures of native America. Viking Fund Publications in Anthropology. 398-423.

Lieber, R. 1992. Deconstructing morphology. Chicago: University of Chicago Press.

Lounsbury, F. 1953. The method of descriptive morphology. In M. Joos (ed.) Readings in Linguistics. American Council of Learned Socieities, Washington, D.C.

McCawley, J.D. 1988. The syntactic phenomena of English. vol. 2 Chicago: University of Chicago Press.

McDonough, J. 1990. Topics in the phonology and morphology of Navajo verbs. Ph.D. dissertation, University of Massachusetts, Amherst.

Morice, Adrian Gabriel. 1932. The Carrier language. Verlag der Internationalen Zeitshcrift 'Anthropos' Mödling bei Wien. St. Gabriel. Osterreich.

Myers, S. 1987. Tone and the structure of words in Shona. Ph.D. dissertation, University of Massachusetts, Amherst.

Nespor, M. & I. Vogel. 1986. Prosodic phonology. Dordrecht: Foris.

Pollock, J-Y. 1989. Verb movement, universal grammar, and the structure of IP. Linguistic Inquiry 20:365-424.

Randoja, T. 1989. The phonology and morphology of Halfway River Beaver. Ph.D. dissertation, University of Ottawa.

Rice, K. 1985a. Noun compounds in Dene. Journal of the Atlantic Provinces Linguistic Association, 6/7:55-72.

Rice, K. 1985b. The optative and *s- and *n- conjugation marking in Slave. International Journal of American Linguistics 51:282-301.

Rice, K. 1988. Continuant voicing in Slave (northern Athapaskan): the cyclic application of default rules. In M. Hammond & M. Noonan (eds.), 371-388. New York: Academic Press.

Rice, K. 1989. A grammar of Slave. Berlin: Mouton Language Library, Mouton de Gruyter.

Rice, K. 1991a. Prosodic constituency in Hare (Athapaskan): evidence for the foot. Lingua 82:201-245.

Rice, K. 1991b. Predicting the order of the disjunct morphemes in the Athapaskan languages. Toronto Working Papers in Linguistics 10.

Rice, K. 1991c. Intransitives in Slave (Northern Athapaskan): Arguments for Unaccusatives. International Journal of American Linguistics 57:51-69.

Rice, K. 1992a. On deriving rule domains: the Athapaskan case. In D. Bates (ed.) The Proceedings of the Tenth West Coast Conference on Formal Linguistics. Stanford: CSLI. 417-430.

Rice, K. 1992b. Blocking and privative features: a prosodic account. The Linguistic Review 9:359-393.

Rice, K. & S. Hargus 1989. Conjugation and mode in Athapaskan languages: evidence for two positions. In E-D Cook and K. Rice (eds.) Athapaskan Linguistics: Current

Perspectives on a Language Family. Trends in Linguistics. State-of-the-Art Reports 15. Berlin: Mouton de Gruyter. 265-315

Rice, K. & L. Saxon. 1991. A structural analysis of *y- in Athapaskan. Paper presented at the Athapaskan Linguistics Conference, Santa Cruz, California, July 1991.

Sandoval, M. & E. Jelinek. 1989. The bi-construction and pronominal arguments in Apachean. In E-D Cook and K. Rice (eds.) Athapaskan Linguistics: Current Perspectives on a Language Family. Trends in Linguistics. State-of-the-Art Reports 15. Berlin: Mouton de Gruyter. 379-406.

Sapir, E. & H. Hoijer. 1969. The phonology and morphology of the Navaho language. University of California Publications in Linguistics 50. Berkeley: University of California Press.

Saxon, L. & K. Rice. forthcoming. On subject-verb constituency: evidence from Athapaskan languages. Proceedings of WCCFL 11.

Saxon, L. 1986. The syntax of pronouns in Dogrib (Athapaskan): some theoretical consequences. Ph.D. dissertation, University of California, San Diego.

Selkirk, E.O. 1980. Prosodic domains in phonology: Sanskrit revisited. In M. Aronoff &M.-L. Kean (eds.) Juncture. Saratoga: Anma Libri. 107-129.

Selkirk. E.O. 1986. On derived domains in sentence phonology. Phonology Yearbook 3:371-405.

Simpson, J. and M. Withgott. 1986. Pronominal clitic clusters and templates. In H. Borer (ed.) Syntax and semantics 19: The syntax of pronominal clitics. New York: Academic Press.

Speas. M. 1984. Navajo prefixes and word structure typology. In M. Speas & R. Sproat (eds.) MIT Working Papers in Linguistics, vol. 7:86-109.

Speas. M. 1986. Adjunctions and projections in syntax. Ph.D. dissertation, MIT.

Speas. M. 1989. Phrase structure in natural language. ms. University of Massachusetts, Amherst.

Speas, M. 1991. Functional heads and the Mirror Principle. Lingua 84:181-214.

Sportiche, D. 1988. A theory of floating quanitifers and its corollaries for constituent structure. Linguistic Inquiry 19:425-229.

Sproat, R. 1985. On deriving the lexicon. Ph.D. dissertation, MIT.

Tenenbaum, J. 1977. Morphology and semantics of the Tanaina verb. Ph.D. dissertation, Columbia University.

Tuttle, S. 1993. The status of object markers in Salcha Athabaskan.

Williams, E. 1981. On the notions 'lexically related' and 'head of a word.' Linguistic Inquiry 12:245-274.

Wright, M. 1983. The CV skeleton and verb prefix phonology in Navajo. In C. Jones & P. Sells (eds.) Proceedings of NELS 14:461-477.

Wright, M. 1986. Mapping and movement of partial matrices in Navajo. In J. McDonough & B. Plunkett (eds.) Proceedings of NELS 17, vol. II:685-699.

Young, Robert and William Morgan. 1987. The Navajo language: a grammar and colloquial dictionary. Revised edition. Albuquerque: University of New Mexico Press.