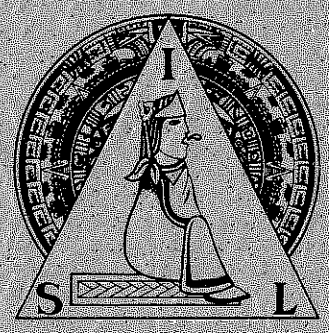
TOWARD A GENERATIVE GRAMMAR OF BLACKFOOT



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TOWARD A GENERATIVE GRAMMAR OF BLACKFOOT

WITH PARTICULAR ATTENTION TO SELECTED STEM FORMATION PROCESSES

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TOWARD A GENERATIVE GRAMMAR OF BLACKFOOT (WITH PARTICULAR ATTENTION TO SELECTED STEM FORMATION PROCESSES)

by

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Introduction

0.1. Purposes. This thesis was written with two purposes in mind: to acquaint the reader with Blackfoot grammatical categories and syntax, and to progress toward an understanding of the nature of a grammar which will characterize the linguistic competence of native speakers of Blackfoot. For the latter purpose, we incorporate many recent proposals from within the theory of generative grammar, as well as some original innovations. It is hoped that this effort with regard to a language that offers problems not encountered in the language (English) most explored in the development of current theory, might thereby contribute in some small measure to evaluation of recent theoretical proposals.

[The reader whose concern is primarily theoretical will find Chapter 4 of greatest interest; it may be comprehensible if use is made of the references to earlier sections listed there. The reader who is not a linguist but is interested in Blackfoot grammar may be able to follow most of Chapter 1, with occasional reference to the notes on transcription in 0.3.1.]

The model-development approach of most of the thesis should not be considered to serve only the second stated purpose of the thesis, however. In fact, the bulk of what the author considers to be important comments about, and insights into, Blackfoot syntax are contained in the discussions of model revision.

Because the author's competence in the language is limited, and because of practical limitations on the size of this undertaking, we will focus on certain phenomena of Blackfoot that may be described loosely as stem-formation processes. But it should be emphasized that this is not a fragmentary approach to one aspect of Blackfoot grammar. Throughout the thesis we attempt to maintain an overall view of the grammar, considering, as far as is practicable, the implications for all of the grammar of any proposed modification of the model or analysis.

To my knowledge, this is the first generative-transformational treatment of the syntax of an Algonkian language. Because languages of this family offer a number of interesting phenomena, the treatment of which cannot simply be a copy of published work done on languages of other families, perhaps it is not too presumptious to hope that the attempts made in this thesis will be of some value to investigators of other Algonkian languages.

But even if I were building upon a great deal of work done in Algonkian within the theory of generative grammar, when we consider the constant and radical revision of treatments of English syntax and of grammatical theory, it would be highly unrealistic to suppose that more than a very few, if any, of the proposals, conclusions, or claims made herein about Blackfoot, or about theory in general, will long stand, unless investigation comes to a complete standstill.

0.2. Overview. Chapter 1 introduces categories and structural types of Blackfoot surface structure which must be accounted for by a generative grammar of Blackfoot. At least a passing acquaintance with the terms introduced in this chapter is necessary for the reader who would understand the remainder of the thesis. Not all of the phenomena described in this sketch are accounted for in later chapters; for example, we nowhere suggest what is the source of subjunctive clauses[1] because this has no bearing on the main focus of the thesis, stem formation processes. However, as many of the surface phenomena have been taken into consideration, and at least sketchily accounted for, as seemed practicable.

Chapter 2 attempts to develop a partial grammar of Blackfoot within a model approximating that of Chomsky 1965. Before doing so, however, we demonstrate the limitations of a phrase structure grammar for dealing with even the most superficial features of Blackfoot syntax. Also discussed briefly in Chapter 2 are verbs without actor (subject) and the phenomenon of 'obviation' or subordination of animate topics.

Chapter 3 takes up a variety of selected stem formation processes and attempts to account for them within the model of Chapter 2. Continuing with the familiar NP + VP sentence analysis, complex surface verb stems are treated as derived from underlying structures in which one root of the complex stem is main verb of a sentence containing a subordinate sentence, which in turn has another root of the complex surface stem as main verb. However, the transformations which are necessary to convert these underlying configurations to the corresponding surface structures seem to be quite ad hoc. Other serious problems arise as well, and we suggest that the attempt to treat actor and goal as underlying functional notions, defined in terms of NP + VP constituency, is wrong.

In 4.1 of Chapter 4 we incorporate Fillmore's proposal to make semantic roles categories of underlying structure, and describe a generalized propositional model in which a proposition consists of a predicate and its arguments or 'terms' (4.2). Underlying structures are generated in 4.3 by "node admissibility conditions" (McCawley 1968). We also introduce negative conditions as constraints on well-formedness of underlying configurations. At this point (4.4) we re-examine the stem formation processes discussed earlier and find that within this new model the transformations needed to derive the attested surface structures are much simpler and quite general. Further support is provided by the fact that the model and rules account for a wide variety of complex verb stems; an extremely satisfying and important result for a grammar of a polysynthetic language. In 4.5 we distinguish between the function of the lexicon as an inventory of predicates and its function of giving substance to post-transformational entities. Here we attempt to show that derivational affixes are accounted for, as part of this spelling process, by 'lexical transformations' which provide enormous savings in the lexicon. Finally (4.6), borrowing proposals by Bach 1968 and McCawley 1970, we attempt to incorporate the beginnings of a theory of reference by distinguishing between established, unestablished, and non-specific referents. This leads us to differentiate identificational propositions from informational propositions of a sentence (and of its discourse

[1] From what is said about them in 1.5, however, one can see that a grammar must deal with the distinction between retrospect and prospect in order to account for the distribution of subjunctives.

matrix); this distinction may be all that is necessary to account for the well-known dichotomy of 'restrictive' vs. 'non-restrictive' (appositional) clauses. The remainder of the last section illustrates the derivation of several Blackfoot sentences, with a view to demonstrating that the model developed is workable.

Throughout the discussion, and particularly in Chapter 4, it will be evident that the author is striving to provide underlying configurations which directly express the meanings of the sentences they underlie. In other words, the goal is a kind of generative semantics, which removes the distinction between 'deep structure' and 'semantic interpretation'. Yet the idea that these underlying configurations are made up of universal semantic features is not adopted. The elements of deep structure are language-specific predicates (though they may themselves have semantic properties [presuppositions] representable as features). These predicates often correspond directly to actually occurring words or morphemes of the language; words or morphemes with more complex meanings may be considered to represent, in surface structure, complexes of underlying predicates (Grimes and Glock 1970). But because the author does not have a native speaker's intuition about the semantic relationships between various morphemes of Blackfoot, each occurring root has been treated as a non-complex predicate. Thus many of the underlying configurations presented in the final chapter could, no doubt, be broken down into configurations made up of more primitive predicates by someone with a native speaker's intuitions about the language.

Finally, it should be clear by now that any model which restricts itself to the domain of the (surface structure) sentence must fail to account for a highly significant portion of linguistic data. Yet despite repeated references to discourse entities and context, the examples chosen as illustrations in the last chapter may appear to reflect a sentence-oriented approach. The primary reason for this is the preliminary nature of investigation of Blackfoot within a generative model. However, the fact that we have retained the distinguished symbol S should not be taken to mean that the model developed in the final chapter of this thesis is entirely sentence-oriented. Among the predicates of every language are those which take sentences as their arguments, and hence may link several surface structure sentences. Such relationships are just outside the scope of this thesis, however.

0.3. Notes on Transcription and Phonology. All examples are cited in the practical orthography developed by the author under the auspices of the Summer Institute of Linguistics. It is essentially a 'broad' phonemic transcription, based originally upon the results of analytic methods widely used in structural linguistics, but subsequently modified in accordance with preferences of native speakers who have learned to read the transcription. Often this modification was in the direction of the underlying systematic phonemic shape of the word in question, but not always.

0.3.1. Symbols Used. In the practical orthography, /h/ represents a palato-velar fricative, /'/ (apostrophe) represents a glottal stop, and underlining of vowels represents stress (prominence) of the vowel (as marked primarily by pitch). (The single slant lines will occasionally be used to indicate that a transcription is in the practical orthography, while the double brackets ⟦ ⟧ indicate that a morphophonemic transcription is being used.)

Other segmental symbols of the practical orthography are vowels /i/, /a/, and

/o/ and consonants /p/, /t/, /k/, /s/, /m/, /n/, /w/, and /y/. (Within a discourse, symbols /,/, /;/, /./, /"/, and /?/ are also used, though the last is used only for sociological reasons, as it never corresponds to a phonological phenomenon; i.e., interrogation is segmentally marked.)

In the transcription of underlying forms of formatives we have segments corresponding to all those used in the practical orthography, plus a few additional. We use the same symbols as in the orthography, except that ⟦x⟧ is used in place of /h/, and ⟦ ´ ⟧ (acute accent) is used to mark inherent stress. We find it necessary to distinguish a fourth vowel ⟦I⟧[2] in underlying forms to account for certain processes.

The "systematic phonemes" (Chomsky 1964, 87) of Blackfoot, then, are those defined in the following table according to binary features; the features themselves are defined briefly below the table:[3]

	'	p	t	k	m	n	s	x	I	i	y	o	w	a
voc	-	-	-	-	-	-	-	-	+	+	+	+	+	+
syl	-	-	-	-	-	-	-	-	+	+	-	+	-	+
cont	-	-	-	-	-	-	+	+	+	+	+	+	+	+
back	-	-	-	O	-	-	-	-	-	-	-	+	+	+
cor	-	-	+	-	-	+	+	-	-	-	-	-	-	-
high	-	-	-	+	-	-	-	+	+	-	-	+	+	-
nas	-	-	-	-	+	+	-	-	-	-	-	-	-	-
glot	+	-	-	-	-	-	-	-	-	-	-	-	-	-

vocoid (voc):[4] central, resonant (oral) continuant (Pike 1943.143).
syllabic (syl): nuclear to syllable (vs. marginal).
continuant (cont): there is not complete stoppage of air flow at the point of primary articulation.
back: primary articulation involves retraction of the tongue body.
coronal (cor): primary articulation involves raising of the blade of the tongue.
high: primary articulation involves raising of the body of the tongue.
nasal (nas): the velic is open
glottal (glot): there is a constriction at the glottis.

We have not bothered to indicate which of these feature values are redundant according to segment structure conditions (Stanley 1967). The O in place of a value for backness of ⟦k⟧ merely indicates that either value could be considered basic, since a phonological rule will give the correct value according to environment.

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[2] Borrowed from Taylor 1969.

[3] Most of the features are equivalent to those with the same labels in Chomsky-Halle 1968.304-5. We have added a feature for glottal constriction (implied in Chomsky-Halle on page 315) to distinguish glottal stop (Chomsky-Halle distinguish glottal as [+low] on p. 307, but that is not consistent with their definition of 'low' as involving lowering of the tongue body). In addition, we make use of a feature 'vocoid' rather than Chomsky-Halle's 'non-consonantal'. 'Vocoid' includes voiced and voiceless vowels and frictionless semi-vowels (including h), but unlike 'non-consonantal', excludes glottal stop. That this is a valid natural class for Language is seen by the very common alternations between voiced and voiceless vowels and semivowels, and between vowels (syllabic) and semivowels (non-syllabic); glottal stop can participate in neither of these alternations.

[4] Not to be confused with the Jacobsonian feature 'vocalic'.

There are a few other symbols which will be used in the transcription of underlying forms. They are ⟦:⟧, ⟦V⟧, ⟦N⟧, ⟦S⟧, ⟦O⟧, and ⟦M⟧. The last of these is completely ad hoc. It represents an alternation in three known partially suppletive morphemes, one of which, the ablative prefix, occurs frequently in the thesis: ⟦Mwi:xt⟧ = ⟦imwi:xt⟧ ~ ⟦wi:xt⟧; the first alternant is found only when immediately preceded by a person prefix.

Similarly, ⟦O⟧ represents puzzling alternations found in two known items, a relator ⟦Ok⟧ (see 1.1), and the reciprocal ⟦Otiiyi⟧ (3.3.3); ⟦O⟧ represents Ø after ⟦a⟧ and after verb stem-final ⟦t⟧ or ⟦tw⟧; elsewhere ⟦O⟧ represents ⟦O:⟧ in these two formatives.

⟦N⟧ and ⟦S⟧[5] are a bit less ad hoc because they represent common alternations that are phonologically conditioned; however, the alternation is found only at the end of certain noun stems. ⟦S⟧ represents s~Ø, the former occurring before ⟦y⟧ or ⟦w⟧ and the latter elsewhere (the ⟦w⟧ and ⟦y⟧ are subsequently lost after consonants [Rule 9 of 0.3.2]):

/niitoyisa/ < ⟦niitoyiSwa⟧ 'it's a lodge'
/niitoyisi/ < ⟦niitoyiSyi⟧ 'lodge (specific)'
/niitoyii/ < ⟦niitoyiSi⟧ 'lodge(s) (non-spec)'

⟦N⟧ represents n~Ø, with distribution parallel to that of the alternants of ⟦S⟧:

/ninihkssina/ < ⟦nInixkkixsiNwa⟧ 'it's a song'
/ninihkssini/ < ⟦nInixkkixsiNyi⟧ 'song (specific)'
/ninihkssii/ < ⟦nInixkkixsiNi⟧ 'song(s) (non-spec)'

We use the symbol ⟦V⟧ in formative-initial position to tentatively represent an ill-understood alternation between ⟦i⟧ and reduplication of a preceding short vowel:

/nitoohtsiihpa/ < ⟦nityooxti+Vxp⟧ 'I heard it'

⟦:⟧[6] following an underlying vowel indicates lengthening (doubling) of that vowel in word-initial syllables (optional in [some?] imperatives) and in other syllables if preceded by a semivowel at a certain late point in the phonological rule sequence (0.3.2); in addition, the vowel apparently may optionally be lengthened in the second syllable of a word if the first syllable is a person prefix. Examples of lengthening follow:

/aamatoota/ < ⟦a:matwiit⟧ 'smell it!'
/nitawaamatoohpa/ < ⟦nitá+a:matwiixp⟧ 'I smell it'
/nitaamatoohpa/ < ⟦nita:matwiixp⟧ 'I smelled it'

Compare the same stem when ⟦a:⟧ does not occur in an environment that meets the rule condition:

/nitaakamatoohpa/ < ⟦nitáaka:matwiixp⟧ 'I'll smell it'

⟦I⟧, as indicated above, represents a high front underlying vowel that is distinct from ⟦i⟧ in early rules but falls together with /i/ by a later rule. It is distinguished primarily by its effect on neighboring segments: it assibilates a preceding ⟦k⟧, changes a following ⟦x⟧ to /ss/, and causes intrusion of an /s/ between

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[5] Not to be confused with the same symbols in Taylor 1969; he used N to represent the class of nasals, and his S corresponds to our ⟦x⟧.

[6] Borrowed from Taylor 1969.

itself and a following ⟦t⟧. Examples follow:

/omahksika/ < ⟦omaxkIka⟧ 'big foot'
/kiksi ssta/ < ⟦kikIxtwa⟧ 'your mother'
/anistoota/ < ⟦a:nItwiit⟧ 'say it!'

We will use parentheses to mark an underlying ⟦i⟧ or ⟦I⟧ that is present only when preceded by a consonant.

In general, it is possible to predict that whenever a formative which ends with a segment other than ⟦i⟧ or ⟦I⟧ is conjoined (within a word) to a formative which begins with a true consonant ([-voc]), an ⟦I⟧ (Taylor 1969.75 calls it "connective ⟦I⟧")[7] appears between the two:

/aipottaawa/ < ⟦áIpottaawa⟧ < ⟦á+pottaawa⟧ 'he flys'
/siksikaikoana/ < ⟦isikIkáIkoaNwa⟧ < ⟦isikIká+koaNwa⟧ 'Blackfoot person'

A very large number of roots exhibit an initial nasal only when in absolute initial position in a word. Such roots will be listed in isolation as if they were nasal-initial. By way of contrast, truly nasal-initial roots (i.e., those with a permanent nasal) will be listed in isolation as if they had ⟦I⟧ before the nasal; i.e., as if connective ⟦I⟧ were part of the root. Thus the initial ⟦n⟧ of ⟦ninaa⟧ 'man' is present only if preceded by a word boundary:

/ninaawa/ < ⟦#ninaawa⟧ 'man'
/omahkinaawa/ < ⟦omaxk+inaawa⟧ 'old man'

In contrast, the ⟦n⟧ of ⟦Inaama⟧ 'bow' is present in all environments:

/naamawa/ < ⟦Inaamawa⟧ 'bow'
/ninaamawa/ < ⟦nInaamawa⟧ 'my bow'
/omahksinaamawa/ < ⟦omaxkInaamawa⟧ 'big bow'

Another phenomenon pointed out by Taylor 1969.84-85 is the appearance of a /w/ in the environment ⟦a_a⟧ at a morpheme boundary:

/kanawaakiiks/ < ⟦wi:xkana+aakiikI⟧ 'all women'
/kikataa'waaniihpa/ < ⟦kikata'+á+a:niixp⟧ 'do you say (anything)?'

(The glottal moves over to the w after its appearance; see Rule 2 below.)

Another 'predictable' phenomenon is the optional appearance of /a/ after word-final stops and nasals:

/ooyita/ < ⟦wIiyit#⟧ 'eat!'
/kitsiniihpa/ < ⟦kitI:niixp#⟧ 'you saw it'
/kokkita napayiini/ or /kokkit napayiini/ < ⟦wi:xkotkit#napayiiNyi⟧ 'give me the bread!'

0.3.2. Phonological Processes. We will very briefly outline and exemplify the most common phonological processes which account for the difference between the underlying shapes of formatives (morphemes and affixes) and their shapes when combined to make up words. These processes can be seen to take place in a sequence; we will discuss them in order and formulate them as rules.[8]

Those alternations which are least likely to be the result of true phonological

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[7] Taylor does not require the stem-initial consonant to be a true consonant.

[8] See 0.4 regarding rule conventions.

processes must be accounted for first.[9] Thus the more ad hoc Rule 1 is ordered first:

1. $\begin{bmatrix} N \\ S \end{bmatrix} \longrightarrow \left\{ \begin{bmatrix} n \\ s \end{bmatrix} \quad / \quad \underline{\quad} \begin{Bmatrix} w \\ y \end{Bmatrix} \right\}$

(as explained and illustrated in 0.3.1)

2. V'VC ⟶ VV'C
   Condition: optional if C = x.

(Throughout this section V = vowel; i.e., [+syl], and C = consonant; i.e., [-syl], unless otherwise indicated.)

/katai'taopiiwaatsi/ < ⟦káta'it...⟧ 'is he home?'

3. ' ⟶ Ø / _x

/kikataohkiimaahpa/ < kikátao'hkiimaaxp < ⟦kikáta'oxkiimaaxp⟧ 'are you married?'

4. $w_2 \longrightarrow \emptyset \; / \; \begin{Bmatrix} \#(m) \\ w_1 \end{Bmatrix} \underline{\quad\quad}$, where # is a word boundary.

Condition: $w_2 \neq [\begin{smallmatrix} AFF \\ +3 \end{smallmatrix}]$.

(This rule evidently blocks in imperatives.)

/iimitaawa/ < ⟦#wi:mitaawa⟧ 'dog'
(Rule 7)

(but /ooyita/ < ⟦wiiyit⟧ 'eat!'
/mamiiwa/ < mimiiwa < ⟦mwimiiwa⟧ 'fish'

(See the note near the end of this section regarding /a/ < i, as in the first syllable of this example.)

5. i ⟶ o / ____ mw

/nita'komoawa/ < ⟦nita'kimwia:wa⟧ 'I threw for him'
(root ⟦a'ki⟧ plus benefactive ⟦(i)mwi⟧)

6. wi: ⟶ o / _x

/aohpommaawa/ < ⟦áwi:xpommaawa⟧ 'he's buying

7. $\begin{vmatrix} w & \begin{Bmatrix} I \\ i \\ ii \end{Bmatrix} & (:)_a \end{vmatrix} \longrightarrow \begin{vmatrix} o(:)_a \\ oo \end{vmatrix}$

Condition: optional if immediately preceded by a person prefix.
(Both pairs of subscripted parentheses are either empty or non-empty.)

/omahkomitaawa/ < ⟦omaxkwi:mitaawa⟧ 'big dog'

/nitomitaama/ < nito:mitaamwa (Rule 7) ⟦nitwi:mitaamwa⟧

/nitsiimitaama/ < nitwi:mitaamwa 'my dog'

---

[9] In 4.5 we will show how such alternations can be handled by the lexicon.

There are serious problems in the application of these rules to verbs. See the brief discussion at the end of this section.

8. $I \longrightarrow y \;/\; \#\left\{\begin{matrix} m \\ n \end{matrix}\right\}$ ___

(The only initial nasals at this point are those which we referred to as 'nasal increments' near the end of 0.3.1; thus this rule merely provides for the fact that ⟦I⟧ behaves like ⟦y⟧ following such nasals.)

(/naapiwa/ [9] <) nyaapiwa < ⟦nIaapiwa⟧ 'old man'

9. $\left\{\begin{matrix} w \\ y \end{matrix}\right\} \longrightarrow \emptyset \;/\; \left\{\begin{matrix} C \\ \# \end{matrix}\right\}$ ___

Condition: C ≠ '.

In feature notation, this rule would be:

$$\begin{bmatrix} +voc \\ -syl \end{bmatrix} \longrightarrow \emptyset \;/\; \left\{\begin{bmatrix} \# \\ -syl \\ -glot \end{bmatrix}\right\} \text{ ___}$$

/ninna/ < ⟦ninnwa⟧ 'my father'

/nitaakakahkomatawa/ < ⟦nitá:kya:kaxkomatawa⟧ 'I'll aim at him'

10. Cixs $\longrightarrow$ (')$_a$ Css

Condition a : C = y.

(The subscript notation here means that if condition a is true, the parenthesized glottal stop is present in the output of this rule; otherwise the output is simply Css.)

/ninihkssini/ < ⟦nInixkixsiNyi⟧ 'song'

/nita'yaoo'yssi/ [10] < ⟦nitá'áwiiyixsi⟧ 'when I ate'

11. x $\longrightarrow$ ss / I ___

/annisska/ < ⟦annIxka⟧ 'that one'

/niksissta/ < ⟦nikIxtwa⟧ 'my mother'

12. I $\longrightarrow \emptyset$ / C_s, where C is [-cont]

/ki tsayiistapoohsi/ < ⟦kitIsayIItapooxsi⟧ 'that you didn't go away'

/aokstakiwa/ < ⟦áwikIsta:kiwa⟧ 'he counts'

13. i $\longrightarrow$ s / C__sV

Condition: i is verb-root initial.

/nitssiksipawa/ < ⟦nit+isikIpa:wa⟧ 'I bit him'

14. $\emptyset \longrightarrow s \;/\; \left\{\begin{matrix} I\_t \\ k\_I \\ t\_\{\tilde{I}, i\} \end{matrix}\right\}$

Condition: usually blocks when ⟦k⟧ of the environment is $\begin{bmatrix} AFF \\ +2 \end{bmatrix}$.

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[10] The origin of the first /y/ here is unclear; it may be part of the durative aspect marker (see 1.4).

In feature notation, the environments would be stated as

$$\left\{ \begin{bmatrix} +\text{voc} \\ -\text{back} \\ +\text{high} \end{bmatrix} \_\_ \begin{bmatrix} -\text{cont} \\ -\text{nas} \\ +\text{cor} \end{bmatrix} \right.$$
$$\left. \begin{bmatrix} -\text{cont} \\ -\text{nas} \\ \left\{ \begin{matrix} +\text{cor} \\ (+\text{high})_a \end{matrix} \right\} \end{bmatrix} \_\_ \begin{bmatrix} +\text{voc} \\ -\text{back} \\ (+\text{high})_a \end{bmatrix} \right\}$$

/niistowa/ < [[nIItowa]] 'I'
/kitaaksinoawa/ < [[kitáakI:noa:wa]] 'you will see him'
/kitsinoawa/ < [[kitI:noa:wa]] 'you saw him'
/miistsisi/ < [[mIItiSyi]] 'stick'

15. ix ⟶ s / s_C

/nitsspiyi/ < nitsixpiyi[14] < [[nitixpiyi]] 'I danced'
/kitaoo'sspa/ < [[kitáoo'sixp]] 'you made dessert soup?'

(For some speakers, the environment is generalized to C_C, though not all consonants actually occur flanking [[ix]].)

16. I ⟶ i

(Actually, because the single front vowel that results from I and i 'falling together' is high, we should express the rule as i⟶I and y⟶Y; in feature notation it is quite simple:

$$\begin{bmatrix} +\text{voc} \\ -\text{back} \end{bmatrix} \longrightarrow [+\text{high}]$$

We will use the symbols i and y for the resultant front vocoids.)

17. i ⟶ y / _V
Condition: V ≠ i.
In feature notation:

$$\begin{bmatrix} +\text{voc} \\ -\text{back} \end{bmatrix} \longrightarrow [-\text{syl}] \; / \; \_\_ \begin{bmatrix} +\text{syl} \\ +\text{back} \end{bmatrix}$$

This rule is not usually reflected in the practical orthography when a consonant precedes:

nita'kyaaki = /nita'kiaaki/ < [[nita'kia:ki]] 'I hit (something)'

18.

$$V_1\text{:} \longrightarrow V_1 V_1 \; / \; \left\{ \begin{matrix} w \\ y \\ \# \left(\begin{bmatrix} \text{AFF} \\ \{+1, +2, +3\} \end{bmatrix} \right)_a \end{matrix} \right\} \; \_\_$$

Condition: optional if *a* subscripted parentheses are not empty.
(may be inapplicable or optional for initial vowels in certain nouns and imperative verbs)

Such underlying vowels will have the feature [+long] in feature notation, so the rule would be as follows:

$$\left\{ \begin{matrix} \\ \# \quad (\end{matrix} \begin{matrix} \begin{bmatrix} +\text{voc} \\ -\text{syl} \end{bmatrix} \\ \begin{bmatrix} \text{AFF} \\ \{+1, +2, +3\} \end{bmatrix})_{\alpha} \\ 1 \end{matrix} \right\} \quad ; \quad \begin{bmatrix} +\text{syl} \\ +\text{long} \end{bmatrix} \quad 2 \longrightarrow$$

$$1 \qquad\qquad 2 \quad 2$$

nita'kyaaki < nita'kya:ki < [[nita'kia:ki]] 'I hit (something)'
/saahkomaapiiwa/ < [[sa:xkomaapiiwa]] 'boy'
/nitaanikka/ ~ /nitanikka/ < [[nita:nItwkwa]] 'he said to me'
(We do not delete the [+long] feature because it has a bearing on stress placement.)

19. $y \longrightarrow \emptyset \; / \; s\_$

/niso'kaa/ < nitsyo'kaa < [[nitIo'kaa]] 'I slept'
(Occasionally this rule is not of full effect; i.e., the front vocoid glide between the s and a following back vowel is phonetically detectable.)

20. $V_1 \longrightarrow \emptyset \; / \; V_1\_C_1\,C_1$

In feature notation:

$$\begin{bmatrix} +\text{syl} \\ \alpha\ \text{cor} \\ \beta\ \text{back} \\ \gamma\ \text{high} \end{bmatrix} \quad ; [X] ; \quad \begin{bmatrix} -\text{syl} \\ \delta\ \text{cont} \\ \epsilon\ \text{back} \\ \eta\ \text{cor} \\ \theta\ \text{high} \\ \iota\ \text{nas} \end{bmatrix} \quad ; [X]$$

$$1 \qquad 2 \qquad 3 \qquad 4 \longrightarrow$$

$$1 \qquad \emptyset \qquad 3 \qquad 4$$

Condition: 1 = 2 and 3 = 4.
/pissini/ < piissini (< [[piixsiNyi]]) 'entering'
/aattsistaawa/ < [[aaattItaawa]] 'rabbit'

21. $i \longrightarrow \emptyset \; / \; \begin{Bmatrix} aa \\ oo \end{Bmatrix} \_C$, where C is [-voc]

In feature notation the environment is simply:

$$\begin{bmatrix} +\text{syl} \\ +\text{back} \\ \alpha\ \text{high} \end{bmatrix} \quad \begin{bmatrix} +\text{syl} \\ +\text{back} \\ \alpha\ \text{high} \end{bmatrix} \quad \underline{\qquad} \quad [-\text{voc}]$$

Optional under undetermined conditions [11].

---

[11] See Taylor 1969.148.

/ nitomitaama / < ⟦ nitwi : mitaaimwa ⟧ 'my dog'

Some further phonological processes not reflected in the practical orthography transcriptions:

22. $\left\{ \begin{array}{l} ao \longrightarrow ɔ \\ ai \longrightarrow æ \\ a \longrightarrow ə \end{array} \right\} / \_\_(s)C_1C_1$

nitɔttakoawa = / nitaottakoawa / < ⟦ nitáottakoa : wa ⟧ 'I give him to drink'
æsttsiwa = / aisttsiwa / < ⟦ áɪttiwa ⟧ 'it hurts'
mɔttsooyita = / mattsooyita / < ⟦ mattɪwiiyit ⟧ 'eat again!'

23. $a \longrightarrow ɔ \quad / \quad \_\_(')o$

ɔoxkiiwa = / aohkiiwa / < ⟦ aoxkiiwa ⟧ 'water'

24. $o \xrightarrow{\text{optional}} ɔ \quad / \quad ɔ\_$

ponokɔɔmitaawa
ponokɔomitaawa = / ponokaomitaawa / 'horse'

25. $\begin{vmatrix} x \\ k \end{vmatrix}_1 \longrightarrow \begin{vmatrix} \overset{x}{\underset{\cdot}{k}} \\ \underset{x}{\overset{k}{\wedge}} \end{vmatrix}_1 \Big|_2 \quad / \quad \begin{vmatrix} \{a \\ ɔ \\ o\} \\ i \end{vmatrix}_2 \quad \_\_$

Notice how the corresponding feature rule captures the generality of this familiar process:

$$\begin{vmatrix} -\text{voc} \\ +\text{high} \\ -\text{cor} \end{vmatrix} \longrightarrow [\beta \text{ back}] \quad / \quad [\beta \text{ back}]\_\_$$

oxkotoka = / ohkotoka / 'stone'
ixkitsika = / ihkitsika / 'seven'

26. $V_1{}^x \longrightarrow \overset{\cdot}{V}_1{}^x$

Condition: V_1 is unstressed.

($\overset{\cdot}{V}^x$ is a voiceless vowel[12] with simultaneous palatal or velar friction: in the remainder of this section, capital letters [except 'V' and 'C'] represent voiceless segments.)

O$\overset{x}{\underset{\cdot}{k}}$ini = / ohkini / 'bone'
I$^x\underset{\wedge}{k}$itsika = / ihkitsika / 'seven'

---

[12] An early redundancy rule [or a "marking convention" (Chomsky-Halle 1968.402ff)] will already have added the feature [+voice] to all vowels and nasals.

27. $V_1(V_1) \xrightarrow{\text{optional}} \underline{V}_1 \;/\; C\_^{\#}$

Condition: V_1 is unstressed

kitanikkI	=	/kitanikki/	'I told you'
kitanikkA	=	/kitanikka/	'he told you'
kitanikkO	=	/kitanikko/	'you were told'
kitso'kA	=	/kitso'kaa/	'you slept'

28. $i \xrightarrow{\text{optional}} \emptyset \;/\; {}^{\#}\_s$

Condition: i is unstressed.

(This rule is virtually obligatory.)

sootawa	=	/isootawa/	'it rained'

29. $\emptyset \xrightarrow{\text{optional}} ' \;/\; \{m\atop n\}\_s$

kiim'ssini	=	/kiimssini/	'wife-taking' (i.e., 'marriage')

30. $\emptyset \longrightarrow ' \;/\; \begin{vmatrix} M \\ N \\ Y \\ W \end{vmatrix} \;/\; \begin{vmatrix} m \\ n \\ y \\ w \end{vmatrix} \;\_\_\underline{V}$

oom'MI < oomI	=	/oomi/	'her husband'
onn'NI < onnI	=	/onni/	'his father'
nitsooy'YI < nitsooyI	=	/nitsooyi/	'I ate'
iimitaaw'WA < iimitaawA	=	/iimitaawa/	'dog'

31. $y \longrightarrow \emptyset \;/\; (V)_a \; V\_\_'\{\underline{Y}\atop s\}$

Condition: optional if $(\,)_a$ is empty.

nitsoo'YI < nitsooy'YI	=	/nitsooyi/	'I ate
mako'YI ~ makoy'YI	=	/makoyi/	'wolf'

Another phenomenon not reflected in the practical orthography is the automatic lengthening of stressed vowels in demonstratives:

oomi	=	/omi/	'that one$_4$'

There are many other phenomena which we have not accounted for, as well as a large number of serious problems in the formulation and ordering of several of the phonological rules included above.

The most difficult phenomenon to account for is the complexity of root-initial morphophonemics. To complicate the situation, many root-initial alternations are not the result of phonological processes, but rather of a characteristically Algonkian phenomenon known as "initial change" (Taylor 1967). For example, we find such doublets as /payottaawa/ ~ /i(i)pottaawa/ 'he flew', as well as otherwise unexplainable optional alternations of vowel length such as that in the first syllable of /siiksipawa/ ~ /isiksipawa/ 'he was bitten'. Of course we have not tried to account for such alternations in the preceding phonological rules. But we have attempted, with partial success, to account for the more common alternations which seem to be the result of phonological processes. Compare the initial variation in the listed forms of the following two intransitive verb roots:

		root gloss:	'rope'	'bead'
actor	2		/akaat/	/ookatakita/
	1		/nitsiikaa/ ~ /nitokaa/	/nitsiikataki/ ~ /nitookataki/
	3		/iikaawa/	/iikatakiwa/
	3	fut	/aakokaawa/	/aakookatakiwa/
	3	dur	/aokaawa/	/aookatakiwa/
	noun		/akaani/	/ookatakssini/

Each of these two verbs is representative of a class of roots (the first much larger than the second) which show the same alternations. Unfortunately, there are many verbs which behave almost as one of these two, but differ in one or two of their verb forms. Nevertheless, we have listed a [[wi:]]-initial underlying form for all roots (such as 'rope') which show the ii/o alternation, and assume that whenever the phonological rules above would result in this [[wi:]] being realized as a (single) i in word-initial syllables, the i > /a/ for some unexplained reason. Roots (such as 'bead') which show an ii/oo alternation, we list as [[wii]]-initial. Thus the underlying forms of 'rope' and 'bead' are [[wi:kaa]] and [[wiikata:ki]], respectively.

Not only verbal roots exhibit this alternation; compare the following shapes of the root [[mwi(:)mii]] 'fish':

/mamiiwa/	'fish'
/omahkomiiwa/	'big fish'
/nitsiimiihkaa/ ~ /nitomiihkaa/	'I caught a fish'

Another of the many difficulties that should be mentioned is that whenever consonant-initial roots occur in initial position in independent finite verb forms, an /i/ or /ii/ increment precedes:

	/ikahtsiwa/	< [[kaxtiwa]]	'he gambled'
(cf.	/kahtsita/	< [[kaxtit]]	'gamble!')
	/iikskimawa/	< [[kI:skimawa]]	'he hunted'
(cf.	/ksiskimata/	< [[kI:skimat]]	'hunt!')

Word stress patterns appear to be a function of both vowel length and inherent stress of certain syllables, although analysis of this system is still incomplete. It is worth pointing out that the stress rules will evidently have to be sensitive to verbal vs. nominal status: cf. nitomitaama 'my dog' and nitomitaami 'I have a dog'.

It should be obvious that a good deal more investigation must be done before Blackfoot morphophonemics can be said to be under control, let alone accounted for even on the level of descriptive adequacy; yet the many problems that remain have little or no bearing on the main goals of this thesis.

0.4. Abbreviations and Conventions. Most abbreviations listed below are defined as introduced; the first two are nowhere defined in the text.

SD — The structural description of a given rule specifies the class of strings to which the rule applies.

SC — The structural change of a given rule is simply its output; i.e., the string to which it applied with changes as required by the rule.

A	argument (term) of a proposition
AFF	affix
AG	agent
ablat	ablative
accomp	accompany
AI	animate intransitive
an	animate (gender)
anl	animate (semantic)
BEN, ben	benefactive
C (in 0.3.2)	consonant
C	conjunctor
Com	comitative
conj	conjunct
cont	continuant
cor	coronal
CS	non-instigative cause
D	demonstrative
dep	dependent
DEVEL	developmental
dur	durative
E	existential operator
elev	elevation
ESS	essive
EXP	experiencer
fn	footnote
FORM	formative
FORMCOND	formative condition
fut	future
G	generic operator
GL	goal
glot	glottal
hypoth	hypothecative
I	instrument
ID	identification
II	inanimate intransitive
imper	imperative
incert	incertitude
incorp	incorporation
indep	independent
instr	instrumental
intrans	intransitive
k	constant
L	location
LT	lexical transformation
M	means
N, n	noun
narr	narrative
nas	nasal
NEG, neg	negative
NOM, nom	nominal
NP	noun phrase
NS	noun stem
O	object
P (Chap. 1-3)	possessor
P (Chap. 4)	predicate
pers	person
pl	plural
PM	phonological member
poss	possessor person

PP	predicate phrase
PRED	predicate
PREDCOND	predicate condition
PROP	proposition
prox	proximity
PS	phrase structure
PSI psi	pseudo-intransitive
purp	purposive
R	result
REFLEX reflex	reflexive
RECIPR recipr	reciprocal
rel	relator
S	sentence
SC	source
sg	singular
sibl	sibling
spec	specific
sub	subordinate
subj	subjunctive
syl	syllabic
T	time
TA	transitive animate
TI	transitive inanimate
tr-agree	transitive agreement
trans	transitive
V (in 0.3.2)	vowel
V	verb
v	variable
voc	vocoid
VP	verb phrase
VS	verb stem
yo	younger
x (Chap. 1-3)	participant unspecified

Other symbols:

w,x,y,z are used as referent variables in Chap. 4.

X is a variable in rules; if more than one X occurs in the same rule, they are not necessarily identical.

Ø null

< derived from

: directly dominates

> dominates

1 speaker

2 addressee

3 prominent topic of animate gender

4 less prominent topic of animate gender

12 1 and 2 involved jointly (inclusive 'we')

< , > encloses an ordered pair

~ alternating with

~ [ ] portion in brackets is not permitted

! imperative verb form

+
^ equivalent concatenators; the second is used where the first might be confused with the use of + as a feature value.

⟶ in rules, the arrow symbolizes the rewrite operation; such operations are obligatory unless otherwise indicated.

⟶ (in glosses) represents the direct relator (see 1.1).

⟵ (in glosses) represents the inverse relator.

; divides SD of transformational rules into chunks for indexing.

◠ under a consonant indicates fronting

. under a consonant indicates backing

Some rule conventions:

Vertical lines in rules indicate the line convention, so that $\left|\begin{matrix}A\\B\end{matrix}\right| \longrightarrow \left|\begin{matrix}C\\D\end{matrix}\right| / \_E$ $A \longrightarrow C / \_E$ and $B \longrightarrow D / \_E$.

The slant bar, as seen just above, means 'in the environment to the right'.

The underline of a blank indicates a particular place in the environment.

Braces enclose disjunctively ordered entities, unless otherwise indicated. Thus $A \longrightarrow \left\{\begin{matrix}B / \_C\\D\end{matrix}\right\}$ abbreviates the two rules $A \longrightarrow B / \_C$ and $A \longrightarrow D$, with the further constraint that they are ordered as listed and that if the first is applicable, the second does not apply.

Greek letters are also used for feature values; in any given rule, the same Greek letter always represents the same value. Thus, [+voc] ⟶ [-α syl] / [α syl] ___ abbreviates [+voc] ⟶ [-syl] / [+syl] ___ and [+voc] ⟶ [+syl] / [-syl] ___ .

Chapter 1

SKETCH OF SURFACE STRUCTURE

1.1. Surface Syntactic Categories And Agreement.

(a) oma ninaawa iyimmiwa (AI) 'the man laughed'
the man he laughed

(b) nitakomimmawa nohkowa (TA) 'I love my son
I love him my son

(c) oma aakiiwa iinima kookowayi (TI) 'the woman saw your house'
the woman she saw it your house

In traditional Algonkianist terminology, the three verbs of sentences (a) - (c) are animate intransitive (AI), transitive animate (TA), and transitive inanimate (TI), respectively. (Analyses of these sentences are given below.) TA verbs occur with objects of animate gender, while TI verbs occur with objects of inanimate gender.

Every Blackfoot noun is inherently a member of one of these two gender classes; this classification pervades the grammar. Since gender classes are syntactic (grammatical), not semantic, it should not be surprising that there is no obvious real-world rationale behind this classification; one can expect nouns which have living beings as their denotata to belong to the animate class, but the animate class also includes a large number of nouns that violate this criterion; e.g., ⟦wixpokoN⟧ 'ball', ⟦oapIxp⟧ 'eye', ⟦naato'si⟧ 'sun, holy-powered one', ⟦wIxk⟧ 'pail', ⟦IttówáN⟧ 'knife'.

In sentences such as (a), (b), and (c), the verb has inflectional affixes determined by number (singular or plural) and person (speaker, addressee, or topic) of both subject and object.[1] The "subject" of a verb is termed the actor, and the object with which the verb must agree is traditionally termed the goal.

oma ninaawa 'the man' is actor in (a), and the AI verb iyimmiwa 'he laughed' has agreeing third person suffix -wa.

Speaker is actor in (b) and requires the prefix nit- on the TA verb ⟦akomimm⟧ 'love'; there is no separate word marking speaker's (or addressee's) involvement in most sentences unless this involvement is to be emphasized, in which case the so-called independent pronoun niistowa (kiistowa, for addressee) would be present in

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[1] Unlike many other Algonkian languages, inanimate intransitive (II) verbs take the same third person (sg and pl) inflectional affixes as AI verbs. Of course, these are the only 'persons' II verbs are inflected for.

addition to the agreeing verb prefix nit-. nohkowa 'my son' functions as goal in (b) and requires agreeing suffix -wa on the TA verb.

The -a immediately preceding the -wa suffix in the verb of (b) is a relator. In TA verbs, the person affixes do not signal the function of persons, but only that they are involved; the relator removes the ambiguity as to which participant involved is actor, in the following manner. There is a ranking system apparently based on something like personal closeness to the speaker. Rank is descendingly ordered as: speaker, addressee, participant unspecified, major animate topic, less prominent animate topic (see below). These will be symbolized as 1,2,x,3,4, respectively. (The so-called "inclusive 'we'", speaker and addressee involved jointly, will be symbolized by 12.) There are two relators; one which signals that the actor is of higher rank than the goal, and another which signals the reverse.[2]

In (b), then, nit- signals speaker is involved, -wa signals major animate topic is involved, and relator -a signals that the higher ranked of these two (1 or 3) is actor; since 1 outranks 3, speaker is actor and 3rd person is goal. Compare nitakomimmoka 'he loves me', in which the other relator -ok signals the reverse relationship to that signalled by -a in (b). (The relators have several variant shapes, and in some combinations of actor and goal persons, one segment serves simultaneously as relator and indicator of speaker's involvement. See Frantz 1967.144.)

oma aakiiwa 'the woman' is actor in (c) and requires the agreeing ending -ma on the TI verb [[I:ni]] 'see'. kookowayi 'your house' is the goal of inanimate gender.

Recapitulating and expanding, we have thus far discussed three major clause types. They are:

I. Intransitive. These have two major constituents: a noun phrase (NP) as actor and an intransitive verb. (We ignore for the moment clauses with an object that has no specific referent, though as far as agreement is concerned such clauses are intransitive. See Sect. 1.2, paragraph d.) This type could be subdivided into animate intransitive and inanimate intransitive, according to whether the actor is animate or inanimate, since intransitive verb stems which occur with an animate actor often differs slightly in shape from the corresponding stems which take inanimate actors. The relative order of verb and actor seems to be of no discernible semantic importance.

Verbs are inflected by both prefixation and suffixation in all but imperative and subjunctive paradigms (see 1.5); the latter two employ suffixation alone. In the intransitive independent verb, e.g., prefix kit- signals addressee is actor, and nit- signals speaker is actor. (These prefixes have a shorter form before certain preverbal roots.) Third person singular and plural are marked by suffixes -wa and -yiawa, respectively; the latter is reduced to -yi if the actor NP immediately follows the verb. There is a sub-class of AI verbs which add -m before the third and fourth person (independent) verb suffixes; e.g., aippiima 'he enters' (cf. nitaippii 'I enter'). Plurality of 1 and 2 are marked by suffixes -(i)nnaan and

[2] For much more detailed description and exemplification of these matters, see Frantz 1966, especially Sec. 3.

-oaawa, respectively (a cluster ⟦xp⟧ is automatically inserted before these two suffixes in the affirmative) 12 as actor is signalled by suffix -o'pa.

II. Transitive Inanimate. The three major constituents are animate NP as actor, inanimate NP as goal, and a TI verb. Relative order of these seems to be of little if any semantic importance.

The TI verb must be inflected to agree, in both person and number, with the actor. In general, the verb inflection also reflects number of the goal, but with a third person actor, plurality of the goal is reflected in the verb only if the goal NP is not overtly present in the immediate clause. The same is true in imperative verbs. For example, cf. :

pommatoot omistsi miinistsi	'Buy those berries!'
pommatootaawa	'Buy them (inan)!'

Many of the same inflectional affixes which occur on the AI verb are found on TI verbs. Independent TI verbs with third person as actor comprise a sub-paradigm in that they have /m/ or /mm/ immediately following the TI stem where all other members of the independent paradigm have ⟦Vxp⟧, and plurality of the goal requires suffix ⟦Iti⟧, while elsewhere in the paradigm it is marked by suffix ⟦yiawa⟧, reduced to /yi/ if the goal is overtly present in the immediate clause. These suffixes which are required by a plural goal are added at the end of the verb, and so any inflectional suffixes required by the actor will precede them.

III. Transitive Animate. The three major constituents are animate NP as actor, animate NP as goal, and a TA verb. Relative order of these constituents is most certainly not crucial in terms of syntactic function; in fact, the only evident constraint on ordering of these is in terms of person: the major third person NP, regardless of whether functioning as actor or goal, normally precedes a less-prominent ('fourth person')[3] NP. Changes in this particular ordering may be a function of emphasis.

The TA verb must be inflected to agree with person and number of both actor and goal. Here again, however, we find that some agreement suffixes are not present if the NP with which they agree is overtly present in the immediate clause. E.g., the full independent paradigmatic ending for 3→4 (3 actor, 4 goal) is ⟦yiiwayi⟧, but the final /yi/ is present only if the NP_4 as goal is not present in the immediate clause. Another example is that the verb ending for 3→4 pl does not contrast with the ending for 3→4 if the NP_{4pl} is present in the immediate clause. There are several other such cases. But considering the TA paradigm of full forms, we find sixty-nine possible non-reflexive combinations of actor and goal, including nine with actor unspecified. The total of sixty-nine also includes four combinations involving fourth person acting upon an animate goal (which we might call 'fifth person') that is subordinate to fourth person. Of the sixty-nine combinations, sixty-three are actually contrastive: there is no contrast between 2 and 2 pl when involved with 1 pl (as either actor or goal); and forms with 12 as actor (and 3 or 4 as goal) are the same as those with actor unspecified.

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[3] See 1.2 for an explanation of 'fourth person'.

While we will not include an analysis of the TA paradigm, we should reemphasize that a person prefix on a TA verb does not necessarily refer to the person of the actor, but rather a particular affix signals only that a particular person is involved. In fact, presence of the prefix nit-, e.g., can be said to signal that the addressee is not involved, as well as signal that the speaker is involved; this is because all combinations with addressee involved (other than jointly with speaker as 12) have prefix kit- whether or not the speaker is involved, and these prefixes are mutually exclusive (i.e., fill the same 'slot'). The relator, mentioned above as the main disambiguating affix with regard to syntactic function, immediately follows the stem.[4]

Quite often a verb will be inflected to agree with certain features of a third or fourth person referent which is neither actor nor goal, but only if an NP for that referent is not overtly present in the immediate clause.

(a) oma ninaawa nomohtsitsinikooka ohkoiks

that man-3 I-about-recounted-◂— 3 his-son-4pl

'the man told me about his sons'

(b) oma ninaawa nomohtsitsinikookaiks

that man-3 I-about -recounted-◂— 3-4pl

'the man told me about them'

Comparing (a) and (b), we find that when the plural adjunct 'his sons' is deleted as in (b), the verb acquires a 4 plural suffix /iks/, even though 'his sons' cannot be goal, because the speaker is goal.

(c) nitsitapsskonaki omiksi aattsistaaiks

I-to-shoot those rabbits-3pl

'I shot at the rabbits'

(d) nitsitapsskonakiawa

I-to-shot-3pl

'I shot at them'

Again, (d) has a suffix /awa/, whereas (c) does not have this suffix. (See 4.4.2D regarding analysis of (c).)

Under conditions not yet fully understood, a suffix /yi/ is added to transitive animate verbs if a singular adjunct referent is not overtly represented by an NP in the immediate clause. Compare (e), (f), and (g) (the latter has the suffix in question):

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[4] For an attempt at slot-class analysis of the TA paradigm, see Frantz 1966.53. For a discussion of this paradigm in terms of Pike's matrix method of analysis, see Frantz 1967.142-146.

(e) nitainihkohtomoawa

I-dur-sing-ben-→3

'I'm singing for him'

(f) nitainihkohtomoawa otsinihkssini

I-dur-sing-ben-→3 his-song

'I'm singing his song for him'

(g) nitainihkohtomoawayi

I-dur-sing-ben-→3-adjunct

'I'm singing it for him'

Compare also (h) and (i):

(h) nitohkotawa ponokaomitaayi

I-give-→3 horse-4

'I gave him a horse'

(i) nitohkotawayi

I-give-→3-adjunct

'I gave it to him'

(One cannot help but observe that in both (g) and (i) the adjunct would be so-called 'direct object' in English, while the goal would be 'indirect object'.) If the adjunct referent is plural, suffixes ⟦Iti⟧ and ⟦ikI⟧ are used for inanimate or animate adjunct referents, respectively (presumably the same phenomenon as in (b)):

(j) nitohkotawaistsi

I-give-→3-pl[-an]

'I gave them (inan) to him'

(k) nitohkotawaiksi

I-give-→3-pl[+an]

'I gave them (an) to him'

1.2. Noun Inflection. Description of noun inflection requires recognition of the following five categorical oppositions:

A. Animate vs. inanimate gender, as discussed above.

B. Main animate topic 3 vs. less prominent (subordinate) topic 4:

Within a clause, and usually within a sentence, only one animate gender topic may be assigned to the third person category; any other animate topic (with specific referent, see below) must be marked as less-prominent (traditionally termed

'obviative'; see also 2.3).

(a) nohkowa isskonakatsiiwa omi aattsistaayi
my-son-3 shoot-3-→4 that-4 rabbit-4
'my son shot the rabbit'

In example (a), nohkowa 'my son' is marked as 3 by suffix -wa; aattsistaayi 'rabbit' is marked as 4 by suffix -yi. The TA verb -isskonakat- 'shoot' has suffix -yiiwa which is required by this combination of 3 actor, 4 goal.

C. Singular vs. plural.

Animate plural and inanimate plural nouns (with specific referents-see below) are marked by suffixes [[ikI]] and [[isti]], respectively. Examples are: nohkoiksi 'my sons' and kookowaistsi 'your houses'.

D. Specific vs. non-specific.

Discussion under B and C above had to be qualified because the category oppositions 3 vs. 4 and singular vs. plural are irrelevant if the speaker has no specific referent for the noun in mind. (We must make it clear that this is different from the notion 'indefinite' which has to do with establishment of a referent for the addressee's benefit.) Whereas specific nouns occur as objects of transitive verbs, and require verbal affixes corresponding to their number and person, non-specific nouns occur as objects of pseudo-intransitive (PsI)[5] verbs which are inflected for actor only, as are other intransitive verbs. Contrast (b) with (a):

(b) nohkowa isskonakiwa aattsistaai
'my son shot rabbit(s)'

In (b), 'rabbit' has non-specific suffix -i. This same suffix is used on non-specific inanimate nouns. Note that (a) and (b) have different verb stems (obviously, the verb stem of (a) (-isskonakat-) is derived from that of (b) (-isskonaki-), but for this sketch of surface syntax we ignore this fact, taking it up in 3.1).

E. Generic vs. existential.

While the speaker may have no particular referent in mind for a non-specific noun, he may intend to refer to the generic set of denotata for that noun. This is marked by suffix -waa(').

iiniiwaa(') aooyi(wa) matoyihkoi 'buffalo eat grass'. Note that even though 'buffalo' is not specific, the verb aooyiwa apparently has 3 suffix -wa, though it does seem to be optional, as indicated by the parentheses. (This area needs much more investigation.)

The following diagram summarizes what we have said thus far about inflectional categories for nouns:

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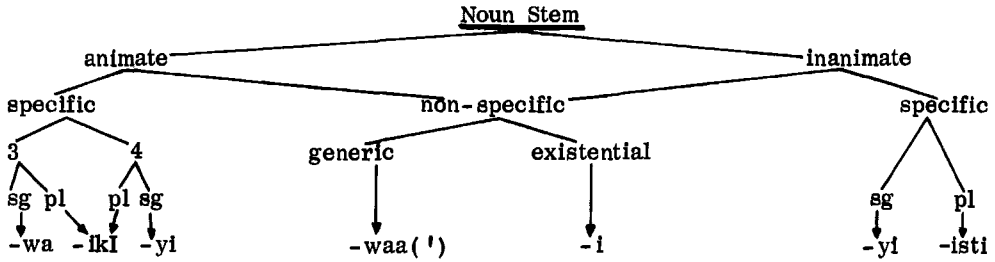
[5] Pseudo-intransitive verbs may be inherently so, or derived. See Section 3.1.



Whiie 3pl and 4pl are marked by the same suffix, they are kept separate on the diagram because they require different verbal suffixes of agreement.

1.3. Possessive Affixes. We may divide all nouns into three classes with regard to possession:

A. Obligatorily possessed nouns never occur without persons 1,2,3,4, or a combination of these, as possessor(s). (This class largely consists of kinship terms.) The characteristic possessive affixes for these are:

1	n-	1 pl	n----------nnaan
		12	k----------nnoon
2	k-	2 pl	k----------oaawa
3	w-	3 pl	w----------oaawa
4	w----ayi		

As an example, we give the possessed forms for 'mother' (stem ⟦ikIxt⟧):[6]

1	niksissta	1 pl	niksisstsinnaana
		12	kiksisstsinnoona
2	kiksissta	2 pl	kiksisstoaawa
3	oksisstsi	3 pl	oksisstoaawayi
4	oksisstayi		

Forms possessed by 1 or 2 are shown with third person suffix ⟦wa⟧ (reduced to /a/ after a consonant); i.e., the noun itself is third person. The final ⟦yi⟧ (reduced to /i/ after a consonant) in the forms with 3 as possessor is required because any animate noun possessed by third person is automatically fourth person (see 2.3). The regular animate or inanimate, noun piuralizing suffixes are added after the possessive affixes shown above.

B. Inherently possessed nouns take essentially the same affixes shown for obligatorily possessed nouns (though a sub-class take Ø- [zero] prefix for 3 instead of w-), but may occur without any of these. (This class largely consists of body parts.) A large number of these have an m- increment when unpossessed, which several

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[6] Some speakers assibilate the initial k of the forms with 2 possessor, indicating that the underlying shape of this stem may be ⟦IkIxt⟧. Also, a variant, kiksisstonnoona of the form with 12 possessor is often heard.

other treatments of Algonkian languages refer to as marking 'indefinite possessor'.[7]

C. Most non-inherently possessed nouns have a suffix ⟦im⟧ when possessed and, except with 12 possessor, take the person prefixes normally associated with verbs; in a later section they will be treated as closely related to verbs. For the present, an example ⟦wi:mitaa⟧ 'dog') will suffice:

1	nitomitaama	1 pl	nitomitaaminnaana
		12	kitomitaaminnoona
2	kitomitaama	2 pl	kitomitaamoaawa
3	otomitaami	3 pl	otomitaamoaawayi
4	otomitaamiayi		

(Compare nitomitaami ~ nitsiimitaami[8] 'I have a dog'.)

1.4. Aspect. Blackfoot, like other Algonkian languages, makes extensive use of preverbal formatives which signal such things as aspect, manner, spacio-temporal relations, etc. Most of these are dependent roots, which we shall later (4.4.2) treat as originating apart from the remainder of the verb and subsequently combined with it by transformational rules. A few of these formatives are appropriately termed aspect markers. The meaning of these is not readily determinable, and often appears to be a function of the co-occurring verb root, at least in-so-far as attempts to express these meanings in English are concerned. Some of the more common ones are:

⟦á⟧ 'durative/iterative' (the shape of this morpheme may actually be ⟦yá⟧): aisootawa 'it's raining/it rains (regularly)', nitaissksinoawa 'I'm thinking/learning of him' (cf. nitssksinoawa 'I know him').

⟦ika⟧ 'completive': akai'niwa[9] 'he's dead (already died)', akao'toowa 'here he is (he's arrived)', nikaayoomi 'I have a husband'.

⟦á:k⟧ 'future/intentive': aakssootawa 'it's going to rain', aaksooyo'pa 'we (12) will eat/let's eat'.[10]

⟦saki⟧ 'incompletive/continuative': sakiaitapiyiwa 'he's still living', nitsakiaissksinoawa 'I remember him' (the two foregoing examples contain both the incompletive and the durative, cf. 'I'm thinking of him' above).

⟦wi:ma⟧ 'to the present time': matomao'toowaatsiksi 'he hasn't yet arrived',

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[7] These nouns which take the m- increment are then grouped in those treatments with the obligatorily possessed nouns as 'dependent' nouns. Here, however, we reserve the term 'dependent' for roots (nominal or verbal) which can occur only in combination with other roots.

[8] These are free variants, showing the two possible realizations of ⟦wi:⟧ after a person prefix (see 0.3.2).

[9] Recall (from 0.3.2) that certain instances of initial short i > a. The completive marker is one of several formatives that take n, k, and ∅ as person prefixes instead of the expected ones.

[10] Taylor 1969.300 lists only -ayaak- with this meaning, and says that it is usually reduced to aaak-. It should be noted that while I am unable to arrive at a consistent semantic characterization of the difference, my informants insist there are two such prefixes, which I take to be ⟦á:k⟧ and ⟦áya(a)k⟧.

iimaitsskaawa 'he's fighting yet', katao'mayiistapoowaatsiksi 'did he leave yet?' (This aspectual preverb, which is less common than the others, has much in common semantically with ⟦saki⟧; perhaps only the latter, like English still, presupposes the truth of its complement.)

One might expect verbs with no aspect marker to be neutral as to aspect; yet the most common English translation given for such forms is simple past. While, in many cases, this is doubtless due simply to the fact that there is no closer English equivalent for such forms, [11] it serves a useful purpose for the investigator by helping him to recognize the semantic character of those verbs which are not so translated when 'neutral'; note the glosses given just above (under listing ⟦á⟧ for TA stem ⟦IxkIno⟧ with and without durative aspect.

1.5. Orders and Modes. Traditionally, Algonkian verb paradigms are classified along two additional parameters: 'order' and 'mode' (see Bloomfield 1946.97-103). These terms are technical, for most of the orders correspond semantically to what in other fields of linguistic description are usually called 'modes' or 'moods'. [12] The rationale for deciding what is an order and what is a mode seems to be somewhat as follows: two paradigm classes belong to different orders if their inflectional systems are distinct enough so that they require description as separate sub-systems of the language; but if their systems seem closely related, so that, e.g., one may be derived from the other by some fairly simple process, they are different modes of the same order. [13] In practice, however, semantic and distributional considerations enter in, so that the above criteria are never followed rigidly.

As for Blackfoot [14], the above rationale could lead one to relate the independent verb paradigms and conjunct verb paradigms as modes of one order, since the person affixes of the two groups of paradigms are nearly the same. But the independent paradigms themselves have two modes, the affirmative and the non-affirmative (see below); the latter are derivable from the former (see Frantz 1967.141-142). Blackfoot also has an 'unreal' (Taylor's term; Uhlenbeck called it the 'potentialis') mode; these paradigms, too, are derivable from the corresponding independent paradigms. Clearly separate orders by the above criteria are the subjunctive paradigms and the imperative paradigms.

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[11] No English verb 'tenses' are really neutral for aspect: 'present-progressive' is incomplective, 'simple present' is iterative for non-stative verbs and (usually) completive for stative verbs, etc. 'Past' is probably the closest to being neutral for aspect, though it usually assumes completive aspect.

[12] Uhlenbeck did use the term 'special mood' for what other Algonkianists call orders. He lists indicative, imperative, conjunctive, subjunctive, and potentialis as special moods of Blackfoot. His attempted semantic characterization of these as degrees of 'repression of communication' is puzzling (p. 157).

[13] For an example of such evidence presented as an argument against the validity of order status for functionally interrogative verb forms in Cree, see Ellis 1961. (The reader should be warned that Ellis [p. 119] misleadingly quotes Gleason's definition of an entirely different technical term: 'order' meaning morpheme slot-class.)

[14] See the appendix for the paradigmatic affixes under discussion.

But, of course, the place of these paradigms in Blackfoot syntax is of far greater importance than their taxonomy. Their uses are sketched in what follows.

1.5.1. Use of the imperative parallels that of the English imperative constructions. Any imperative may be negated (to form a prohibitive) by prefixing min- (the initial /m/ fluctuates more or less freely with /p/ in this and one or two other formatives):

asai'nit 'cry!', minasai'nit 'don't cry!'.

1.5.2. The independent paradigms, as the name implies, are used in non-imperative independent clauses. The non-affirmative mode of these is obligatory when the verb is negated (by prefix [[mat]]), but when used otherwise the non-affirmative mode expresses uncertainty[15] (parenthesized portions of Blackfoot examples are optional): matsakiaopiiwaatsi(ksi) 'he's not home', sakiaopiiwaatsi(ksi) 'he's home?' (cf. the affirmative: sakiaopiiwa 'he's home', literally 'incompletive-durative-stay-3'); nimataooyihpa 'I'm not eating'. A prefix kata'- is often found with non-affirmative verbs as interrogatives:

kata'yao piiwaats(iksi) 'is(n't) he home?'.

Such questions (probably) have a negative flavor, since kata'- is a negative, found, e.g., in verbs used as nouns: kata'yayoohtsimiwa 'not-hearer (=deaf one)'. Although one informant declared that use of kata'- is the 'correct' way to form yes-no questions if really expecting an answer, it has been my experience that yes-no questions with kata'- are much less common than those formed simply by use of the non-affirmative mode.

1.5.3. Broadly speaking, the conjunct is used in dependent clauses which are non-presumptive, while the subjunctive occurs in those which are presumptive. The former include:

A. Non-suppositional[16] antecedent (prerequisite) for a main-clause consequent:

iihtoki'takiwa nitsiistapoohsi

result-angry-3 I-left (conj)

'He was angry because I left.'

As illustrated, in condition-result situations the verb of the main-clause (consequent)

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[15] Similar to the use in English of intonation up-glide without subject-verb inversion:

'you're fil?'

Taylor 1969.308 says mat- also occurs with the affirmative ending. It is difficult to determine whether such examples, and they are common, are bona fide or merely reduced forms, because informants would accept them in either case.

[16] Uhlenbeck states that the conjunct is also used in some suppositional clauses, but all his putative examples of "the suppositional conjunctive" (p. 164) appear to be subjunctives (some subjunctive and conjunct verb inflectional endings differ only in short s vs. long ss [from [[xs]] after i], a contrast Uhlenbeck rarely recorded).

usually has the 'result' marker ⟦Mwi:xt⟧; its surface shape is iiht- in the example.

B. Closely related to the above use of the conjunct, is its use in temporal clauses of past occurrence:

ahpiyiwa nitai'to'toohsi

dur-dance-3 I-when-there-arrive(conj)

'He was dancing when I got there.'

(The prefix a'- [glottal methathesized to next consonant] seems to mean 'at a certain time' and prefix it- to mean 'at a certain place'; it- signals either (or both) of these 'meanings' when used in independent verbs. a'- occasionally is found in independent forms, but then seems to have a slightly different force; see Taylor 1969.307, for examples.)

C. Also closely allied to A above is the use of the conjunct in purpose clauses:

iihto'toowa nahkitsspomooyissi

result-arrive-3 I-to-then-help-← 3(conj)

'He came here to help me.'

Notice that this type differs from examples such as that in A only by the prefixation of ⟦máxk⟧ and ⟦it⟧ to the conjunct verb. (The preverbal formative ⟦máxk⟧ is another one of the several that require person prefixes n-, k-, ∅ for 1, 2, and 3, respectively, instead of the expected ones.) Conjunct verbs with the nominalizing suffix ⟦n⟧ or ⟦xsiN⟧ (in place of the ⟦xs⟧ cluster which is characteristic of other conjunct verbs) but still making use of verbal person affixes, occur commonly, but not exclusively, in purpose clauses:

iihtssaksiwa annahka ninnahka naahkitso'kaani

result-exit-3 that one$_3$ my-father$_3$ I-to-then-sleep-nom

'My father went out so I would sleep.'

D. Verb complement:

iimai'takiawa nikai'nissi

believe-3pl(AI) I-complet-die(conj)

'They believed that I was dead.'

nitssksiniihpa nitaomai'toyissawa

I-know(TI) I-dur-believe-← 3pl(TA conj)

'I knew that they believed me.'

(One might have expected a nominalized verb here [and a conjunct nominal would be acceptable--see below] as goal of a TI verb, but this seems to be a case of a

conjunct verb as complement of a main verb which, unlike the root ⟦wi:mai't⟧ 'believe' in the preceding example, cannot be "intransitivized"--see Section 3.1.)

Conjunct verbs are negated by addition of prefix ⟦sa⟧: nitsayiistapoohsi 'that I didn't go away', nitsawaooyissi 'that I'm not eating'.

Derived from the conjunct, and in some contexts virtually equivalent to it, is the conjunct nominal. (These nominals have functions in common with English factive, action, and gerundive nominals [Lees 1960].) To every conjunct verb form there corresponds a nominal formed by substitution of p for s in the ⟦xs⟧ cluster characteristic of conjunct forms (the ⟦xs⟧ cluster follows the relator in TA conjunct forms and follows the stem in intransitive and TI conjunct forms): [17]

Conjunct	Conjunct nominal [18]
kitaanistohsi 2-said to-←I (conj) 'I said to you	kitaanistohpi 'what I told you'
otsiisowahsayi 3-feed-4 (conj)	otsiisowahpiayi 'what he fed him'
manistaokaksstsimaahsi manner-rule-3 (conj)	manistaokaksstsimaahpi 'his manner of rule/ way he rules'

As an illustration of a context where informants find these virtually equivalent, compare the example from A above (repeated here as a) with a sentence (b) that is the same except for substitution of the conjunct nominal for the conjunct verb:

a. iihtoki'takiwa ninna nitsiistapoohsi
result-angry-3 my-father-3 I-leave (conj)

b. iihtoki'takiwa ninna nitsiistapoohpi
my-leaving

c. iihtoki'takiwa ninna nitsiistapoohsini
my-leaving

a, b, and c all translate as 'my father was angry because I left'. [19] c has the corresponding conjunct nominal formed by the nominal suffix ⟦xsiN⟧ (as mentioned

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[17] See appendix for the paradigms; note that conjunct 12 forms have ⟦'s⟧ rather than ⟦xs⟧.

[18] Uhlenbeck 1938.101-108 lists some of these forms with ⟦xp⟧, which he called a "relative suffix" (probably because these often translate as nominal clauses introduces by 'what' in English), but did not notice that these forms are derivable from conjunct verbs. Taylor, on the other hand, correctly recognizes the relationship, though his corpus evidently contained no evidence of their surface status as nouns (see below); hence he termed them verbs of a "relative conjunct mode" (Taylor 1969.169, 277). Bloomfield's description of a "participle of the conjunct order" (1948.101) for proto-Algonkian seems almost to fit this construction.

[19] Cf. the near-equivalence in English of 'that I left angered him' and 'my leaving angered him'.

in C above) and is also nearly equivalent to a and b. (As far as I am able to ascertain, the nominalization suffix may be used, though not freely, in place of the [[xp]] suffix as an alternate way of forming conjunct nominals.)

While the verbal character of conjunct nominals is indisputable (they take verbal person affixes, not possessive affixes as do other deverbal nouns), they are nouns at the most superficial level of syntax; witness the inanimate plural demonstrative and the inanimate plural suffix of the next example:

omistsi otsito'toohpistsi

those 3-there-arrive-conj nom-pl$_I$

'the places he went'

This example illustrates the Blackfoot equivalent of English locational clauses.[20]

Conjunct nominals whose underlying verbs have 12 as actor and stems which contain the instrumental preverb [[Mwi:xt]] (see 3.5.1) or the locative preverb [[it]] are often used as the common 'names' for instruments or places, respectively:

iihtaooyo'pi 'fork'

instr-dur-eat-12 (conj nom)

itaooyo'pi 'restaurant'

where-dur-eat-12 (conj nom)

1.5.4. The subjunctive paradigms have no person prefixes; consequently a number of forms are ambiguous as to whether the actor is speaker or addressee. As noted above, these paradigms are found in presumptive dependent clauses, which include the following semantic types:

A. Suppositional antecedent for a main clause consequent:

ikkaminaayisi nitaaksspomooka

incert-chief-3 (subj) I-fut-help-←3

'If he's a chief, he'll help me.'

ikkamaooyinowaainiki nitaakahkayi

incert-dur-eat-2pl (subj) I-fut-go-home

'If you (pl) are eating, I'll go home.'

As in these examples, subjunctive verbs which are suppositional usually have the 'incertitude' prefix [[wikkam]].

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[20] Compare the nominal character of 'where he went' in English; notice that 'places' had to be substituted for 'where' to pluralize the English gloss.

B. Iterative antecedent for a main clause consequent:

kanaooyiiniki ayo'kaawa

every-eat-I(subj) dur-sleep-3

'Whenever I eat, he's sleeping.'

kanainoainiki itawahkayiwa

every-see-I 3(subj) then-dur-go home-3

'Everytime I see him, he goes home.'

In this semantic type, the antecedent has quantifier preverb ⟦wixkana⟧ 'all, every' and the consequent has the durative-iterative aspect marker ⟦á⟧.

C. Non-retrospective temporal clauses:

a'yo'kaainiki aakitahkayiwa

when-sleep-I(subj) fut-then-go home-3

'He'll go home when I (go to) sleep.'

ao'tooyiniki aakayo'kaawa

when-arrive-I(subj) fut-dur-sleep-3

'When I arrive he'll be sleeping.'

As shown, temporal subjunctive clauses usually have prefix ⟦a'⟧.

Subjunctive verbs, like conjunct verbs, are negated by prefix ⟦sa⟧:

ikkamsaohkokkiiniki nitaakahkayi

incert-neg-give-1←2(subj) I-fut-go home

'Unless you give it to me, I'll go home.'

1.5.5. The unreal paradigms are derived from the independent paradigms by addition of suffix ⟦opi⟧. (Surprisingly, this suffix is positioned after whatever person suffixes are present except those which mark 3 pl, 4, 4 pl, or inanimate pl; these particular suffixes follow the ⟦opi⟧ suffix.[21] Whenever this positioning would attach ⟦opi⟧ directly to the stem, a cluster ⟦Vxt⟧ unexplainably intervenes; in TI verbs this ⟦Vxt⟧ seems to replace the ⟦Vxp⟧ suffix which is otherwise characteristic of a large portion of the independent TI paradigm.) The unreal indicates purely hypothetical (contrary to fact?) predication. It is quite rare, but usually occurs in an antecedent clause which states a hypothetical prequisite for another clause:

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[21] At least one other formative is so positioned: the 'narrative' marker ⟦yiixk⟧ which means something like 'this is not a first-hand account'. Significantly, the affixes which follow these two formatives are just those suffixes which are present in their full form only when the noun with which they 'agree' is not overtly present. See Section 1.1.

nitsinaayiihtopi nitaakomatsskoawa

I-chief-hypoth I-fut-send-3

'Were I a chief, I'd send him.'

(Uhlenbeck 1938.171 lists examples in which both the antecedent and consequent clauses make use of an unreal verb, but I have been unable to elicit such from my informants.) Unreal verbs are negated by prefix ⟦kata'⟧ or ⟦sa⟧ (the latter after preverbs):

nikatai'naayiihtopi nitaaksakiaopii

I-neg-be-chief-hypoth I-fut-still-dur-stay

'Were I not a chief, I'd still be home.'

nitsitsayooyiihtopi nitaaksooyi annoohka

I-then-neg-eat-hypoth I-fut-eat now

'If I hadn't eaten then, I'd eat now.'

1.6. Demonstratives. Most of the Blackfoot examples of preceding sections contained demonstratives which were glossed 'this', 'that', 'these', or 'those'. In accord with their deictic character, they occur with nouns that have a specific referent only, and they agree with the head nouns in both gender and number. The only information they add about their head noun is locational (unless they are extended by various suffices--see Taylor 1969.212).

There seem to be four basic demonstrative stems. (There may be another basic stem ⟦am⟧; if so, the scheme presented here will require revision because segmentation of a suffix ⟦o⟧ is possible [Taylor 1969.207].) While a good deal more investigation is called for, we can approximate their central meanings in terms of proximity to speaker and addressee:

amo

$$\begin{bmatrix} +1 & \text{prox} \\ -2 & \text{prox} \end{bmatrix}$$

anno

$$\begin{bmatrix} +1 & \text{prox} \\ +2 & \text{prox} \end{bmatrix}$$

om

$$\begin{bmatrix} -1 & \text{prox} \\ -2 & \text{prox} \end{bmatrix}$$

ann

$$\begin{bmatrix} -1 & \text{prox} \\ +2 & \text{prox} \end{bmatrix}$$

We say that these features approximate the central meanings of the stems because they seem to be extended and modified in various contexts. For example, despite its central meaning of proximity to addressee, the stem ⟦ann⟧ with the suffix ⟦xk⟧ (the latter apparently meaning something like 'not present or visible') is commonly used in reference to an absent person or object. In such a case, the 'proximity to addressee' can only be understood in terms of familiarity of the referent to the addressee rather than physical closeness. Notice also the glosses for ⟦anno⟧ with suffixes

[[m]] 'locational focus', [[xk]] 'not visible', and [[iki]] '3pl':

annoma	'around here'
annohka	'now'
annooksi	'people around here'

Chapter 2

PARTIAL GRAMMAR

2.1. Development. As a starting point, we consider the kind of phrase structure (PS) rewrite rules[1] that would be necessary to account explicitly for the syntactic facts discussed above in 1.1 and 1.2 only. Considering first sentences such as (a) - (c) of 1.1 (repeated here), we have three sub-classes of verb stems: AI, TA, and TI.

(a) oma ninaawa iyimmiwa (AI) 'the man laughed'
that-3 man-3 laugh-3

(b) nitakomimmawa nohkowa (TA) 'I love my son'
I-love- 3 my-son-3

(c) oma aakiiwa iinima kookowayi (TI) 'the woman saw your house'
that-3 woman-3 see-3 your-house

Note that Rule 2 of the PS rules below does not account for restrictions of occurrence of these verb stems as described above. To do this within the PS Rules, we must substitute Rule 2a (where subscripts A and I indicate animate and inanimate). This, in turn, requires that we substitute 3a and 3b for Rule 3, to correspondingly sub-classify the noun phrases which occur as objects of the verbs in question. Note also that this assumes we will sub-classify the nouns and noun stems and verbs and verb stems as in Rules 4a, b, c, 5a, b, and c, 6a, b, and c, and 7a, and b.

PS RULES (for a phrase structure grammar)

1. $S \longrightarrow (NP)\,VP$

2. $VP \longrightarrow V(NP)$

2a. $VP \longrightarrow \left\{ \begin{matrix} V_I \\ V_{TA} \quad +NP_A \\ V_{TI} \quad +NP_I \end{matrix} \right\}$

3. $NP \longrightarrow (D)\,N\,(P)$

3a. $NP_A \longrightarrow (D_A)\,N_A$

3b. $NP_I \longrightarrow ((D_I)\,N_I$

[1] For an introduction to phrase structure rewrite rules see Lyons 1968.215-27, and Bach 1964, Chapter 3.

4. $V \longrightarrow pers_1 + VS\,(rel)\,(pers_1\,pl)\,(pers_2\,pl)$

4a. $V_1 \longrightarrow (pers_1)\,VS_1\,(\ \left\{\begin{matrix} pers_3 \\ pers_1\,pl \end{matrix}\right\}\ )$

(Either $pers_1$ or $pers_3$ must be chosen.)

4b. $V_{TA} \longrightarrow (pers_1)\,VS_{TA} + rel\,(pers_1\,pl)\,(\ \left\{\begin{matrix} pers_3 \\ pers_2\,pl \end{matrix}\right\}\ )$

4c. $V_{TI} \longrightarrow pers_1 + VS_{TI}\,(pers_1\,pl)\,(pl_1)$

5. VS $\longrightarrow$ { Iyimmi, akomimm, I:ni, ... }

5a. $VS_1 \longrightarrow$ { Iyimmi, ... }

5b. $VS_{TA} \longrightarrow$ { akomimm, ... }

5c. $VS_{TI} \longrightarrow$ { I:ni, ... }

6. $N \longrightarrow (poss)\,NS\,(poss\ pl)\ \left\{\begin{matrix} waa' \\ i \\ (pers)\,(pl) \end{matrix}\right\}$

6a. $N_I \longrightarrow (poss)\,NS_I\,(poss\ pl)\ \left\{\begin{matrix} waa' \\ yi \\ i \\ (pl_I) \end{matrix}\right\}$

6b. $N_A \longrightarrow (poss)\,NS_A\,(poss\ pl)\ \left\{\begin{matrix} pers\,(pl_A) \\ waa' \\ i \end{matrix}\right\}$

7. NS $\longrightarrow$ { oxko, ookowa, ... }

7a. $NS_A \longrightarrow$ { oxko, ... }

7b. $NS_I \longrightarrow$ { ookowa, ... }

8. D $\longrightarrow$ { oma, omi, ... }

8a. $D_A \longrightarrow$ { oma, ... }

8b. $D_I \longrightarrow$ { omi, ...)

9. P $\longrightarrow$ NP

Even with this extra complication of the rules, we still have not accounted for agreement in person and number between verb and actor or goal (nor even the co-occurrence restrictions within the verb and noun). To do so within the PS rules we would have to further sub-classify sentences according to all the possible combinations of actor and goal persons and numbers. Such is seldom done.[2]

It is perhaps worth pointing out here that if we introduce context sensitive rules[3]

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[2] Tagmemicists, for example, have been content to add a statement to the effect that such agreement is required. While this indicates recognition of the fact that such agreement is superficial, it avoids taking sub-classification to extremes only at the cost of explicitness.

[3] See Lyons 1968.235-247; Bach 1964.36.

we can, if we wish, make it clear that the sub-classification of one constituent is determined by the sub-classification of another constituent. For example,

$$NP \longrightarrow (D) \left\{ \begin{matrix} N_A \\ N_I \end{matrix} \right\} \quad \text{, and } D \longrightarrow \left\{ \begin{matrix} D_I \ / \_N_I \\ D_A \ / \_N_A \end{matrix} \right\} \quad ,^{4}$$

would capture the intuitive notion that the sub-classification of demonstratives is a consequence of the gender sub-classification of nouns in Blackfoot.

The co-occurrence requirements discussed above may be handled much more efficiently by other than PS devices. The devices utilized below make use of syntactic features.[5]

Categorical restrictions such as TA verbs occuring only with animate objects, intransitive verbs occurring without objects, etc, are accounted for by two changes: (a) choice of lexical item is no longer by PS rule (such as 5 or 7) but rather by transformational[6] rule which inserts lexical items according to insertion conditions associated with that lexical item, and (b) these conditions are stated in terms of contextual features which define the class of contexts into which the lexical item may be inserted. For example, a TA verb could have as one of its features $[+ \_(D)\ N_A]_{VP}$, which permits insertion of the TA verb in a VP with an animate object.

Agreement in person and number is accomplished by eliminating these categories from the PS rules and making them syntactic features. These features can then be carried from their 'source' (say, a noun as actor) to the agreeing constituent (the verb of which the noun is actor). Later rules ('spelling' rules) will add affixes corresponding to these features.

The PS rules which remain after we make the modifications just discussed are:

1' $S \longrightarrow (NP)VP$

(The NP is left optional to account for meteorological verbs, such as ⟦isoota⟧ 'rain', which occur with no actor, and also for sentences containing transitive verbs with no specified participant as 'actor'. See discussion in Sect. 2.2.)

2' $NP \longrightarrow (D)N(P)$

Obligatorily possessed nouns (1.3 A) will have contextual features [+NP: _P]; inherently possessed nouns (1.3 B) will be marked [+NP: _(P)]. P, of course, is possessor. The colon indicates domination, so that the second feature, e.g., is to be read as follows: "may be inserted in an NP with or without a possessor".

3' $VP \longrightarrow V(NP)$

---

[4] Where A B/_C is to be read, 'rewrite A as B in the environment of a following C'. Braces here abbreviate disjunctively ordered rules. (We will use them later on the left side of the arrow to abbreviate conjunctively ordered rules.)

[5] See Lyons 1968.165-166.

[6] This term is generally used for rules which account for various syntactic relationships between different structures. But because such rules violate restrictions normally placed on PS rules, the term 'transformational' is often used for any rule which is more powerful than a PS rule and whose conditions of applicability may be stated in the same manner as those for a transformation.

4' P⟶NP

In addition we have Feature Rules 5' - 8':

5' $$[+N] \longrightarrow \left\{ \begin{array}{ll} \left\{ \begin{array}{l} [+\text{generic}] \\ [+\text{spec}] \end{array} \right\} & / \ S:NP:N:\_ \\ [+\text{spec}] & / \ NP:D\hat{}N:\_ \\ [\pm\text{spec}] & \end{array} \right\}$$

The first sub-rule of 5' adds either [+generic] or [+spec] to a noun as actor; i.e., in an NP directly dominated by S. (If more than one subrule of disjunctively ordered rules is applicable, only the first may apply.) (A metatheory convention rewrites terminal categories (N, V, D) as features (+N, +V, +D).)

6' [+spec] ⟶ [±an, ±pl]

7' [+an] ⟶ [±2, ±1]

8' $\begin{bmatrix} +\text{an} \\ -1 \\ -2 \end{bmatrix} \longrightarrow [+3]$

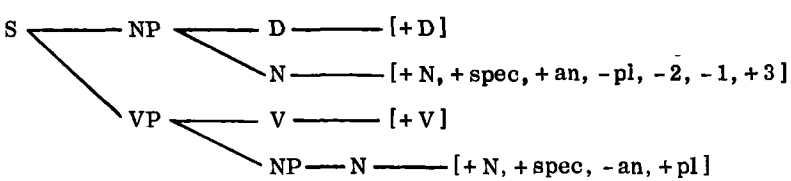
The feature [-3] for less prominent animate topic (obviative) will be introduced transformationally--see 2.3.

For purposes of illustration, we will trace the transformational derivation of the following sentence:

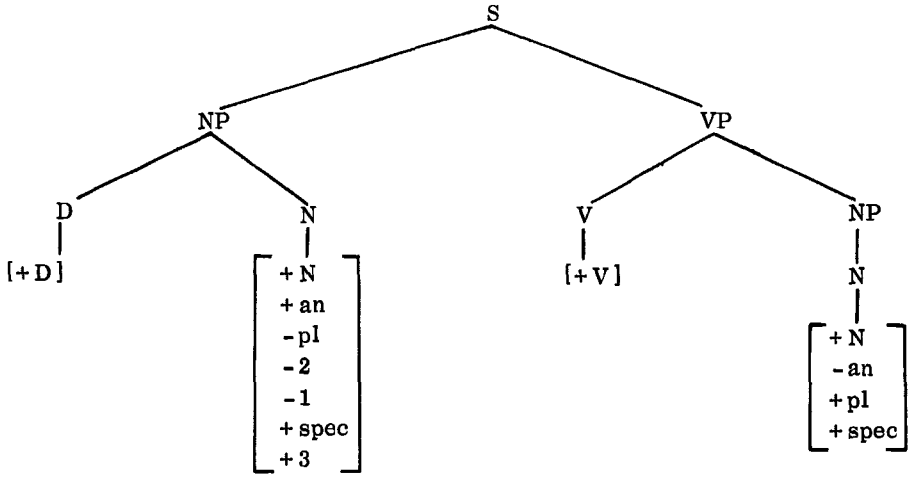
oma ninaawa iihpommatooma miinistsi

'the man bought (some particular) berries'

The corresponding constituent structure defined by the rules above can be represented schematically as follows:



A line indicates that the category symbol at its left terminus dominates the symbol at its right terminus. For example, the topmost NP and the VP directly under it are the immediate constituents of S. This type of schematic arrangement will be used throughout the thesis, and is a 'tipped' version of the 'phrase marker' or 'tree' that many readers will be familiar with (the arrangement chosen here is less costly in terms of space and printing costs). For the benefit of such readers, the following tree is included as equivalent to the above schematic:



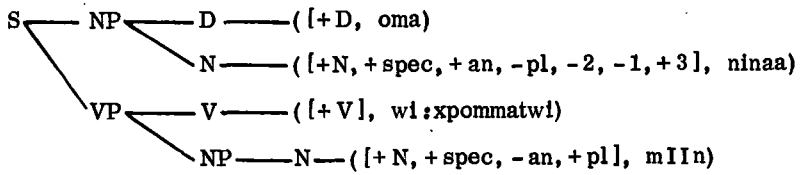
(Notice that 'topmost' in the tipped version corresponds to 'leftmost' in this tree, and vice-versa.)

At this point lexical insertion rules can apply. Assume the following lexical entries (note: while parentheses in rules and in contextual features indicate optional presence of whatever they enclose, parentheses will also be used in this thesis to enclose members of a set; thus each lexical entry which follows is a set with two members: an underlying phonological form, and a matrix of syntactic features):

(ninaa,	[+N, +an, -1, -2])	'man'
(mIIn,	[+N, -an])	'berry'
(akomimm,	[+V, +VP:_NP:N:[+an]])	'love' (TA)
(wi:xpommatwi,	[+V, +VP:_NP:N:[-an]])	'buy' (TI)
(Iyimmi,	[+V, -VP:_NP])	'laugh' (AI)
(omi,	[+D, +NP:_N[-an, -pl]])	
(oma,	[+D, +NP:_N[+an, +3, -pl]])	

The rule for lexical insertion will be stated informally: a lexical item may be inserted at a terminal label (which corresponds to the category symbol [N, V, or D] of the lexical entry) if (a) the lexical entry is not distinct from the matrix of features already developed at that point (two sets of features are distinct if and only if they have opposite specifications for any feature), and (b) no contextual feature of the lexical entry is contrary to the context of that terminal label at which it is to be inserted.

Given this very short lexicon, the only insertions permissible are those which will lead to the sentence we intended to generate:



If any of these lexical items had additional feature entries (to account for further subclassification or idiosyncratic properties), these features would have been carried along into the terminal matrix of features when the items were inserted.

Next to apply will be transformational rules which account for agreement between verb and nouns as actor and goal by carrying actor and goal features to the verb.

$T_{i\text{-}agree}$ Intransitive agreement

$$[[[+N;\gamma\ ]_N]_{NP};[[+V]_V;\ ([[-spec]_N]_{NP})]_{VP}]_S$$

$$1\ \ 2 \qquad\qquad 3 \qquad\qquad 4 \longrightarrow$$

$$1\ \ 2 \qquad\qquad 3+2 \qquad\qquad 4$$

where γ is person, number, and gender features dominated by N.

$T_{tr\text{-}agree}$ Transitive agreement

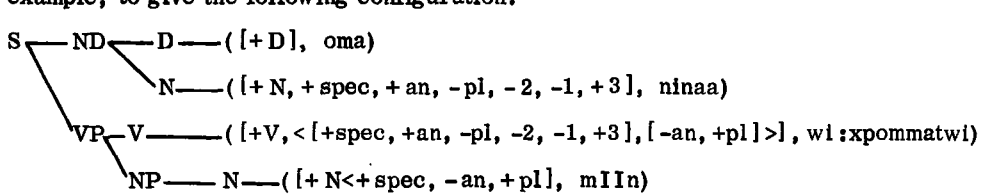
$$[[[+N;\ \gamma\ ]_N;]_{NP}[[+V]_V;\ [+N,+spec;\ \delta\ ]_N]_{VP}]_S$$

$$1\ \ 2 \qquad\qquad 3 \qquad\qquad 4\ \ 5$$

$$1\ \ 2 \qquad\qquad 3 + \langle 2,5 \rangle \qquad\qquad 4\ \ 5$$

where γ and δ are person, number and gender features dominated by N. (Angle brackets $\langle\ ,\ \rangle$ indicate an ordered pair.)

$T_{tr\text{-}agree}$, then, adds an ordered pair of feature matrices to the verb of our example, to give the following configuration:



Last to apply before phonological rules are the affix-spelling rules. A sample of those that would be needed for Blackfoot follow:

1. $[+V, +3, +indep] \longrightarrow [\quad]\hat{}wa$

2. $[+V, \begin{matrix}+1\\+pl\end{matrix}\quad]_a \longrightarrow [-next\ rule]_a\hat{}naan$

(Subscript a is to disambiguate bracket-matching across the arrow.)

3. $[+V, \begin{matrix}+2\\+pl\end{matrix}\quad]_a \longrightarrow [\quad]_a\hat{}oaaw$

4. $[+V, +\text{indep}, \left\{\begin{matrix}\left[\begin{matrix}+1\\+2\\+3\end{matrix}\right]\\\left[\begin{matrix}+1\\+2\end{matrix}\right]\end{matrix}\right\}, X]_a \longrightarrow [\ ]_a^{\wedge} xp$

where X contains no $\left[\begin{matrix}+an\\-1\\-2\end{matrix}\right]$ or $\left[\begin{matrix}+spec\\-an\end{matrix}\right]$

5. $[+V, < \left\{\begin{matrix}[+3]\\[-3]\end{matrix}\right\}, [-an] >, +\text{indep}]_a \longrightarrow [\ ]_a^{\wedge} m$

([-3] is the obviative or 'fourth person' feature.)

6. $[+V, +2, X] \longrightarrow kit^{\wedge}[\ ]$, where X is not [+sub]

The feature [+sub] will be present if the first formative of the verb stem is one of those which takes the shorter forms of the person prefixes (see 1.1).

7. $[+V, +1, -2, X] \longrightarrow nit^{\wedge}[\ ]$, where X is not [+sub]

8. $[+N, -\text{spec}, -\text{generic}] \longrightarrow [\ ]^{\wedge}i$

9. $[+N, \left|\begin{matrix}+3\\-3\end{matrix}\right|, -pl] \longrightarrow [\ ]^{\wedge}\left|\begin{matrix}wa\\yi\end{matrix}\right|$

(Vertical bars indicate the line-correspondence conventions; see 0.4.)

10. $[+N, +an, -1, -2, +pl] \longrightarrow [\ ]^{\wedge}ikI$

11. $[+N, -an, \left|\begin{matrix}-pl\\+pl\end{matrix}\right|] \longrightarrow [\ ]^{\wedge}\left|\begin{matrix}yi\\isti\end{matrix}\right|$

12. $[+V, < \left\{\begin{matrix}[+1]\\[+2]\end{matrix}\right\}, [-an] >, +\text{indep}]_a \longrightarrow [\ ]_a^{\wedge} Vxp$

13. $[+V, +\text{conj}] \longrightarrow [\ ]^{\wedge} xs$

14. $[+V, < [\ ], [-an] >]_a \longrightarrow [\ ]_a^{\wedge} i$

(See fn.1 of Chapter 3.)

These rules are ordered so that outermost affixes are added first.

Thus far in our design of a partial grammar, we have not only ignored such things as mode, inter-sentence relationships, nominalizations, and many other important facts of Blackfoot syntax, but we have implicitly assumed that the grammatical functions 'actor' and 'goal' are of primary importance, definable as S:NP and VP:NP, respectively.[7] Our main motivation for this assumption was the pervasiveness of agreement requirements between the verb and actor and goal. We shall later have reason to question this assumption (see 4.1).

2.2. Actorless Verbs. We pointed out in 2.1 that the NP of S in PS Rule 1' is optional to account for both meteorological verbs and TA verbs with no actor specified.

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[7] Parallel to Chomsky's definitions of subject and (direct) object in English; see Chomsky 1965.68-71.

2.2.1. Meteorological verbs such as aisootawa 'it's raining' then present no particular problems. Their contextual features in the lexicon are exemplified by the following entry for 'rain':

(isoota, [+V, -NP ^ VP:_, -VP:_NP]) 'rain'

Even though they have no actor, such verbs occur with the third person singular suffix.[8] This can be accounted for by the following feature rule which will add appropriate features to the verb so that the same segmentalization rule which adds suffix [[wa]] to verbs with a third singular actor will also add it to meteorological verbs:

[+V, -NP ^ VP:_, X] → [+3, -pl]

where X does not contain [+imperative]. The condition added to this rule is necessary because of the possibility of someone (such as a shaman) saying (i)soo̲tat 'rain!' as a command.

2.2.2. Transitive verbs occurring without surface structure actor are exemplified by (a) - (c):

(a) nita̲anikko "mi̲isinsskiaaki"
I-say ← (TA) badger-woman
'I'm called "badger-woman".'

(b) iihtssikssapi̲nawa o̲ma saahko̲maapiiwa mi̲istsi̲i
ablat-blacken eye- → 3 that-3 boy-3 stick[-spec]
'A stick blackened that boy's eye.'

(c) ki̲itaanistsi a'ohpommatooxs(awa) ni̲tsakia̲opii
baked goods-pl when-buy(TI)-conj-pl I-still-dur-stay
'When the baked-goods were bought, I was at home.'

In (a), speaker is goal of the TA verb [[a:nItw]] 'say'. In (b), saahko̲maapiiwa 'boy' is goal of the compound TA verb [[isikIaapin]] 'blacken-the-eye-of'; this verb has ablative prefix [[Mwi:xt]] (realized as /iiht/), indicating an instrument, means, or point of origin is involved in the verbal predication; mi̲istsi̲i 'stick' is, of course, the means or instrument. (c) has ki̲itaanistsi 'baked goods' as goal of the TI verb [[wi:xpommatwi]] 'buy'.

Similar sentences in English are usually treated by transformationalists as passive sentences with a "category representative" (Chomsky 1964.70,71) such as 'someone' as underlying subject.[9] In terms of Blackfoot syntax, these sentences are indisputably not passives; the term is completely inappropriate, since there are no active vs. passive paired counterparts such as 'I hit him'; 'he was hit by me',

[8] The actor of such verbs cannot be considered to be a locative (overt or covert) because when occurring with plural locatives the verb retains singular affixes.

[9] See e.g., Katz and Postal 1964.36, 42.

etc. But what bears explanation is why we have chosen not to posit an underlying actor for these sentences. For sentences such as (b) there are at least two reasons. First and foremost is that (b) may be used in a situational context where no other participant is even indirectly involved; e.g., if a rotten branch fell from a tree. (Clearly, 'stick' is not actor in (b): cf. nomohtssiksaapinawa oma saahkomaapiiwa miistsii 'I blacked the boy's eye with a stick' which differs from (b) only in having an actor indicated in the verb.)[10] Second, and less significant, I have found no indefinite pro-form or category representative with meaning 'some unspecified animate being' that could be construed as the underlying actor of such sentenoes. (There are forms that translate 'someone' but these are equivalent to the 'particular' interpretation of 'someone' [see Langendoen 1970.164] rather than the indefinite, non-particular 'someone' that would have to be the underlying subject in the English counterparts to (a) and (c); furthermore, these Blackfoot forms are systematically treated as third or fourth person nouns in Blackfoot syntax, so that when they are present they require agreeing person affixes on the verb.)

Nor do such sentences result from deletion of an NP that is coreferential with another NP (see 3.3.1); such deletions take place after the verb involved acquires features which are later segmentalized to give verb forms other than those we are saying have no underlying actor.

To fully account for such sentences, we need to modify agreement transformation $T_{tr-agree}$ so that the feature [+x] is added to transitive verbs without actors; segmentalization rules can then refer to this feature as they do to person, number, and gender features.[11]

$T_{tr-agree}$ (transitive agreement [revised])

$$[\ ([[+N;\ \gamma\ ]_N]_{NP})_a[\ [+V]_V\ ;\ [\ [+N,+spec;\ \delta\ ]_N]_{NP}]_{VP}]_S$$

$$1 \quad 2 \qquad\qquad 3 \qquad\qquad 4 \quad 5$$

$$1 \quad 2 \qquad\qquad 3+ \ <\ \left|\begin{matrix}[+x]\\ \gamma\end{matrix}\right|\ ,\ \delta > 4 \quad 5$$

Condition: $(\ )_a$ is $\left|\begin{matrix}\text{empty}\\ \text{non-empty}\end{matrix}\right|$

2.3. Obviation. One of the most salient features of Algonkian languages is the phenomenon termed 'obviation'. As we stated in 1.2, whenever two or more non-coordinate, animate gender nouns with specific referents occur together, only one may be assigned third person status; the other(s) must be reduced to the subordinate obviative status. We sometimes term this subordinate category 'fourth person' (and symbolize it as 4).

As a syntactic device, this subordinate category is exploited extensively by the language to disambiguate sentences. The Blackfoot counterpart of the following English sentence is a good example: The man told his friend that he saw him. If we assume a deep structure with no participants other than the man and his friend, oblig-

[10] In 3.5.2 we will suggest that sentences such as (b) are ambiguous, so that one interpretation assumes an unidentified agent; and once we allow unidentified participants, (a) and (c) must be considered to assume unidentified 'addresser(s)' and 'purchasers', respectively.

[11] It should be reiterated (see 1.1) that the forms in question which have 3 or 4 as goal are the same (phonologioally) as those with 12 as actor and 3 or 4 as goal.

atory pronominalization has rendered the English sentence multiply ambiguous in the sense that the surface pronouns could refer to any established third person singular referents. But even if we rule out interpretations where the pronouns refer to participants other than those in the main clause, the English sentence is still two-ways ambiguous. The Blackfoot counterpart, however, is much less ambiguous. Assuming the 'man' is the primary topic and thus [+3], the 'friend' would be obviative ([-3]) because any animate gender noun possessed by third person is automatically fourth person. The verb 'see' must then be marked as having either third or obviative person as actor. Thus there are two Blackfoot sentences, (a) and (b), corresponding to the two interpretations of the English sentence which involve only the two participants of the main clause:

(a) oma ninaawa itanistsiiwa omi otakkaayi otsinoahsayi

that-3 man-3 then-say-3→4 that-4 his-friend-4 3-see→4(conj)

'The man$_3$ then told his friend$_4$ that he$_3$ saw him$_4$.'

(b) oma ninaawa itanistsiiwa omi otakkaayi otsinoyissayi

3-see←4(conj)

'the man$_3$ then told his friend$_4$ that he$_4$ saw him$_3$.'

While choice of a particular animate participant as primary topic (subsequently third person) is clearly one that must take place in the base of a grammar of Blackfoot, relegation of animate participants to the obviative, or fourth person, category is automatic once the primary topic is chosen. But because there seems to be no fixed unit of discourse for which the primary animate topic must be selected (occasionally the domain of prominence of a topic is less than a full surface structure sentence, though usually its domain includes several narrative sentences), it is difficult to write rules which will account for all obviation.

The simplest case of obviation is that alluded to above: an animate participant possessed by third person. Even within a portion of discourse in which the possessed participant is the main third person, it must be reduced to fourth. This suggests that there is obligatory, temporary transformational reassignment of the third person category to any possessor of the prominent animate topic in the immediate portion of a discourse; this could account for much of the apparently erratic shifting about of the third person category. Obviation rules would, of course, apply subsequent to such shifting.

2.3.1. Personal 'Pronouns' and Obviation. Because verbs acquire features in agreement with third and/or fourth person actor and goal, it seems only reasonable that obviation rules apply before agreement rules. There is, however, one phenomenon which can be considered closely allied to the process of obviation, and yet which must not affect verb agreement. This is the process which accounts for the ⟦yi⟧ suffix on all occurrences of the third person independent 'pronoun' oostoyi and on many occurrences of the other personal 'pronouns'.

The most common form of each of the so-called independent pronouns is as follows:

1	niistowa	1 pl	niistonnaana
		12	k(s)iistonnoona
2	k(s)iistowa	2 pl	k(s)iistowaawa
3	oostoyi	3 pl	oostowaawayi

Comparing this paradigm to those of 1.3 A we see that these pronouns are inflected exactly as obligatorily possessed nouns. They have a common base ⟦IIto⟧, which we will henceforth gloss as 'self'. Notice that all except the 3 forms end in ⟦wa⟧ (reduced to /a/ after a consonant). If this can be equated with the third person suffix of the same shape, there is good reason to identify the ⟦yi⟧ suffix on those forms for 3 as the obviative suffix. In other words, we are hypothesizing that because the independent 'pronouns' are nouns (we shall henceforth call them 'person nouns') in surface structure, certain rules for obviation apply to them as they do to other [+spec] nouns.

The same hypothesis can account for the presence of the ⟦yi⟧ suffix on first and second person nouns in the following examples:

(c) oma Asinaaikoana itapsskonakiwa ksiistoyi
that-3 Cree-3 to-shoot-3 your-self-4
'the Cree shot at you'

(d) nohkowa iihtsspiiyiwa niistoyi
my-son-3 result-dance-3 my-self-3
'my son danced for me'

(e) oma ninaawa nomohtsitsinikooka ksiistowaawayi
that-3 chief-3 I-about-relate-◂— 3 your-selves-4
'the chief told me about you (pl)'

In (c) oma Asinaaikoana 'the Cree' is actor; ksiistoyi functions as an adjunct of an intransitive directional verb whose stem includes the directional preverb ⟦itap⟧ (see 4.4.2). The suffix /yi/ on ksiistoyi, according to our hypothesis, is conditioned by presence in the same clause of the third person participant, 'the Cree'. This is supported by the presence of /wa/ in place of the /yi/ suffix when we substitute 'speaker' for the third person ('Cree') in (c) to give (f):

(f) nitsitapsskonaki ksiistowa 'I shot at you'
I-to-shoot your-self-3

There is no longer any other third person topic, so in accordance with our hypothesis, the person noun 'possessed' by the addressee is permitted to be inflected as third person.

Sentence (d) has an intransitive verb made up of the ablative preverb [[Mwi:xt]] and root [[ixpiiyi]] 'dance'; nohkowa 'my son' is actor and niistoyi is adjunct as non-instigative cause (see 3.5.2). Our hypothesis correctly predicts the /yi/ suffix on niistoyi as it did on ksiistoyi of (c). Again, (g) shows that substitution of a non-third person as actor eliminates the /yi/ suffix on the person noun:

(g) komohtsspiiyi niistowa 'you danced for me'
you-result-dance my-self-3

Example (e) is a similar construction, included to show that the /yi/ suffix is added to person nouns with plural 'possessor's' as well.

Our hypothesis as it stands predicts that whenever a person noun occurs in construction with a third person participant, the person noun will be inflected as an obviative. But exceptions are readily found:

(h) niistowa nitsinoawa nohkowa 'I saw my son'
my-self-3 I-see-→3 my-son-3

We stated in 1.1 that there is usually no overt indication that speaker or addressee is involved in a predication other than the person affixes on the verb. In constructions such as (h), where a person noun is redundant, its presence is apparently emphatic. And in their emphatic role, person nouns are not necessarily subject to inflectional obviation, though obviation of the person noun in the inverse counterpart of sentences such as (h) (i.e., emphasized person is goal and 3 is actor) does seem to be obligatory: [12]

(i) niistoyi nitsinooka nohkowa 'my son saw me'
my-self-4 I-see-←3 my-son-3

The person nouns in (c) - (g), however, cannot be present merely for emphasis; there is no other indication that the person they signal is involved. They are subject to rules of inflectional obviation.

Summarizing, we have recognized the nominal status of the so-called 'independent personal pronouns' and have hypothesized that, as nouns, they are subject to rules of obviation. In their emphatic function, i.e., when they are redundant, first and second person nouns are inflectionally obviated obligatorily only when they are goal of a verb with a third person actor. The rule of obviation which obviates animate nouns possessed by third person applies in all circumstances, but such obviation does not reduce the third-person 'personal pronoun' to fourth person for purposes of verb agreement. In their non-emphatic roles, person nouns are treated inflectionally exactly as other [+spec] animate nouns so far as rules of obviation are concerned.

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[12] If such occurrences of first and second person nouns with suffix /yi/ are the only ones Taylor has encountered, one can understand why he insisted that they are not obviatives (1969.210).

Chapter 3

STEM FORMATION PROCESSES

3.1. Transitivity. As it stands, our partial grammar is incapable of accounting for the similarity of the verbs in the following sentences:

(1a) nitohpommaa (i'ksisakoi) 'I bought (meat)'

(1b) nitohpommatoohpa omi i'ksisakoyi 'I bought that meat'

(1c) nitohpommataw oma mamiiwa 'I bought that fish'

Our partial grammar can generate these sentences only if all three verb stems of 1a, 1b, and 1c are entered in the lexicon, with contextual features appropriate to pseudo-intransitive, TI, and TA verbs, respectively. But even limited acquaintance with Blackfoot makes it abundantly clear that the process which relates these verb stems is productive; i.e., a major generalization would be missed by entering these stems separately in the lexicon. The root common to 1a -c is inherently pseudo-intransitive. As illustrated and stated earlier (in 1.1), PsI verbs may occur with an object if that object is [-specific]. But when an inherently PsI root occurs with a [+specific] object (goal), the root is extended (transitivized) by addition of suffix ⟦atw⟧. The stem is then further extended by addition of ⟦i⟧[1] if the goal is of inanimate gender.

We make the following lexical entry for this inherently PsI root (in place of that listed earlier for 'buy (TI)'):

(wi:xpomm , [+V, +VP:_(NP)]) 'buy'

And we add a transformational rule which transitivizes such roots when they occur with a [+spec] object:

T_{trans} (transitivization)[1a]

$$[\,[PM;\,,\,[+VP:\_(NP)]\,]_V[\,[+spec\,]_N]_{NP}]_{VP}$$

1 2 ⟶

1 atw 2

where PM is the phonological member of the lexical set V. (Outside the lexicon, we interpret a given feature such as [+VP:_(NP)] as an indivisible unit, so that the

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[1]The combination of this ⟦i⟧ with the preceding ⟦w⟧ results in /o/ (see Rule 7 of 0.3.2). Evidently, all II stems end in ⟦i⟧; if this is so, we can account for it by spelling Rule 14 of the partial grammar above (2.1).

[1a]This rule and $T_{ps.i}$ below violate a constraint proposed by McCawley (1968, p.264) that contextual features not be inserted with lexical items and thus not present for transformations to refer to them. The model revisions we make in 4.5 allow us to conform to this constraint.

parentheses about NP are an integral part of this feature which was brought along from the lexicon when the verb was inserted. Thus [+VP:_(NP)] in this rule does not stand for either of the two features [+VP:_NP] or [+VP:_]. In the lexicon, on the other hand, such a feature is a condition on insertion, and the parentheses then mean that the NP may or may not be in the environment.)

These changes will enable our partial grammar to generate sentences (1a), (1b), and (1c), given a complete set of spelling rules.

Next we compare (2a), (2b), and (2c):

(2a) nita'kiaawa oma pokona
I-hit-⟶3 that-3 ball-3
'I hit that ball'

(2b) nita'kiihpa omi miistsisi
I-hit-inan that stick [+spec]
'I hit that stick'

(2c) nita'kiaaki (miistsii)
I-hit-intrans stick [-spec]
'I hit (stick(s))'

Common to these three is the inherently transitive root ⟦a'ki⟧. The process which forms a PsI stem from an inherently transitive root by addition of ⟦a:ki⟧ is also productive. The defining contextual feature for transitive roots which can be made PsI is [+VP:_NP]; thus we are assuming that such roots must have an object, but the speaker need not have a specific referent in mind for that object. When such a verb occurs without an object, as the parentheses in (2c) are intended to indicate is possible, we assume that one was present in the underlying structure of the sentence. To add the pseudo-intransitivizer ⟦a:ki⟧, we need a transformational rule:

$T_{ps.i}$ (pseudo-intransitivization)

$[\,[PM;\ ,\ [+VP:\_NP]\,]_V[\,[-spec]_N]_{NP}]_{VP}$

1 2 ⟶

1 a:ki 2

In addition to inherently PsI roots which can be transitivized, and transitive roots which can be pseudo-intransitivized, there are true intransitive roots which can never be transitivized;[2] thus (3b) is ungrammatical:

(3a) nitaopasoo 'I'm yawning'

(3b) * nitaopasooatawa ('I'm yawning at him')

[2] We ignore for the present the fact that other formatives such as benefactive, causative, etc., can combine with an intransitive verb root to form a transitive verb stem; such processes will be taken up in Chapter 3.

Likewise, there are pure transitive roots which can never be made pseudo-intransitive, i.e., must always have a [+spec] goal; so (4c) is ungrammatical:

(4a) nitainoawa 'I see him'

(4b) nitainiihpa 'I see it'

(4c) * nitainaki ('I see')

In summary, we have at this point four major types of verb roots, based on their potential for occurrence with a goal. These are listed below with the contextual features that define them:

1. Pure transitive [+VP:_NP:N:[+spec]]
2. Transitive [+VP:_NP]
3. Pseudo-intransitive [+VP:_(NP)]
4. True intransitive [-VP:_NP]

We shall say little more here that is conclusive about transitivity stem formation processes; however, it should be emphasized that while we have illustrated and provided in our partial grammar for the most productive of such processes, there are a large number of related pairs of transitive and intransitive stems which are not accounted for by the rules we have included in the grammar. Some pairs are unique, while others may be grouped together and accounted for by marking them in the lexicon as exceptions to T_{trans} which undergo other transformations[3] to extend the roots to their transitive forms under the proper circumstances; still other pairs are evidently partially suppletive. Examples follow:

intransitive stem		transitive stem	
⟦a:nIi⟧	'say'	⟦a:nItw⟧	'say to (TA)/say (TI)'
⟦I'nii⟧	'die'	⟦I'nitw⟧	'kill (TA)'
⟦nInixki⟧	'sing'	⟦nInixkixt⟧	'sing (TI)'
⟦a:'yi⟧	'point'	⟦a:'yIxkixt⟧	'point (TI)'
⟦ppIi⟧	'enter'	⟦pIxkixt⟧	'enter (TI)'
⟦wi:xpIxkii⟧	'paint faces'	⟦wi:xpIxkin⟧	'paint the face of (TA)'
⟦issapi⟧	'look'	⟦issamm⟧ / ⟦issa't⟧[4]	'look at (TA/TI)'

The last example calls attention to the difference between many TA and TI stem pairs. We noted earlier (fn 1) that all TI stems seem to end in ⟦i⟧; therefore we have not included this final ⟦i⟧ in the morphophonemic shape of TI stems above. But while this means TA and TI stems derived from intransitives by addition of

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[3] 'Minor rules' in terms of Lakoff 1965.

[4] There is an exasperating abundance of formatives in Blackfoot which, for some speakers, have long vowel, and for other speakers, vowel plus /'/; thus both isaaatsita and issa'taita are heard for 'look at it!'

[[atw]] do not differ in basic shape, there are many other apparently related TA and TI stems that have additional differences. A large number have /o/ added in the TA form (in some cases, this might be the short form of the benefactive formative--see Section 3.4--but in other cases this seems virtually impossible on semantic grounds), while others seem partially suppletive. Some examples follow (hyphenated -i is assumed to be the predictable ending):

TI		TA
[[I:n-i]]	'see'	[[I:no]]
[[IxkIn-i]]	'know/recall'	[[IxkIno]]
[[yooxt-i]]	'hear'	[[yooxto]]
[[wi:mai't-i]]	'believe'	[[wi:mai'to]]
[[a:'yIxkixt-i]]	'point at'	[[a:'yIxkoxto]]
[[pikkIst-i]]	'chew'	[[pikkIp]]
[[isi:kIst-i]]	'bite'	[[isi:kIp]]
[[pisati't-i]]	'be surprised at'	[[pisatimm]]
[[issa't-i]]	'look at'	[[issamm]]
[[a'pItw-i]]	'roll'	[[a'pimm]]
[[wikIstw-i]]	'count'	[[wikI]]

Those transitive roots which have the additional /o/ when their goal is of animate gender can be marked (by a syntactic feature) to undergo a 'minor' transformation that adds this /o/ under the proper circumstances. The same technique can handle the relatively small number of verbs that behave like 'chew' and 'bite' above,[5] and also the many like 'be surprised at' and 'look at'.[6] For most of these irregular roots the TI form must be entered in the lexicon and the TA form derived from it by the minor transformations that deal with these sub-classes of verbs, because the TI form occurs with derivational suffixes such as [[a:ki]]. Compare:

pikksipisawa	'chew them (an)!'
pikkstsitawa	'chew them (inan)!'
pikkstakita	'chew!'

We will term such roots TI stem-basic. But stems (such as 'count') which have (to my knowledge) idiosyncratic differences between TI and TA stem must either be entered twice in the lexicon (i.e., both TI and TA stems entered) or the lexical insertion rule must be modified to allow lexical entries which capture partial similarities. (The latter technique could deal with suppletive change from intransitive to

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[5] Taylor 1969.239 observes that all such verbs refer to action by mouth or teeth.

[6] See Taylor 1969.245.

transitive, as well.) As an example, the partial similarity between 'count (TI)', and 'count (TA)' might be captured by collapsing entries A_1 and A_2 below to give B:[7]

A_1 (wikI, [+V, +VP: _NP:N $\begin{bmatrix}+\text{an}\\+\text{spec}\end{bmatrix}$) 'count (TA)'

A_2 (wikIstw, [+V, +VP: _NP]) 'count (TI)'

B (wikI $\left|\begin{matrix}\emptyset\\ \text{stw}\end{matrix}\right|$, [+V, +VP: _NP:N: $\left|\begin{matrix}[+\text{spec}\\ +\text{an}]\\ \text{X}\end{matrix}\right|$])[8] 'count (T)'

There is another subgroup of verbs which, peculiarly enough, have intransitive and TI stems which are the same, but TA stems that have an additional ⟦t⟧:

I/TI	TA	
⟦aapikI⟧	⟦aapikIt⟧	'throw'
⟦ipikI⟧	⟦ipikIt⟧	'strike/pound'
⟦yiskIpI⟧	⟦yiskIpIt⟧	'tie up'

Note these examples with 'throw':

(5) nitaapiksi 'I threw'

(6) nitaapiksiihpa 'I threw it (inan)'

(7) nitaapiksistawa 'I threw him (an)'

These verbs also take the intransitivizing suffix ⟦a:ki⟧ added to the TA stem:

(8) nitaapiksistaki 'I throw'

Informants say (5) and (8) are equivalent, and I have no evidence to the contrary (both are PsI and may occur with non-specific objects). I see no way to account for the existence of both of these forms within our grammar, however.[9] But if we ignore forms such as (5) for the moment, we can enter the TA form as basic in the lexicon (to account for its use in derivatives such as (8)) and assume a minor transformation that removes the final ⟦t⟧ when the verb has an inanimate goal. We will term these roots TAstem-basic.

Another puzzling fact about this class of verbs is the length of the final consonant in TI imperative constructions:

(9) aapiksitta '(2) throw it!'

(10) aapiksikka '(2 pl) throw it!'

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[7] We are assuming a partially ordered lexicon; i.e., a convention will be available to indicate that certain entries are disjunctively ordered. Thus A_2 can be selected in all transitive environments except those specified in A_1. This is important because the A_2 form is the one that is found in derived stems: akstakita 'count'.

[8] We assume that the same ordering mentioned above holds in the vertical bars of the collapsed entry.

[9] The obvious possibility that (8) makes use of the TA stem because it assumes an underlying animate goal does not prove to be the case.

Most verbs other than those in this class add ⟦t⟧ in the singular imperative and ⟦k⟧ in the plural imperative forms; in fact, the intransitive imperatives of TAstem-basic verbs have the expected short consonants:

(11) aapiksistakita '(2) throw!'

(12) aapiksistakika '(2 pl) throw!'

A possible explanation for the long consonant in forms such as (9) and (10) is that the TA stem, being basic, is the one used as stem for TI imperatives. But the fact that we get (9) and not * aapiksistta is difficult to explain; it is apparently related to the fact that the rule which inserts /s/ in the environment ⟦I_t⟧ does not apply if the ⟦t⟧ is the imperative suffix.[10]

3.2. Purposefulness. Having treated transitivity derivation in 3.1, we are in a position to examine the relationships between the following four sentences:

(a) nitaisstsipisaaw amo ponokaomitaawa
I-dur-whip-→3 (TA) this-3 horse-3
'I'm whipping this horse.'

(b) nitaisstsipisaaki ponokaomitaai
I-dur-whip-PsI horse[-spec]
'I whip horses.'

(c) nitaisstsipisimaa ponokaomitaai
I-dur-whip-purp(PsI) horse[-spec]
'I whip horses (purposefully).'

(d) nitaisstsipisimataw amo ponokaomitaawa
I-dur-whip-purp-trans-→3 this-3 horse-3
'I whip this horse (he requires it).'

Sentence (a) is an ordinary transitive sentence made up of TA root ⟦Ixtipísi⟧ 'whip' inflected to agree with 'speaker' as actor and 'horse' as animate goal. That ⟦Ixtipísi⟧ is not a 'pure transitive' as we have defined them in 3.1 is shown by its occurrence in (b) with a [-spec] object and the consequent addition of suffix ⟦a:ki⟧ by T_{psi}. (c) is also a pseudo-intransitive and will usually be given the same English translation as (b) by informants. But the fact that (c) is a socially-safe utterance, while (b) attributes sadism to the speaker[11] makes it clear that the suffix ⟦(i)m⟧ adds a semantic component of valid personal motivation on the part of

[10] Taylor 1969 cites examples to the contrary which he elicited in Montana, but my informants (in Alberta) find them unacceptable.

[11] An informant was extremely reluctant to put (b) on tape, but did not hesitate to have his voice recorded saying (c).

the actor of the verb to which it is attached. Sentence (d), like (a), is transitive, but is secondarily derived from the PsI stem seen in (c) by addition of the transitivizer ⟦atw⟧.

Since nearly all verbs in my data which occur with the suffix ⟦(i)m⟧ also may occur with ⟦a:ki⟧, we shall assume that this suffix is added only to the class of verb roots we have called 'transitive' and to which we assigned the contextual feature [+VP:_NP].[12] Since in the model we are approximating, no semantically important choice may be made after lexical insertion,[13] the choice of this purposive element must be made before or during lexical insertion. It must be restricted to sentences with an object; and, whether pre-lexical or lexical in its origin, if it is picked before the verb is inserted we must then restrict the choice of verb to one with contextual feature [+VP:_NP]. This would seem to require marking all other verbs in the lexicon negatively for co-occurrence with this element; this could be done by a redundancy rule (see Chomsky 1965.166ff). Alternatively, if we can somehow make choice of the purposive element follow lexical insertion, we can very simply restrict its choice to sentences with verbs that carry the contextual feature [+VP:_NP]. This could be done by allowing a post-lexical, meaning-bearing feature rule. Such a feature rule would be simply: [+VP:_NP]→[±purposive]. To add the suffix ⟦(i)m⟧ we could then utilize a transformation:

$T_{purposive}$

$$[PM,; [+V, +purposive]]_V$$
$$1 \qquad\qquad 2 \longrightarrow$$
$$1(i)m \qquad\quad 2$$

(As in previous T-rules, PM is the phonological member of V.) We shall assume that some such solution will prove satisfactory and turn our attention to (d) above. Since ⟦ɨxtipísi⟧ is not a pseudo-intransitive root, a sentence with this root does not fit the structural description of T_{trans}; yet after ⟦(i)m⟧ has been added to a transitive root, the combination then behaves like a PsI root, occurring with [-spec] objects as in (c), and adding suffix ⟦atw⟧ when it occurs with a [+spec] object as in (d). Thus we need to modify T_{trans} so that a purposive verb with specific object will fit its SD:

T_{trans} (transitivization [revised])

$$[[PM;, [\begin{Bmatrix} +VP:\_NP) \\ +purposive \end{Bmatrix}]]_V [[+spec]_N]_{NP}]_{VP}$$
$$1 \qquad\qquad\qquad\qquad 2 \longrightarrow$$
$$1\ atw \qquad\qquad\qquad\quad 2$$

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[12] The few apparent exceptions I have found can possibly be explained away.

Taylor 1969.226,227 says that 'themes' with ⟦(i)m⟧ refer to unspecified animate objects, while ⟦a:ki⟧ themes refer to unspecified inanimate objects; however, I was unable to maintain that attractive hypothesis in my investigation of the syntax of such PsI verbs.

[13] See Chomsky 1965, pp. 135-6.

$T_{purposive}$ must precede T_{trans} so that the suffix ⟦(i)m⟧ is added before ⟦atw⟧.[14]
We will discuss the status and treatment of im verbs again in 4.5.2.

3.3. Coreferentiality Transformations.

3.3.1. Deletion. Under conditions similar to those which permit or require pronominalization in English, Blackfoot deletes underlying nominals. Consider the following portion of a narrative discourse:

(a) Ama ninaawa iito'tooyiihka.
there was man-3 there-arrived-narr-3

(b) Otai'noahsi omi aisokinakiyi,
3-when-see-conj-→4 that-4 doctor-4
itanistsiiyiihkayi,
then-say-narr-3-→4

(c) "Annaahka nitsi'nakotanahka iikstonnatsisttsiistomiwa.
that one-3 my-little-daughter-one-3 very-strongly-sick-3

(d) Noohkohpo'kiiyoota kaahkitssokinawa;
might-accompany-imper you-to-there-doctor-→3
aakitsayi'niwa."
fut-then-neg-die-3

Free translation:

'A man arrived (there). When he saw the doctor, he said to him, "My little girl is critically ill. Please come with (to her) to doctor her; then she will pull through."'

A referent is established in (a) by use of a demonstrative and third person verbal ending (homophonous with nominal ending) on ninaawa 'he's a man', and this same referent is actor for the accompanying independent verb 'there he arrived'. In (b), there is no overt NP as actor of 'when 3 saw 4' or of 'then 3 said to 4', because in both cases the underlying actor is coreferential with the actor in (a) and hence has been deleted (obligatorily for the first occurrence in (b) and optionally in the second). Likewise, aisokinakiyi 'doctor$_4$' is goal of two verbs in (b). Within the quotation (c), nitsi'nakotanahka 'my little daughter$_3$' is actor for 'she's very sick'. The same referent is goal for 'you to doctor her' and actor for 'then she won't die', but the underlying NP's have been deleted (both obligatorily, I think) from these clauses.

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[14] This is why we did not use a spelling rule to add the phonological shape of the purposive element. Alternatively, $T_{ps.i}$ and T_{trans} could each add an appropriately labeled feature (say, [+ps. intrans]) to the verb which would later be given a phonological shape by spelling rules. Then, rather than needing a T_{purp}, we could simply order a spelling rule for [+purposive] after those for [+trans] and [+ps. intrans]. (Recall that spelling rules add outermost affixes first.) See Section 3.R.

We will not here attempt to formalize transformations which will make such deletions, primarily because they have not been studied to any extent, but also because we will later look at a model of deep structure in which this phenomenon is viewed quite differently (see Section 4.6).

3.3.2. Reflexives.

(a) oma iimitaawa siiksipohsiwa
that-3 dog-3 bite-reflex-3 'that dog bit himself'

(b) nitainoohsi
I-dur-see-reflex 'I see myself'

Because transitive animate stems never occur with actor and overt goal which are coreferential, we assume that such underlying structures are obligatorily transformed into structures with no overt goal, such as those which lead to (a) and (b) above. Such a transformation would be:

T_{reflex} (reflexivization)

$$[[X]_{NP}; [[PM, \quad ; \quad X]_V; [X]_{NP}]_{VP}]_S$$

1 2 3 4 ⟶
1 2o:xsi 3 Ø

Condition: 1 and 4 are coreferential

All reflexive verbs are made up of a TA stem plus reflexive marker [[o:xsi]], and are inflected for actor only.[15] The underlying transitive structure must, then, still be transitive (i.e., a goal must still be present) when the verb root is inserted, because no true intransitive roots may be the (main) verb of such structures. But to account for the fact that reflexive verbs take intransitive inflectional affixes, we must order the reflexivization rule (T_{refl}), which obligatorily deletes the goal and adds the reflexive suffix when actor and goal are coreferential, before agreement transformations $T_{i-agree}$ or $T_{tr-agree}$ apply; otherwise, $T_{tr-agree}$ will add an ordered pair of feature matrices to the verb that will later be erroneously and incompletely spelled as TA inflectional affixes.[16]

If we take sentences such as (c) into account, we can show that T_{reflex} must apply after transformations $T_{purposive}$ and T_{trans}:

(c) nitsskonaakatohsi
I-shoot-trans-reflex 'I shot myself'

Example (c) shows us that T_{trans} must apply before T_{reflex} (i.e., while the underlying goal is still present), to account for the presence of transitivization suffix

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[15] See Frantz 1968 for further discussion of this construction and its generation.

[16] Of course, if we had other, overwhelming evidence for applying $T_{i-agree}$ and $T_{tr-agree}$ earlier, we could always add conditions to these transformations so that the former applied instead of the latter whenever underlying actor and goal are coreferential. But as things stand, we conclude that $T_{i-agree}$ and $T_{tr-agree}$ apply after T_{reflex} and after all lexical insertion.

[[atw]] (realized here as /at/) after root [[iskonaak]] 'shoot'.[17] And of course $T_{purposive}$, which we have already shown (Section 3.2) to precede T_{trans}, necessarily precedes T_{reflex}.

So far, we have shown that we must order our transformations as follows: $T_{purposive}$, T_{trans}, T_{reflex}, $T_{i-agree}$, and $T_{tr-agree}$ (these last two are mutually exclusive, but both must follow T_{reflex}). The place of $T_{ps.i}$ in this ordering is inconsequential.[18]

3.3.3. Reciprocals.

(a) awaa'psskatsiimiiwa amo nohkowa omi ninaayi
dur-bet-trans-3→4 this-3 my-son-3 that-4 chief-4
'my son_3 is betting that $chief_4$'

(b) otawaa'psskatsiimok amo nohkowa omi ninaayi
dur-bet-trans-3→4 this-3 my-son-3 that-4 chief-4
'that $chief_4$ is betting my son_3'

(c) awaa'psskattsiiyliaw amo nohkowa omi ninaayi
dur-bet-trans-recipr-3pl this-3 son-3 that-4 chief-4
'my son_3 and that $chief_4$ are betting each other'

Because (c) is a paraphrase of the conjunction of (a) and (b), we wish to consider whether the underlying structure of (c) might be equivalent to the two structures which underlie (a) and (b). Such a solution would neatly account for two facts about sentences such as (c): first, like reflexives discussed in the preceding section, they always make use of TA stems, even though they are always inflected for actor only; and second, they always have either a conjunction of more than one NP as in (c) or simply a plural NP, either of which requires plural inflectional affixes on the verb.

A transformation (call it T_{recipr})[19] which could account for such a relationship between (a) plus (b) and (c) would have to: (1) be optional; (2) require identity between actor of (a) and goal of (b), between goal of (a) and actor of (b), and between verb stem of (a) and verb stem of (b); (3) delete one member of each of these identical pairs; (4) add the reciprocal suffix [[Otiiyi]] to the TA verb stem;[20] and (5) be ordered at the same position as T_{reflex} for the same reasons stated above in determining the position of the latter.

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[17] In Chapter 4 we will be forced to use a different means of accounting for the presence of the suffix [[atw]] before the reflexive formative.

[18] See Chafe 1968, especially pp. 26-129, for a tentative proposal (for phonological rules) to order each rule at the latest possible point.

[19] See Frantz 1968 for such a rule and further discussion.

[20] The particular verb used as an example is slightly irregular in that the TA stem in (c) is the one used when the goal of 'bet' is the 'stakes' put up, rather than the other party of the bet as in (a) and (b). In 4.5 we make a proposal which can handle such problems.

3.R. At least twice above when we have chosen one of two or more alternative treatments, the choice had implications that were seen when we wanted to establish the correct ordering of the transformational rules we have thus far included.

In 3.2, we suggested in footnote 14 that T_{trans} and $T_{ps.i}$, rather than add suffixes directly to the verb, could add features that would later be spelled as ⟦atw⟧ and ⟦a:ki⟧, respectively. As we also indicated there, this would eliminate the need for $T_{purposive}$, since the sole reason for using a T-rule rather than spelling rule was to assure that its phonological realization, the suffix ⟦(i)m⟧, was attached to the verb root before the suffix ⟦atw⟧ was added by T_{trans}.

In 3.3.2, we pointed out that $T_{i-agree}$ and $T_{tr-agree}$ would not have to be ordered after T_{reflex} if we complicated them slightly so that $T_{i-agree}$ applied rather than $T_{tr-agree}$ whenever underlying actor and goal were coreferential.

In 3.3.1 we spoke of deletion under conditions of coreferentiality, but attempted no formalization of this little-studied but very familiar process. Let us suppose we had been able to write a rule or rules that accounted for it, and symbolize the supposed rule or rules by T_{delete}. Let us further suppose that T_{delete} is general enough to make the deletions we earlier accomplished in T_{reflex} and T_{recipr} (the latter involves a much greater supposition, since an entire VP must be deleted). If, then, we revise the latter two transformations so that they make no deletions and add [+reflex] and [+recipr], respectively, to the verb, rather than adding the actual suffixes, we can again rely on spelling rule ordering to take care of the relative order of these affixes with respect to the others we have discussed.

If we accept all the revisions mentioned so far in this discussion, we find that we need not order our transformations at all, except that T_{delete} must be last to apply. Is there any reason to favor such a formulation? We notice that we have eliminated $T_{purposive}$ but have added a corresponding spelling rule, and we have added conditions to $T_{i-agree}$ and $T_{tr-agree}$. Thus we probably have not gained or lost much in terms of simplicity as measured in number of symbols. Have we captured any linguistically significant generalizations in this formulation that were missed before? Probably only by making use of T_{delete} to simplify T_{reflex} and T_{recipr}, and we could have done that in the earlier formulation. We might argue that, other things being equal, a formulation that requires the least ordering is to be preferred ("more highly valued").[21] But no one, to my knowledge, has proposed a measure that would assign a relatively lower value (higher cost) to ordered T-rules than to unordered T-rules. Besides, for every ordering we eliminated from the T-rules we added a required ordering to the spelling rules. (There is a subtle difference here, though: the ordering of the spelling rules reflects only the temporal order of phonological realizations of formatives, while ordering of T-rules can be of much greater systematic import. E.g., when we observed that both lexical insertion and T_{trans} would have to take place in reflexive sentences before the underlying goal was deleted, this lent credence to our initial intuition that such sentences are, at base, transitive. Order of affixes, on the other hand, often seems arbitrary even though fixed.)

There is another factor we must consider in evaluating the relative merit of alternative formulations: their relation to universal grammar. Postal 1966 suggests

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[21] Chafe 1968.127 speculates briefly on this point with regard to phonological rules.

that reflexivization is a 'linguistic universal', i.e., to be "characterized within linguistic theory", and points out that his analysis of English self as a noun stem with features [+Pro, +Reflexive] rather than as a single formative contributes toward permitting a universal statement of reflexivization. He further says, "Reflexivization can be taken as that subtype of pronominalization relevant to identical NP within the same simple sentence structure at the point of proniminalization" (p. 202). Recall that we suggested above that NP deletion, which is the Blackfoot counterpart of English pronominalization, might account for the deletion portion of reflexivization. Thus our use of the feature [+reflex], splitting T_{reflex} into two processes, the first adding the feature [+reflex] and the second deleting the object NP, as well as our hope of accounting for the latter process by more general rules of NP deletion, seem 'well motivated' in terms of universal theory.

Most of the other points of indeterminacy mentioned in this discussion will no longer be relevant questions after the model revisions in Chapter 4.

3.4. Benefactives.[22]

Compare (a) and (b):

(a) nitohpommaa napayii

I-buy flour [-spec] 'I bought flour'

(b) nitohpommoawa nitakkaawa napayii

'I-buy-ben-→3 my-partner-3 flour [-spec]

'I bought flour for my partner'

Example (a) contains the PsI verb nitohpommaa 'I buy' and a non-specific object, as explained in 1.2 d. (b), on the other hand, has an additional object nitakkaawa 'my partner' as benefactee of the predication.

The verb in (b) is comprised of the same root [[wi:xpomm]] seen in (a) plus the benefactive derivational suffix [[o]]; the combination is a TA stem, and the benefactee 'my $partner_3$' functions as goal.

Study of many such constructions indicates that most are paraphraseable in English as 'actor benefits goal by S', where S is a sentence with the same actor and verb root as found in the Blackfoot construction. Thus (b) above is paraphraseable as 'I benefitted my partner by buying flour'.[23] (Notice that this paraphrase covers situations where the speaker is focusing on the eventual receipt of the flour by the benefactee, the purchase in lieu of purchase by the benefactee, of both.)[24] This suggests that even though the benefactive suffix only occurs attached to other verbs,

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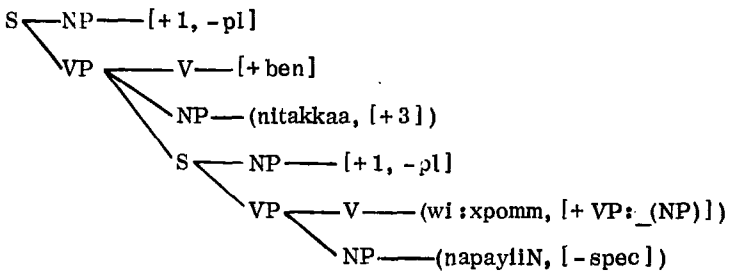
[22] See Taylor 1969, Sections 670, 694.

[23] We will see in Chapter 4 that not all surface occurrences of this formative signal action that benefits the goal.

[24] It also covers the situation where the benefactee is the seller, so that (b) can also mean 'I bought flour from my partner', but such usage may involve a different, though homophonous, derivational suffix.

it is actually the main verb of sentences such as (b). That is, we are led to consider an underlying configuration such as the following (greatly simplified one) for (b):



Notice that VP of the topmost S has three constituents, the third being an embedded S. We can provide for this quite simply by revising PS Rule 3' of Section 2.1 to read as follows:

3' VP → V (NP) (S)

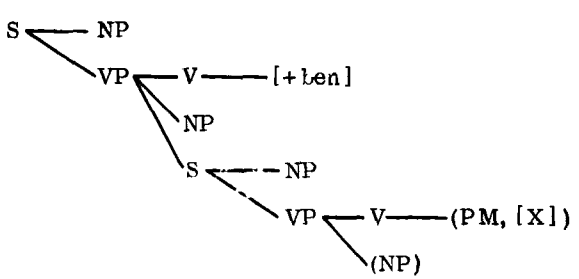
(This provision for S embedded in a VP can also be the source of verb complement clauses illustrated in 1.5.3.D.)

The lexical item [+ben] inserted as underlying main verb has no phonological shape at this point; it will be 'spelled' later. Because the surface configuration of such sentences has the underlying embedded verb as main verb, we need a transformation to replace the underlying main V by the V of the embedded S, at the same time retaining the feature [+ben] to later be spelled at the proper position in the surface verb. The same transformation can delete the actor of the embedded S (it must be coreferential with the actor of the matrix S). Call this T_{ben}:

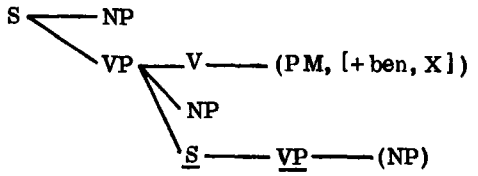
T_{ben} (benefactive verb attachment)

[[+ben];	NP	; [NP	: [(PM, [X])$_V$;	(NP)]$_{VP}$]$_S$]$_{VP}$
1	2	3	4	5 →
4+1	2	Ø	Ø	5

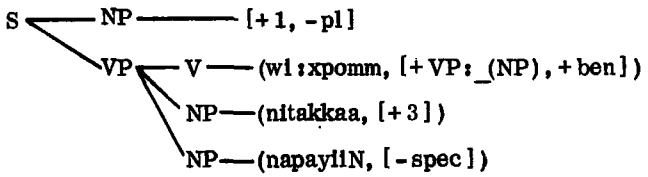
It applies to the class of trees represented by the following:



And transforms them to:



Metatheoretical conventions will delete the non-branching nodes (underlined) which did branch in the underlying structure.[25] The resultant structure after application to (b) above will be:



Agreement transformation $T_{tr\text{-}agree}$ will treat ⟦nitakkaa⟧ as goal[26] and add the proper features; these will later be spelled, as will the benefactive formative.

This treatment of sentences such as (b) entails the assumption that the surface verb is subcategorized in terms of the goal of the embedded S and not in terms of the surface goal. Such, indeed, is the case. Recall (3.1) that our major subcategoization of verbs was according to potential occurrence with an (underlying) goal. The same subcategorization scheme is applicable to verbs found in benefactive constructions only if we assume an underlying structure as shown above.

It would be a satisfying confirmation of our analysis to find that whether or not T_{trans} or $T_{ps.1}$ applied to verb roots in these sentences was dependent upon whether or not a [+spec] NP was present as goal in the underlying sentence. But such is not the case. Compare (b) [repeated here], (c), (d), and (e):

(b)	nitohpommoawa	nitakkaawa	napayii
	I-buy-ben-3	my-partner-3	flour [-spec]
(c)	nitohpommoawa	nitakkaawa	napayiini
	I-buy-ben-3	my-partner-3	flour [+spec]
(d)	nitohpommatomoawa	nitakkaawa	napayii
	I-buy-trans-ben-3	my-partner-3	flour [-spec]
(e)	nitohpommatomoawa	nitakkaawa	napayiini
	I-buy-trans-ben-3	my-partner-3	flour [+spec]

---

[25] This is Cook's generalization of Ross' 'tree-pruning' convention. See Ross 1966 and Cook 1968.132,133.

[26] ⟦napayiiN⟧ also satisfies the definition of goal VP:NP (or would were it [+spec]) but we will assume, for now, an ad hoc ordering of VP constituents. We will return to this problem in 4.1.

(The benefactive formative always has the shape /omo/ after the transitivization suffix.)[27]

All of these are acceptable sentences, though it appears that a given speaker will make use of either pair (b) and (c) or pair (d) and (e).[28] The only way to account for the existence of (d) is to order T_{trans} [which adds the transitivizing suffix present in (d) and (e)] after T_{ben}. Since all benefactive sentences have a [+spec] goal (the benefactee) at this point, we must make T_{trans} optional with [+ben] verbs to account also for (b) and (c).

We never find Transitive roots (subcategorized as [+VP: _NP] in 3.1) extended by ⟦a:ki⟧ in benefactive constructions. This is easily accounted for by ordering $T_{ps.i}$ after T_{ben}. Such verbs in benefactive constructions will never meet the SD of $T_{ps.i}$ because of the presence of the benefactee as goal. Thus while (f) shows that ⟦piiki⟧ is a transitive root, (g) is acceptable and (h) is unacceptable:

(f) nitaaksipiiksaaki

I-fut-chop-intrans 'I'll chop (wood)'

(g) kitaaksipiiksoomoo

2-fut-chop-ben-←1 'I'll chop (wood) for you'

(h) * kitaaksipiiksaaki(om)oo

2-fut-chop-intrans-ben-←1 (I'll chop (wood) for you')

Verbs discussed in 3.1 which are exceptions to T_{trans} generally add the benefactive suffix to the transitive stem:

(i) nitainihki 'I'm singing'

(j) nitainihkihtsiihpa 'I'm singing it'

(k) nitainihkohtomoawa 'I'm singing for him'[29]

Thus the minor rules which extend these roots apply after T_{ben}. The same is true of minor rules which apply to the TAstem-basic verbs of 3.1; the minor rules leave the verbs in their TA form because of presence of the animate benefactee as goal:

(l) nitaapiksistomoawa

'I-throw(TA)-ben-→3 'I threw for him'

We cannot in this way explain the behavior of TIstem-basic verbs in benefactive constructions, however. We find only the TI stem of these verbs in benefactive con-

[27] This longer form frequently occurs with unextended roots, also, usually as an alternant of ⟦o⟧ but perhaps exclusively with certain roots.

[28] Older speakers find (d) and (e) less acceptable.

[29] The mutation of /ixt/ in (j) to /oxt/ in (k) is difficult to explain; Taylor 1969.254 suggests that the stem has been shortened by haplology from ⟦ninixkIxkoxto⟧ which has common TA extension ⟦Ixkoxto⟧.

structions, no matter whether the embedded S in which they originate has an inanimate, animate, or [-spec] goal; note the following example, which we must assume has a [-spec] goal for 'chew' in the underlying configuration:

(m) nitsipikkstomooka

I-chew (TI)-ben-◄-3 'he chewed for me'

This suggests that we may have been wrong, at least with regard to TAstem-basic verbs, to explain their shape in benefactive constructions according to presence of the benefactee as goal. It seems, rather, that for the two subclasses of verbs, TAstem-basic and TIstem-basic, neither transitivity nor gender of goal is relevant when these verbs are inserted in an S dominated by [+ben]. Thus the minor rules which would adjust these stems according to their environments must not apply if the verb is [+ben].

Similarly, we could more briefly explain the doublets such as (b), (d) and (c), (e) above by requiring application of T_{trans} in the presence of the long form of the benefactive. This would require choosing between ⟦o⟧ and ⟦(i)mwi⟧ at an earlier stage, which in turn would seem to assume that they are not variants of the same root. And while no clearly stateable semantic difference between the two has yet been isolated, some difference does appear to exist with certain verbs: cf. nitaipasskoawa 'I sing/play so he can dance', and nitaipasskatomoawa 'I dance for him' / 'I put on a dance for him'.

3.4.R. We alluded above to the fact that the actor of the matrix S underlying benefactive sentences must be identical to, and coreferential with, the actor of the embedded S. Of course there is nothing in our PS rules or lexicon to prevent the existence of underlying sentences that fit the structural description of T_{ben} but do not have the coreferentiality requirement. If we add this coreferentiality condition to T_{ben}, sentences which do not fit this requirement can be 'filtered' out by the technique proposed by Chomsky in 1965.138; i.e., marked as ill-formed by the presence of boundary or other symbols that would have been removed had T_{ben} applied. But this means that our grammar will specify as ungrammatical in this way an infinite number of ungrammatical benefactive sentences for every grammatical one. This use of transformations as filters[30] is untuitively very inelegant and unsatisfying, perhaps primarily because in spite of oft-repeated warnings against doing so, we tend to think of generation as production. But a stronger objection can be made against this technique: it fails to express linguistically significant generalizations. The structures that underlie the ungrammatical sentences in question are ill-formed because they fail to meet a condition which can be stated explicitly.[31] In the case we are discussing, the condition is stateable as a property of the lexical item [+ben]. Until now we have assumed a lexical entry for this verb something like the following:

(____, [+ben, +VP: _NP: N: [+anl]S])

[30] As opposed to Lakoff's more general characterization of transformations as local derivational constraints which act as 'filters' (Lakoff [forthcoming]).

[31] Perlmutter 1968 demonstrates that many such conditions must be stated pre-transformationally, because the particular transformation which does the filtering might be ordered after an earlier transformation has transposed or deleted the crucial constituents.

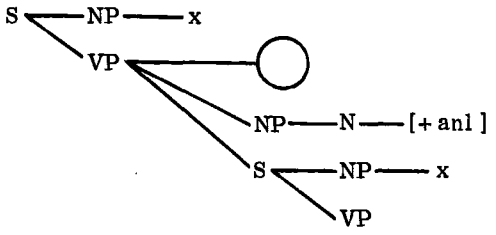
We can expand this to require the needed condition of identity:

$$(\text{\_\_\_}, [+\text{ben}, S: [NP:x]\,\hat{}\,VP:\_\,\hat{}\,[NP:N:[+\text{anl}]]\,\hat{}\,S:NP:x])$$

(We are now additionally using brackets to permit indication of concatenation of complex constituents which are themselves co-constituents of one category.) Were we to utilize labeled bracketing such as we have used in T-rules, the above lexical entry would be as follows:

$$(\text{\_\_\_}, [+\text{ben}, +[\,[x]_{NP}\,[\text{\_\_}\,[[+\text{anl}]_N]_{NP}[\,[x]_{NP}\,VP]_S]_{VP}]_S])$$

Both notations permit insertion of the abstract benefactive verb into the following structure at the circled position:



(We will assume a convention that in lexical entries, two or more occurrences of a small case letter represent identical--and in the case of NPs, coreferential--constituents.) The feature [anl] corresponds to the presumably universal feature [animate], as opposed to the language-specific gender feature [an] seen earlier. (All [+anl] are [+an], but not vice versa.)

In proposing that such conditions be a part of the base component, even as part of the contextual features of a lexical item, our grammar seems to violate a condition set out by Chomsky 1965.137: "When the base rules generate a Phrase-marker from an occurrence of S that is embedded in an already generated Phrase-marker, they cannot take account of the context in which this occurrence of S appears." The motivation for this restriction is not stated there.

A further criticism can be raised against Chomsky's use of transformations as filters. Chomsky defines deep structures as those structures generated by the base which underlie well-formed surface structures, i.e., those which are not filtered out by transformations. But then he states that the semantic component interprets deep structures generated by the base. If he means all structures generated by the base, this is absurd--the semantic component can not give any interpretation (not even an anomalous one) to structures that violate the kinds of conditions we are talking about. I assume he means 'deep structures' as defined above; i.e., those which underlie well-formed surface structures. But even if a grammar using the transformational filtering technique could generate (demarcate) the set of well-formed sentences of a language, it would not demarcate these for the benefit of the semantic component. To do so, the grammar would have to provide a procedure for retracing the transformational steps that led to a given surface structure; this would be, in effect, a procedure for finding the deep structure of a given sentence, which procedure Chomsky 1965.141 denies to be a part of the function of a generative grammar. Thus the filtering technique fails in another way.

See 4.3.2 for further discussion of constraints on underlying configurations.

3.5. Causatives.

3.5.1. Instrumentals. When an NP as instrument or means is involved in the predication, what we earlier (2.2.2) called the ablative prefix [[Mwi:xt]] is present on the verb which expresses that predication:[32]

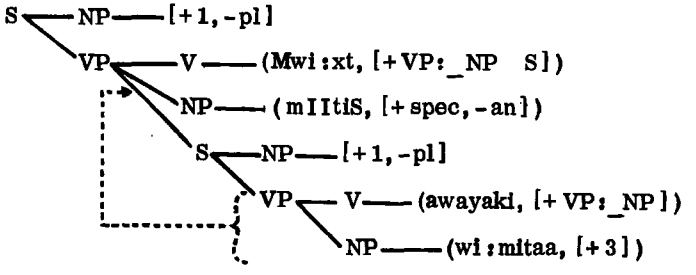
(a) nomohtawayakiaa' iimitaawa miistsisi

I-instr-hit-→3 dog-3 stick [+spec]

'I hit the dog with a stick'

Speaker is actor in (a) and 'dog' is goal; 'stick', of course, is the instrument. Because such sentences are usually paraphraseable in English as sentences which have 'use' as main verb—(d) could be paraphrased as 'I used a stick to hit the dog'—an underlying configuration with [[Mwi:xt]] as main verb seems reasonable:[33]

(b)



(The main and embedded actors must be coreferential.) As indicated by the dotted arrow, this configuration requires verb attachment, as did benefactive and causative configurations, but of a different type. Because the embedded goal must end up as surface goal, the entire embedded VP must be elevated to become a constituent of the main VP, with subsequent combination of the two verb roots into one stem and loss of the extra VP node. Tentative rules which will make these changes follow.

T_{instr} (instrument verb attachment)

[NP:	[[Mwi:xt]$_V$	; NP;	[NP;	VP]$_S$]$_{VP}$]$_S$	
1	2	3	4	5	⟶
1	2+5	3	∅	∅	

[32] The verb of (a) below has a variant /'/ of the [+3] suffix which often is used if the [+3] noun with which it agrees immediately follows the verb.

The /o/ of the first syllable in (a) is another case of the regressive assimilation accounted for by phonological Rule 5 of 0.3.2.

[33] See Lakoff 1968 for discussion of such a deep structure for English instrumentals.

We are not saying that 'use' is in any sense a possible translation of [[Mwi:xt]], but rather that the latter expresses the relation between an agent and an instrument that is apparent in the English paraphrase with 'use' (see 4.1.2).

V-consolidation[34]

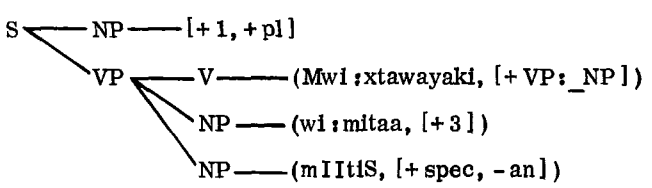
$$[\,[\,(PM,;[X])\;;\;[\,[\,(PM,;[X])\,]_V;(NP)\,]_{VP}\,]_V;NP\,]_{VP}$$

1 2 3 4 5 6 ⟶

(1+3, ∅ 4) ∅ ∅ ∅ 5+6

These rules convert (b) to (c):

(c)



(We have provided the resultant verb stem with the features of the originally embedded verb root, because they may determine applicability of later transformations.) Transitivity transformations will give the correct result if applied to these structures before the illustrated VP attachment takes place (unless they are embedded in sentences with certain other lexical items as main verb--see discussions under 3.4 Benefactives, 3.6 Comitatives, and 3.5.3 Instigative Cause).

3.5.2. Non-Instigative Cause. A non-instigative cause of a predication is also indicated by the prefix ⟦Mwi:xt⟧ (here glossed 'result') on the verb expressing that predication:

(a) niistoyi iihtoki'takiwa[35]

I result-angry-3

'I made him mad / he was angry on account of me'

(b) nomohtaihpiyi ninaawa

I-result-dance chief-3

'the chief made me dance / I danced for the chief'

(c) aohkiyi iihtsisttsiistomiwa aakiiwa

water [+spec] result-sick-3 woman-3

'the water made the woman sick'

niistoyi 'I', ninaawa 'chief', and aohkiyi 'water' function as non-instigative cause in (a), (b), and (c), respectively. The other participant ('he' in (a), 'I' in (b), and 'woman' in (c)) is actor in each case.

Instrument and non-instigative cause are semantically very closely related, the

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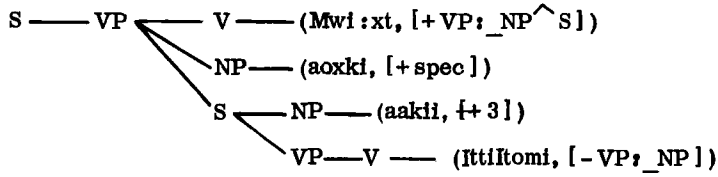
[34] The parentheses in the SC enclose a two-membered lexical set, as usual.

[35] See discussion in 2.3 concerning the suffix /yi/ on niistoyi.

former assuming an agent and the latter occurring without an agent.[36] Add to this the fact that both require a prefix [[Mwi:xt]], and it would seem reasonable to posit similar underlying configurations for them. Taking (c) as representative, we suggest an actorless structure which is otherwise like the structures assumed for instrumentals in 3.5.1:[37]



While we wish to have the embedded verb attach to the main verb, we do not want to delete any NPs; in addition, we must raise the embedded actor to surface actor position, because aakiiwa 'woman' is actor in (c). In other words, we need a rule something like the following:[38]

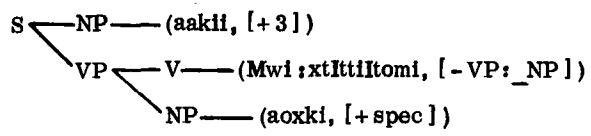
$T_{n-i,cs.}$ (non-instigative cause verb attachment)

$$[\,[\,[\,\text{Mwi:xt}\,]_V;\text{NP};[\,\text{NP};\text{VP}\,]_S\,]_{VP}\,]_S$$

$$1 \qquad 2 \quad 3 \quad 4 \longrightarrow$$

$$3[\quad 1+4 \quad 2 \quad \emptyset \quad \emptyset \quad]_{VP}$$

V-consolidation (3.5.1) and the pruning conventions will complete the changes to give us the following:



There is just one problem: aoxki 'water' now meets the definition of goal and will cause $T_{tr-agree}$ to add its features to the verb. But the verb is intransitive and 'water' is <u>not</u> goal in (c).[39] We could prevent this by adding conditions to $T_{tr-agree}$ and $T_{i-agree}$ so that the latter and not the former applies when the verb is [-VP:_NP], but this would not solve the problem in cases where the originally embedded verb is what we have termed either PsI or Transitive. Several ad hoc devices come to mind, but none meets the real problem: we have structural ways to

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[36] See Langendoen's discussion of the relationship between instrument and cause roles--Langendoen 1970 (Chap. 4); Fillmore 1968a equates the two.

[37] The embedded verb [[IttiItomi]] is made up of two roots, but this has no bearing on this discussion.

[38] This rule and T_{instr} could be combined into one rule with alternative conditions and corresponding changes, but due to problems that arise below we will not carry out this combination. In Section 4.1.3 we will see that rules of much greater generality account for these structures.

[39] The same problem will arise in instrumental sentences (3.5.1) if the embedded verb is intransitive; we put off discussing the problem until now by using an example there with a transitive embedded verb.

define and distinguish only two functions, actor and goal, while there are other functions that can be filled by NPs. We return to this problem in 4.1.

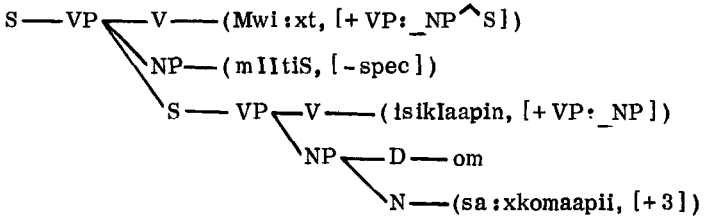
How do sentences such as 2.2.2(b) [repeated here as (d)], which we said have no actor in either deep or surface structure, fit into this picture?

(d) [= 2.2.2(b)]

iihtssiksaapinawa	oma	saahkomaapiiwa	miistsii
instr-blacken eye-→3	that-3	boy-3	stick [-spec]

'a stick blackened that boy's eye (gave him a black eye)'

We can assume that the underlying matrix and embedded sentences are both actorless:[40]



In such cases, the embedded goal will end up as surface goal, just as was the case in our instrumental example [3.5.1(a)]. And if we somehow allow for unidentified participants in deep structure, we can account for the ambiguity of (d): if there is no underlying actor, the semantic role of 'stick' is non-instigative cause, whereas if an actor (as agent) is assumed, even though not specified, the role of 'stick' is instrument. See 4.1.3 for further discussion.

3.5.3. Instigative Cause. Although more remains to be investigated on this subject than is understood, we will look at several sentences in which the actor is the [+anl] intentional cause of an underlying sentence.

Consider first (a) - (d):

(a) nitaohpommaaplooka niksissta

I-dur-buy(PsI)-cause-←3 my-mother-3

'my mother is making me buy'

(b) nitsiikstakiipiaawa nitana mamiiksi

I-count-intr-cause-→3 my-daughter-3 fish-pl

'I made my daughter count the fish'

(c) nitaohpommattsooka niksissta

I-dur-buy(PsI)-cause-←3 my-mother-3

'my mother is making me buy'

[40] The fact that [[isikIaapin]] is itself made up of two roots is irrelevant to the discussion. We could substitute any transitive verb capable of occurring with an instrument.

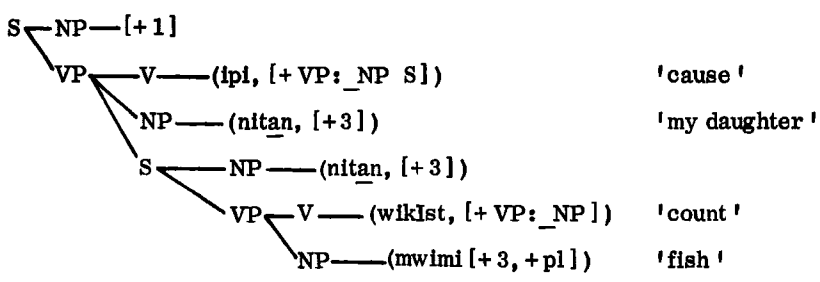
(d) nitsiiikstakiattsaawa nitana mamiiksi
I-count-intr-cause-→3 my-daughter-3 fish-pl
'I made my daughter count the fish'

(a) and (b) show the causative suffix ⟦ipi⟧, while (c) and (d) differ from (a) and (b) only in that they have instead the causative suffix ⟦atti⟧. These formatives are always added to intransitive stems, whether basic, as in (a) and (c), or derived, as in (b) and (d), even in cases such as (b) and (d) where the non-causative counterpart would require a transitive stem because of the presence of a [+spec] object. In all cases, the cause is actor and the undergoer of the cause is surface goal. Thus in (b) and (d) the speaker is actor and 'my daughter' is goal.

It is difficult to determine just what the semantic difference between these two causatives is; it may be that ⟦ipi⟧ is the more specific, including a semantic component of more direct[41] personal influence on the surface goal (underlying actor of the predication), while ⟦atti⟧ covers more general responsibility for the action or state of the surface goal. If this is correct, the truth of a sentence using causative ⟦ipi⟧ would entail the truth of the same sentence with ⟦atti⟧ substituted for ⟦ipi⟧, a situation which would explain the difficulty of determining the semantic difference in the first place.

Whatever the differences between these two formatives, both require a [+anl] surface goal. This suggests that the influence of the cause is directly upon the surface goal,[42] a relationship which could be captured by the following underlying configuration (with (b) as an example):

(b')



The actor of the embedded S must be coreferential with the goal of the matrix S; the latter has the causative as its main verb, while the former has the other member of the surface verb stem as its main verb. To map this into its surface form we require a transformation:

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[41] Attached to directional preverbs (4.4.2), ipi translates as 'bring' or 'take'.

[42] In the case of ⟦ipi⟧, at least. There is some semantic evidence that ⟦atti⟧ does not always involve influence directly upon the surface goal: nitohkoyo'kattsaawa 'I provided him a place to sleep'; cf. iihkoyo'kaawa 'he has a place to sleep'; both contain the root ⟦wi:xko⟧ 'have the wherewithall for'. Thus the underlying structure of causatives with ⟦atti⟧ may have no goal in the matrix S, but the embedded actor is 'elevated' (see 3.7) to matrix goal status before T_{cause} applies (see below).

T_{cause} (causative verb attachment)

$$[\,[\ \left\{\begin{matrix}\text{ipi}\\ \text{atti}\end{matrix}\right\}\ ]_V;\ NP;\ [\,NP;\ [\,[X]_V;\ (NP)\,]_{VP}\,]_S\,]_{VP}$$

1	2	3	4	5 ⟶
4+1	2	∅	∅	5

This rule combines the two verbs, and deletes the embedded actor (identical to matrix actor).

It remains unexplained how to account for the required intransitive form of the embedded verb. In the case of PsI verb roots, the presence of the causative somehow blocks the application of T_{trans} (see 3.1) which must, then, be ordered after T_{cause}. But what about Pure Transitives and Transitives? Obviously, our earlier statement that the causatives are added only to intransitive stems rules out their occurrence with Pure Transitives, for the latter cannot be intransitivized; the contextual features of the causatives must forbid their domination of Pure Transitives. Transitives, on the other hand, never appear in these constructions without intransitivization suffix ⟦a:ki⟧, yet there is no stage in the derivation of sentences such as (b) and (d) when these verbs occur with a [-spec] goal to meet the SD of $T_{intrans}$ which adds ⟦a:ki⟧ (see 3.1). For now the best we can do is add an alternative condition to $T_{intrans}$ that makes it applicable to transitives in causative constructions whether or not a goal is present.[43]

A related but even more serious problem is offered by idiosyncratic verbs such as 'count' in (b) and (d). Recall (from 3.1) that because the TA form of this verb is the 'marked' one and the difference between this marked form and its form elsewhere is not according to regular rule, we proposed making use of lexical insertion to select the proper shape according to context. But here we see that the context of the embedded verb of (b') would erroneously require the TA form, showing that the lexical insertion technique of handling this partial suppletion fails under the present formulation.

We will look at the above problems again in 4.1, as we consider a different formulation. For now we will just observe that while selection of a root must be made in terms of underlying context, it seems that neither applicability of transitivity transformations to regular roots, nor selection of a particular stem allomorph in the case of irregular roots, can be determined until after verb attachment rules have applied. Moreover, the following construction[44] seems to confirm that the addition of ⟦a:ki⟧ to transitive verb roots has nothing to do with transitivity when they are embedded in causative structures but is simply automatic before the causative formative:

nitaokstakiipiaaki

I-dur-count-intrans-cause-intrans

'I'm having (someone) count'

---

[43] This would be more easily expedited if T_{cause} added features corresponding to the causative formatives (to be spelled later, as in the case of [+ben]) rather than the phonological shape of the formative.

[44] Such constructions were brought to my attention by Allan Taylor.

This construction has two occurrences of the intransitivization suffix. The last one is easily accounted for by application of $T_{intrans}$, assuming an underlying [-spec] goal of ⟦ipi⟧ 'cause' in the matrix sentence. But the first occurrence of ⟦a:ki⟧ is evidently conditioned by the presence of the causative, irrespective of presence or absence of a goal in the embedded S. Similar constructions are possible with ⟦atti⟧.

Some other constructions which seem to involve an instigative cause, but which will not be dealt with in this thesis, are illustrated by (e) - (h).

(e)	nitssiksinawa	'I blackened him'
	(cf. siksinamma	'he's black')
(f)	nitaakssootamssta	'I'll make it rain'
	(cf. aakssootawa	'it's gonna rain')
(g)	nitssetoohtoohpa	'I chilled it'
	(cf. isstoyiiwa	'it's cold')
(h)	nitsiiksistohsiihpa	'I heated it'
	(cf. ksiistoyiiwa	'it's hot')

Example (e) illustrates what is probably best treated as containing an 'abstract predicate'[45] CAUSE (and possibly also another abstract predicate DEVELOPMENTAL or INCHOATIVE) which has no surface realization. All examples at hand of this kind have goals of animate gender. (f) evidently has what is semantically equivalent to CAUSE with an S made up of a meteorological verb; all of the examples I have seen of this construction are meteorological. (g) and (h) evidently have different realizations of the combination of CAUSE and DEVELOPMENTAL predicates.

3.6. Comitatives.

compare (a), (b) and (c):

(a) nohkowa nitsowatainnaanini aattsistaayi

my son-3 I-eat-trans-→1 pl-4 rabbit-4

'my son and I ate the rabbit'

(b) nitohpoksoyiima' nohkowa aattsistaayi

I-accomp-eat-→3 my-son-3 rabbit-4

'I ate the rabbit with my son'

(c) nitohpoksoyiimoka nohkowa aattsistaayi

I-accomp-eat-←3 my-son-3 rabbit-4

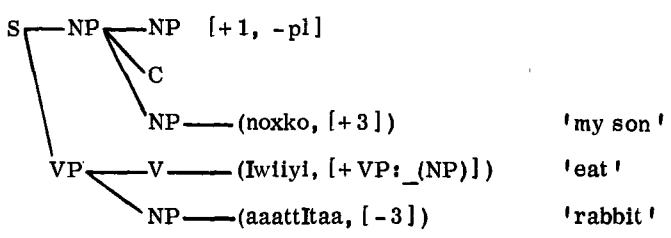
'my son ate the rabbit with me'

---

[45] See Lakoff 1965, and Langendoen 1969.105.

Sentence (a) has 'my son$_3$' and speaker conjoined as actor, as evidenced by the first person prefix and the 1 pl suffix on the verb, even though there is no other indication of the speaker's involvement. (If the so-called independent first-person pronoun were present [for emphasis, as explained in 1.1 and 2.3.2], the conjunctor /ki/ would be required between it and the coordinate noun nohkowa.) Thus at some stage in the derivation of (a), we must assume configuration (a') [simplified]:[46]

(a')



That is, the actor NP is made up of three constituents: two NPs and a conjunction. Because it is the sum of the features of the conjoined constituents which determines the verbal person affixes (in this case [+1, +3]⟶[+1, +pl]), we must have rules to sum the features of all head nouns dominated by the top-most NP as actor or goal, respectively, and these features must be added to that top-most NP. Then the agreement transformations must be modified to carry features of these NPs, rather than of the constituent nouns as earlier formulated, to the verb. Although such modification of $T_{i\text{-}agree}$ and $T_{tr\text{-}agree}$ will offer difficulty, it appears to be a purely mechanical problem and so we will not take time to attack it here.

(The question whether (a') is basic, or derived from two conjoined sentences with speaker and 'my son$_3$' as respective actors by a 'conjunction reduction' transformation,[47] has no bearing on the discussion at this point.)

Sentences (b) and (c) have comitative verbs, or 'verbs of accompaniment',[48] made up of the discontinuous, dependent root ⟦wi:xpok+ im⟧[49] plus the PsI root ⟦(I)wiiyi⟧ 'eat'. They are semantically similar to (a) in that both (b) and (c) entail (a); i.e., both (b) and (c) tell us that the speaker and his son partook of a particular rabbit. They differ from (a), however, in that they additionally tell us that one of the participants, the speaker as actor in (b) and the son as actor in (c), was instigator of the accompaniment; in each case, the other participant is goal.

The semantic interpretation described in the preceding paragraph can be accounted for by positing (b') as the (simplified) underlying configuration for (b):

---

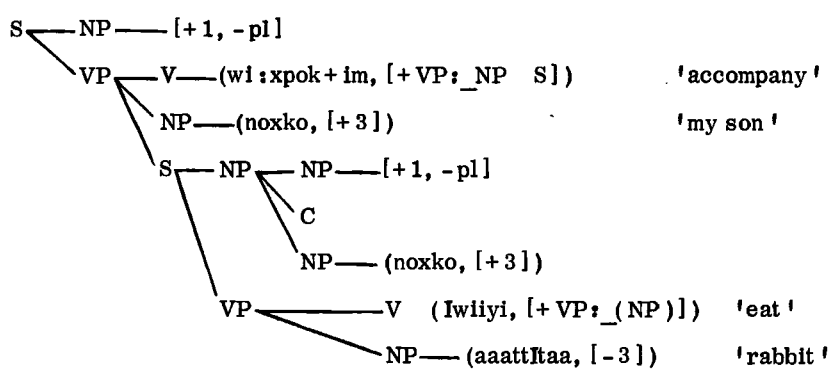
[46] The reason for loss of the final syllable ⟦yi⟧ of the verb root 'eat' before transitivization suffix ⟦atw⟧ is added [as in (a)] is not clear. Evidently it is the intransitive 'theme' ending (see Taylor 1969).

[47] See Langendoen 1969.88-95, for a brief discussion of conjunction reduction.

[48] Cf. Bloomfield's mention of the cognate construction in the central Algonkian languages--Bloomfield 1946.113.

[49] Forms with 12 actor, which translate 'we...together' make use of ⟦wi:xpok⟧ as an attributive root; perhaps the underlying source of these constructions has the same structure as the sources of those treated here.

(b')



Notice that the embedded S of (b') is identical to the underlying configuration assumed for (a); this corresponds to our earlier statement that (b) entails (a). It also neatly accounts for selectional restrictions on both the actor and goal of comitative verbs. For example, an S with a comitative verb built on the verb root ⟦yoomi⟧ 'marry' would be internally contradictory unless both surface actor and goal are female, since ⟦yoomi⟧ is an intransitive root that requires (presupposes) a female actor. Thus (e) and (f) are internally contradictory for the same reason that (d) is:

(d) * ni'sa akayoomiwa
'my (older) brother is married (has a husband)'

(e) * ni'sa iihpokoomiimiiwa ninsstsi
'my (older) brother got married (in accompaniment) with my (older) sister'

(f) * ninssta iihpokoomiimiiwa ni'si
'my sister got married with my brother'

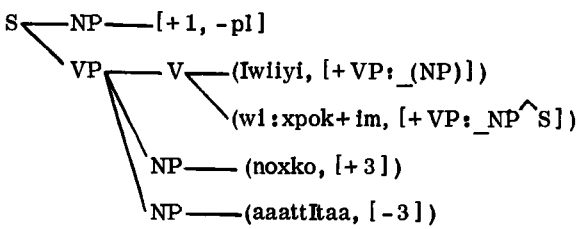
A transformation that would apply to (b') to give us the derived configuration (g) (which will eventually lead to (b)) is as follows:

Tcom

$$[\,[\text{wi:xpok+im}]_V;\ \text{NP};\ [\text{NP}\ ;\ [[\text{X}]_V;\ (\text{NP})]_{VP}]_S]_{VP}$$

1	2	3	4	5 ⟶
4+1	2	∅	∅	5

(g)



We will assume that a later rule will move the first portion of the discontinuous accompaniment verb to stem-initial position.

Like the causatives ⟦ipi⟧ and ⟦atti⟧ (3.5.3), the accompaniment verb occurs only with intransitive stems, and the same problems exist regarding a technique to assure the correct form of the embedded verb.

The actor and goal of the matrix S must each be coreferential with a constituent of the complex actor NP of the embedded S; we can account for this by a restriction on insertion of the dependent root ⟦wi:xpok+im⟧:[50]

(wi:xpok+im, [+V, +S: [NP: x]^VP: [_^[NP: y]^S: [NP:[NP: x]^C^NP: y]^VP])

or, using labelled bracketing, the contextual feature will be expressed as:

$$[\,[x]_{NP}[\_[y]_{NP}[\,[x]_{NP}C\,[y]_{NP}]_{NP}{}^{VP}]_{S}]_{VP}]_{S}$$

Like the benefactive and the ⟦atti⟧ and ⟦ipi⟧ causative predicates, the commitative predicate requires that the goal of the matrix S be [+anl].

Comparing T_{ben}, T_{cause}, and T_{com}, we find that they are quite similar in that they all move an embedded verb to the main verb position. This suggests that there is a bona fide class of dependent verb roots, all of which require a [+anl] goal, an embedded S, and transformation by a rule which moves the embedded verb to main verb position. If there are many such verbs, their common contextual restrictions need not be entered in the lexicon, but stated once for all verbs of this class; their lexical entries will then contain a feature indicating this class membership. And, of course, instead of a different transformational rule for each of these verbs, we should hope to have one rule general enough to cover all of them and which will apply only to sentences containing such dependent verbs in main verb position. In fact, comparison of T_{cause} and T_{com} reveals that they are identical (except, of course, for the causative or accompaniment verbs themselves) and must be combined. T_{ben}, while it has much in common with the others, deletes a different NP and so cannot be directly combined with them unless we treat the deletion portion of these rules as a separate step. (Later we will see that the transformation that moves an embedded verb root into main verb position is quite general--see 4.1.4 and 4.3.3.)

But as they stand now, what is the place of T_{com} with regard to some of the other transformations we have discussed? (i) would seem to indicate that T_{cause} precedes T_{com}, as the latter is formulated, because the ⟦ im⟧ portion of the comitative formative follows the causative formative:

(i) nitohpoksoyattsiima' nohkowa niistoyi
I-accomp-eat-cause-→3 my-son-3 my-self[51]
'I made my son eat with me'

However, T_{cause} cannot precede T_{com}; the only configuration that matches the semantic interpretation of (i) has the accompaniment verb subordinate to the causative verb:

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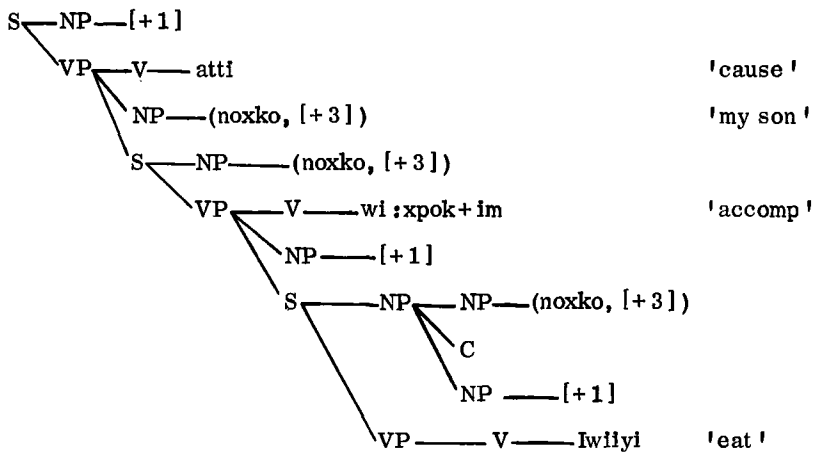
[50] Obviously, this solution rules out the possibility that the embedded conjunction is the result of 'conjunction reduction' (see fn 47), and so our PS rules must allow for coordinate NPs.

[51] See 2.3.2 concerning the suffix /yi/.



And in a configuration with multiple embedding such as this, verb attachment must apply first to the verb of the most deeply embedded S; otherwise, the result will not meet the SD for a second application of verb attachment. Since this means that T_{com} will apply first, perhaps it should attach the embedded verb to the right of the discontinuous accompaniment formative, with movement of the ⟦im⟧ portion to stem final position after T_{cause} has applied. (This would make combination of T_{cause} and T_{com} a bit more complicated, but not prohibitively so.) What is important to see here is that because verb attachment always applies to the most deeply embedded S first, it is not relative ordering of T_{com} and T_{cause} that we must establish for our grammar, but restrictions on dominance relations between sentences containing these verbs. An underlying structure with the accompaniment verb dominating an S with a causative verb is illformed, i.e., does not correspond to any acceptable sentence in Blackfoot. I see no way to introduce this condition under the model we are following.[52] Nor is this problem limited to co-occurrence of these two verbs. Causative and benefactive verbs must not co-occur, nor may benefactive and accompaniment verbs co-occur. We will take up these problems again in 4.3.2.

3.7. Possessor Elevation and Noun Incorporation.

(a) ? nitssiksiihpa oma ninaawa o'kakini
I-break(TI)-it that-3 man-3 his-back[+spec]

(b) nitssiksisstoaw oma ninaawa o'kakini
I-break(TA)-→3 that-3 man-3 his-back

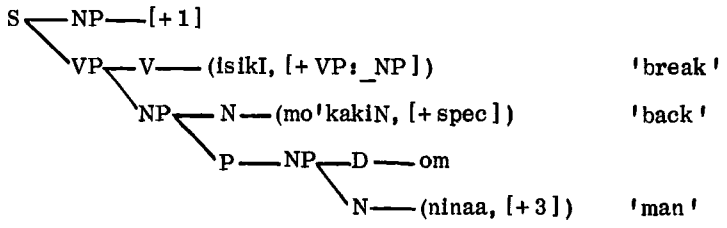
(c) nitssiko'kakinaw oma ninaawa
I-break-back-→3 that-3 man-3

(a), (b), and (c) all translate as 'I broke the man's back'. All three have the agent of the breaking (the speaker) as actor. But in (a) 'back' is goal, while in (b) and

[52] As pointed out earlier (3.4R), Chomsky 1965.137 expressly forbids that the expansion of an embedded S take account of its context.

(c), the affected participant whose back is broken ('man') is goal. Because the back is, after all, what is broken, sentence (a), in which 'back' is goal, could probably be given a more direct semantic interpretation. We propose then, the following as the tentative configuration underlying all three examples:

(a')



While informants say that (a) is a 'correct' sentence, they nevertheless consider it odd. Normally, the possessor of the back, who is quite personally affected (to say the least!) by the predication is, for purposes of agreement and transitivity transformations, elevated[53] to goal status. A transformation must carry out this elevation. The same transformation will be applied less frequently in the case of a large number of other situations where the possessor is affected in a less personal way.[54] E.g., both (d) and (e) translate as 'I broke my son's axe':

(d) nitssiksimaayini nohkowa otohkaksaakini
I-break(TA) -4 my-son-3 his_3-axe-4

(e) nitssiksisstoawa nohkowa otohkaksaakini
I-break-ben?-→3 my-son-3 his_3-axe-4

But 'axe[4]' (animate gender) is goal in (d), and the possessor of the axe is goal in (e).[55]

The following rule can account for this difference:

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[53] 'Promoted' is Fillmore's term for a similar phenomenon in English. See Fillmore 1965a, Sect. 5.3.

[54] It could be argued that application of this transformation in the clearly optional cases has some semantic effect, and that effect is precisely to highlight the personal affect of the predication upon the possessor. (Cf. the choice, open to a child seeking 'justice', between 'Johnny hit my stomach' and 'Johnny hit me in the stomach'.) Grimes 1968 (Sect. 2) suggests that any option open to the speaker is meaningful to some degree, and proposes that 'parameters' which include the probability pattern of a set of transformations (in this case, possessor elevation and identity [=no change] comprise the set) be part of the base component of a grammar. While Grimes' discussion is apparently intended to be suggestive only and is therefore sketchy, he does say that each parameter is "a special kind of lexical element" and has "a meaning in terms of style or genre". In addition to the meaning, a parameter has "an indication of the transformations to which it applies", "a probability vector with one component for each transformation in the set and probability values that sum to 1", and "a predicate-like specification that allows the parameter to be incorporated into a derivation" (p. 18).

[55] The /o/ on the verb in (e) is probably the short form of the benefactive (3.4), but this is a transformationally introduced occurrence of that formative, and plays no part in the semantic interpretation of this sentence (though it can be brought to the attention of a native speaker, usually eliciting an amused response).

$T_{poss.elev}$ (Possessor Elevation)

$[_V; [_N; [_{NP}]_P]_{NP}]_{VP}$

1 2 3 ⟶

1+3 2 ∅

(Applicability is a function of 1 and/or 2.)

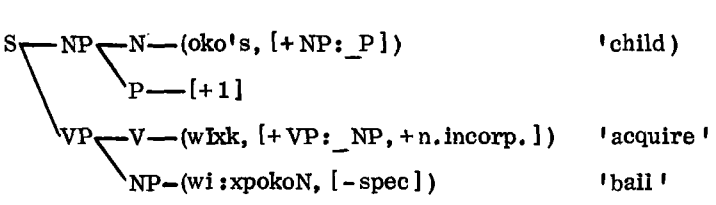
Returning now to (c) we see that 'man' is still goal, but that 'back' has become as part of the verb stem.[56] This process is possible with only a relatively small number of verb roots. It is optional in the case we are discussing, but obligatory where the verb is a 'dependent' root, as exemplified in (f).

(f) ihpokonsskaawa nokoʻsa

ball-acquire-3 my-child 'my child got a ball'

On the surface, (f) is intransitive, with 'my child' as actor. But the verb stem is made up of two roots, ⟦wi:xpokoN⟧ 'ball' and ⟦wɪxk⟧ 'acquire'. If we posit underlying structure (f'), the same transformation assumed to relate (b) and (c) above (call it 'noun incorporation')[57] can convert (f') to (f), except that in this case the rule is obligatory.

(f')



Notice that the underlying goal is [-specific]; the resultant surface structure is neutral for number of items required. (If the underlying goal were [+specific], it could remain as an adjunct after being copied into the verb.)

But now compare (f) with (g):

(g) nitohpokonsskoawa nokoʻsa

I-ball-provide-⟶3 my-child-3

'I provided my child with a ball'

In (g), 'my child' is now goal and speaker is actor. The verb of (g) differs from that of (f) in that the former is transitive animate. It has been extended by a suffix /o/, which could be the short form of the benefactive (see 3.4); however, if we consider it to be such we will be hard-pressed to explain the resultant meaning of the stem. Recall that we paraphrased benefactive constructions as "A benefits B by A

[56] It is possible for 'his back' to remain as an adjunct, even though copied into the stem, but this is very rare.

[57] Despite the fact that in Blackfoot it is a much more restricted process than what goes by that label in other Amerindian languages.

doing X". Since the meaning of intransitive constructions with ⟦wIxk⟧ (such as (f)) is "A acquires C", the corresponding benefactive with B as benefactee should be paraphraseable as "A benefits B by A acquiring C". But this is not quite a correct paraphrase of transitive construotions with ⟦wIxk⟧ such as (g), since it does not entail the ultimate acquisition of C by B, which is part of the meaning of (g).[58] Were we to consider the actor of transitive constructions with ⟦wIxk⟧ to be the actor of an underlying abstract causative verb which dominates a sentence with ⟦wIxk⟧, we would be a little closer to a configuration that accounts for the meaning of such constructions; but is it necessary to posit such an underlying abstract verb here?

Let us look again at the meanings of (f) and (g). (f) is a true statement in any situation where the child acquired the ball by manufacturing, buying, finding, inheriting, stealing, or otherwise having it come into his possession. (f) is true whether the speaker gave, sold, or traded the ball to, or otherwise effected possession of the ball by his child. Thus the underlying participants of sentences such as (f) are two: the one who experiences the acquisition, and the object that is acquired. Sentences such as (g) also have the experiencer and the object, but in addition there is an agent who instigates the acquisition. This additional participant, the agent, is involved in essentially the same way as participants we have earlier characterized by this term. Relating these facts to the form of (f) and (g), we can simply observe that besides obligatory incorporation of the object, the verb ⟦wIxk⟧ selects the experiencer as actor unless there is also an agent involved, in which case the agent becomes actor and the experiencer is goal; the root ⟦wIxk⟧ is extended by addition of ⟦o⟧ in the latter 'transitive' context. Thus while we find the categories actor and goal necessary at some point in the derivation of these sentences, we find them usable for expressing underlying configurations of (f) and (g) only if we either ignore the relationship between these sentences or posit an abstract verb, the main function of which is to define agent. But if we were to define agent in this way here, why not so define it at every occurrence? In Chapter 4 we will propose that not only should participant roles (such as agent, experiencer, object, etc.) be indicated somehow, but that they, rather than actor and goal, are the functional notions which must be defined in underlying structure.

Before leaving this section, let us look at another pair of related sentences which add support to the non-basic status of actor and goal. Compare (h) and (i):

(h)	no'kakini	aisttsiwa	
	my-back [+spec]	dur-pain [-an]	'my back hurts'
(i)	nitaisttso'kakini		
	I-dur-pain-back		'I have a backache'

In (h), 'my back' is actor and the intransitive verb is inflected accordingly. In (i), the speaker is actor and the complex verb stem is made up of the roots ⟦Itti⟧ 'pain' and ⟦o'kakiN⟧ 'back'.

---

[58] In other words, even if the /o/ extension is the benefactive formative, it was not present in the underlying structure, but has been transformationally introduced.

Thus (h) and (i), while semantically equivalent, differ in two ways: the possessor of a body part in (h) is part of the verb in (i). The first difference is similar to the difference we saw earlier between (a) and (b), and between (d) and (e). In those cases and the one at hand, if we consider (h) to be basic, a possessor is elevated to actor status. As it stands, $T_{poss\ elev}$ cannot serve to accomplish what appears to be a variant of the same process that it was originally formulated to capture; i.e., it cannot relate (h) and (i). But if the selection of actor and goal were made subsequent to possessor elevation, we could capture this generality. Speaking in role terms again, we point out that the object in which the pain is centered is surface structure actor in (h), but when the personally involved possessor is elevated out of the NP, he, being the experiencer, is selected as actor. Noun Incorporation will account for the remaining difference between (h) and (i), as it did between (b) and (c).

Summarizing this section, a personally involved possessor, as experiencer, may be elevated out of its NP; this process is virtually obligatory if the NP as object of certain verbs is a body part. For a small class of verbs, the head N of an object NP may be incorporated (or copied) as part of the verb stem; this process is obligatory with certain of these verbs (such as [[wɪxk]]) and is possible in other cases only if Possessor Elevation has already taken place; indeed, in certain cases, such as exemplified in (i) ('I have a headache') it is obligatory if Possessor Elevation has been carried out.[59] Selection of actor and goal must be made after these transformations have taken place, and according to the following scheme: we will descendingly rank roles as agent, experiencer, and object; the highest ranked of these present is selected as actor, and the next higher, if any, is selected as goal (unless, of course, it is [-spec] in which case there will be no goal but simply adjunct(s), since only [+spec] nouns may function as inflectionally-defined goal--see 1.2 d).

[59] In 4.4.3, we suggest that noun incorporation may be a special case of a more general process which results in elevation of a possessor as a side product; thus Possessor Elevation as a separate process will be mutually exclusive with noun incorporation.

Chapter 4

TOWARD A LEXICO-SEMANTIC THEORY

4.1. Surface Function vs. Underlying Role. We saw in 3.7 that while the traditional Algonkian functions actor and goal are important in Blackfoot surface structure, they do not allow us to account for the relationships between certain sentences in a natural way. And in earlier sections we often found that in order to maintain the functions actor and goal as basic, we were forced to change the actor or goal status of participants en route to surface structure. Why, then, should we feel bound to these particular functions in underlying structure? In this section we will consider an alternative that stems directly from the work of C.J. Fillmore. But before explaining the alternative, certain problems in the surface configurations we have been using should be remedied.

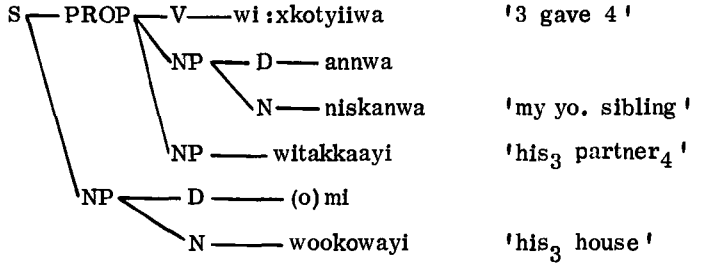
4.1.1. Surface Structure Revision. In a sentence such as (a),

(a) anna niskana iihkotsiiwa otakkaayi omi ookowayi
that-3 my-yo.sibl-3 give-3-→4 his-partner-4 that his-house
'my younger sibling gave his house to his partner'

there are three participants in the main predication. anna niskana 'my younger sibling' is actor, otakkaayi 'his partner' is goal, and omi ookowayi 'his house' is a second object or adjunct. We have no way to define this additional object using the categories we have introduced so far. Here, as at least twice in Chapter 3, we are left with a surface constituent that is neither actor nor goal, yet wherever it is attached in the constituent structure it will meet the definition of either actor (S:NP) or goal (VP:NP). Of course, we could introduce an intermediate node PP (=predicate phrase), so that our PS rules would include S ⟶ (NP)PP and PP ⟶ VP(NP); we would then be able to define the surface second object as PP:NP. But not only would this leave us with no way to define other constituents such as instrument (both instrument and second object can remain 'dangling' in surface structure), it would contribute to the ad hoc nature of our rules by adding a second category whose only raison d'etre is to permit a function definition. I say 'second' because it turns our that the only need for the category VP in Blackfoot is to define goal; the only rules we have posited (or that I foresee) which refer to VP are those which require a definition of goal. How, then, should we structurally define actor and goal? Recall that these functions were originally taxonomically set up in reference to agreement phenomena (see 1.1). More often than not in linguistic practice, items which share agreement requirements are treated as co-constituents of one category (the prime example being agreement requirements within noun phrases).

Let us then treat actor and goal and agreeing verb in Blackfoot surface structure as co-constituents of a category PROP(osition). Actor and goal will be distinguished by order within PROP. Other NPs, whether second object, instrument, or whatever, will simply be attached to S. Thus the near-surface structure for (a) above can be represented as (a'):

(a')



We will assume that agreement transformations will carry only features of NPs within PROP to the verb. Thus for intransitive verbs, only the actor will be within PROP in surface structure. (The goal of an actorless verb (see 2.2) will be distinguished from the actor of an intransitive verb by techniques to be explained later [4.1.3].)

(Preliminary investigation indicates that the particular order shown above for verb, actor, and goal permits the simplest formulation of reordering rules, as well as being consonant with the theory of a relationship between order and 'gapping' (Ross 1967, Bach [forthcoming]); i.e., Blackfoot appears to be a VSO language.)

4.1.2. Roles. We could characterize the semantic roles of participants in (a) above as giver ('my younger sibling'), gift ('his house'), and recipient ('his partner'). If we did so, however, virtually every verb would occur with different roles. Fillmore (1968b and c) points out that we can abstract from verb-specific notions (such as giver, gift, etc.) more general role notions which recur with many other verbs. Thus the role of the giver in (a) has something in common with that of the killer in (b):

(b) i'nitsiiwa nitomitaam omi poosi
kill-3-→4 my-dog-3 that-4 cat-4
'my dog killed that cat'

The sibling in (a) and the dog in (b) are each instigators of the predication in which they participate. The traditional term for this abstracted role is Agent. (We have already used this term in the same sense in 3.7. But because some role labels will be words which we have used elsewhere with different meanings, we will always capitalize the first letter of role labels.) Recall now example 3.7 (g), repeated here as (c):

(c) [=3.7 (g)]

nitohpokonsskoawa noko'sa

I-ball-provide-→3 my-child-3

'I provided my child with a ball'

Notice that in this sentence the 'ball', which we analyzed in 3.7 as originating outside the verb, fills essentially the same role as does the 'house' in (a). Following Fillmore, we will call this role Object. We can tentatively define it as the entity which is affected (in a very broad sense) by the predication, but for which affect animateness of the entity is not a prerequisite (the reason for the latter qualification is to distinguish Object from Experiencer below).

Some other roles[1] (with their abbreviations) which we will need are:

Experiencer (EXP)

The participant which is affected by or undergoes the predication; the 'experience' must be of a kind ascribable only to animate entities. (Fillmore called this role 'Dative' until 1968c, where he introduces the label used here.)

Non-Instigative Cause (CS)

The non-instigative and (usually?) involuntary cause of a predication.

Instrument (I)

The non-instigative means made use of by the Agent of a predication. (As pointed out in 3.5.2, I and CS can possibly be combined as one role; they seem to be in complementary distribution with respect to presence or absence of an Agent. This will be more evident later. Fillmore includes CS under I, but additionally requires inanimateness of the participant in this role.)

Source (SC)

The place or entity from which something, not necessarily physical, is directed.

Goal (GL)

The place or entity to (or toward) which something (again, not necessarily physical) is directed.

Location (L)

The entity which identifies the spatial orientation of the predication.

Time (T)

The temporal orientation of the predication.

Agent, defined earlier, will be abbreviated as AG, and Object will be abbreviated as O.

Comparing sentences (a) and (c) again, we see that in each case the actor is the instigator, and hence Agent, of the acquisition of an Object. But as explained in 3.7, the Object (ball) in (c) need not necessarily have passed from control of the

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[1] Fillmore often refers to these roles as 'oases' (see Fillmore 1968a, in particular). The roles and their labels here closely approximate those in Fillmore 1968c.77 [where Fillmore's definition of Goal is erroneously labeled Source], except as noted below under Instrument.

Agent (the speaker) enroute to the child. In (a), on the other hand, the Agent ('my younger sibling') necessarily was in possession of the Object (the house) before the effect of the predication which put it in possession of his partner. This difference leads us to recognize that the giver fills not only the role of Agent in (a), but also the role of Source, whereas the speaker is simply Agent in (c).[2]

Another example of a dual role is that of the one who acquires the ball in (c), and also that of the one who acquires a house in (a); both of these are simultaneously Goal and Experiencer.

Verbs are subcategorized according to what roles they may (or must) occur with. For the verbs 'give' and 'acquire' of (a) and (c) we can indicate this graphically as follows:

wi:xkot [_AG-SC, GL-EXP, O][3]

wIxk [_(AG), GL-EXP, O]

Notice that for wIxk the Agent is optional, as we saw in 3.7, but for wi:xkot it is not. (It may be that we will need to distinguish between truly optional roles such as Agent for wIxk, and roles that, even though frequently unspecified, are always conceptionally present [see Fillmore 1968b and 1968c]).

4.1.3. The Semantic Range of Mwi:xt. We can further illustrate the use of roles in underlying structure by examining an interesting set of sentences, all of which contain the formative ⟦Mwi:xt⟧[4] (realized as /omoht/, /iiht/, or /oht/ in these examples), glossed as 'from', 'by', 'with', or 'result':

(f) nomohto'too soohkittsi

I-from-arrive Gleichen (lit. 'big-belly'; the name of a town)

'I came from Gleichen'

(g) nomohto'too aipottaawa

I-by-arrive airplane ('he flies')

'I came by plane'

---

[2] Fillmore's recognition (1968c.78ff) of the need to allow one participant to fill, simultsneously, more than one role has been the solution to innumerable problems regarding role assignment.

Joseph E. Grimes (personal communication) suggests that this supports the idea that roles are shorthand labels for recurrent sets of presuppositions; a dual role is simply the union of two such sets.

[3] Uhlenbeck lists, and Taylor was able to re-elicit, putative examples of this verb with Object as surface goal (and thus no GL-EXP involved). One example they both present is nítoxkotsiixpa 'I gave it'. No such form is acceptable to my informants. (I had thought perhaps Uhlenbeck misidentified /nitohko'tsiihpa/ 'I got it' [my transcription] but this is not the kind of error Taylor could make.) Perhaps this is a dialectal difference.

[4] Recall (from 0.3.1) that ⟦M⟧ represents an alternation between ⟦im⟧ and ⟦ø⟧.

(h) [=3.5.1(a)]

nomohtawayakiaawa iimitaawa miistsisi

I-with-hit-→3 dog-3 stick [+spec]

'I hit the dog with a stick'

(i) [=3.5.2(c)]

aohkiyi iihtsisttsiistomiw aakiiwa

water [+spec] result-sick-3 woman-3

'the water made the woman sick'

(j) [=1.5.3-D-a]

iihtoki'takiwa ninna nitsiistapoohsi

result-angry-3 my-father-3 I-leave-conj.

'my father was angry because I left'

(k) iihtssaksiwa ninna nahkitso'kaani

result-leave-3 my-father-3 I-might-then-sleep-nom.

'my father went out so I'd sleep'

(l) iihtohto'toowa ninna soohkittsi nahkitsspomoyissi

result-from-arrive-3 my-father-3 Gleichen I-might-then-help-←3 (conj.)

'my father came from Gleichen to help me'

(m) iihtohto'toowa ninna aipottaawa nahkitsspomoyissi

result-by-arrive-3 my-father-3 airplane I-might-then-help-→3 (conj.)

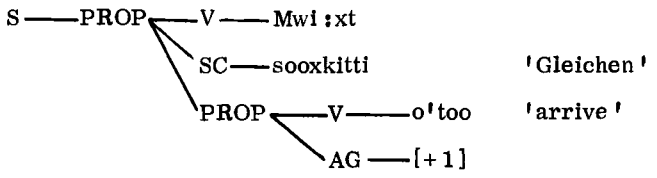
'my father came by plane to help me'

Notice the variety of uses of [[Mwi:xt]]. In (f) it signals that a point of origin is involved. In (g) and (h) it signals a means is involved. In (i) there is a non-instigative cause. In (j) as well, the prefixed root, attached to a result clause, can be considered to signal the presence of a non-instigative cause, but in this case the cause is a clause made up of a conjunct verb (see 1.5.3). In (k) the root in question helps to signal the relation between a purpose clause and the intended result. We can see that various pairs or even triples of these have something in common, but I have been unable to isolate a semantic component that is common to all of them. Examples (l) and (m) serve to show that a verb may contain two occurrences of [[Mwi:xt]]; however, in such cases they are always attached to a result clause, and one signals either point of origin or means.

If we allow verbs to have slightly different meanings when occurring with different roles, we can still treat all these occurrences of the formative [[Mwi:xt]] as realizations of one verb root. The simplified underlying configurations for (f) - (m)

will then be as shown in (f') - (m'), respectively.

(f')



Notice that role labels now occur as categories in the configuration. (At this point in the exposition we may consider the omission of nodes NP, N, D, etc. as merely simplification; however in 4.2 and subsequent sections we will do away with all categories (except S) that were introduced by PS rules in 2. New rules which generate underlying structure will be presented in 4.3.) Borrowing terminology from symbolic logic,[5] we may say that Mwi:xt is a predicate which occurs with more than one argument (='term'), at least one of which must be PROP; in (f') the other argument is Source. Mwi:xt, being a dependent root, requires that the constituents of the embedded PROP be moved into the matrix PROP, and the verbs combined. This can be accomplished by a rule which we shall call Proposition Consolidation:

Proposition Consolidation

$$[\,[+\text{dep}]_{V_1}\ ;\ X\ ;\ [\,[X]_{V_2}\ ;\ X\,]_{PROP_1}\,]\ PROP_2$$

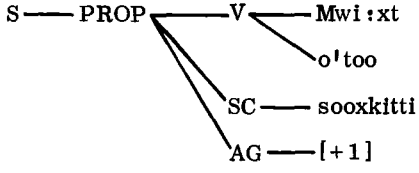
$$1 \qquad 2 \qquad 3 \qquad 4 \longrightarrow$$

$$1+3 \qquad 2+4 \qquad \emptyset \qquad \emptyset$$

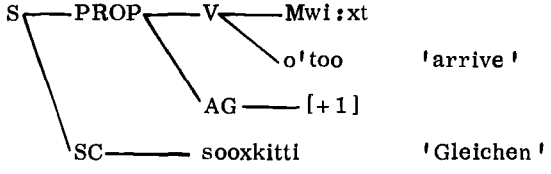
(All dependent roots will have the feature [+dep].)

Condition: V_1 and $PROP_1$ are sibling nodes.

The result of application of this rule to (f') is:



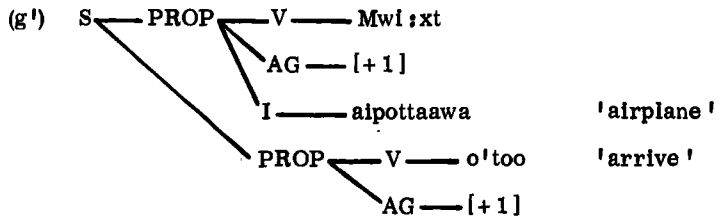
Because Source is never an actor or goal, it will always be removed from PROP; in this case, we are left with the derived structure corresponding to (f) (subsequent transformations will treat the speaker as actor, as stated above):



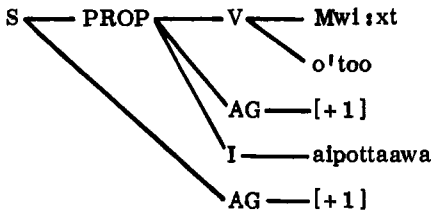
[5] See Langendoen 1969.96,97 for a less traumatic introduction of the terminology.

See Fillmore 1968b for a discussion of why the predicate calculus must be supplemented with the notion of something like roles in order to capture certain logical and semantic properties of natural language predicates.

The configuration underlying (g) is (g'):

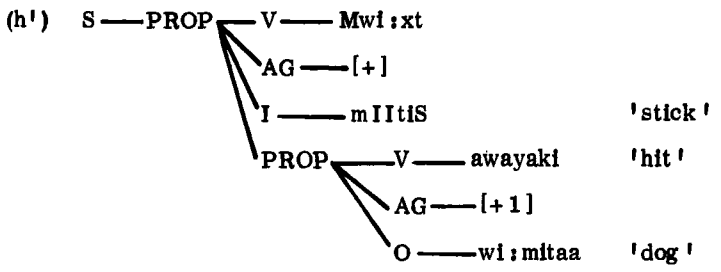


In (g') the predicate Mwi:xt has three arguments. Proposition Consolidation converts (g') into the following:

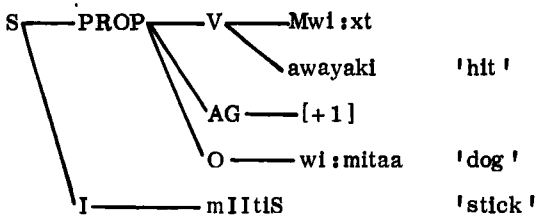


Deletion of one of the coreferential Agents (more on this type of deletion later) and movement of Instrument (which is never actor or goal) out of PROP will provide the constituent structure corresponding to (g).

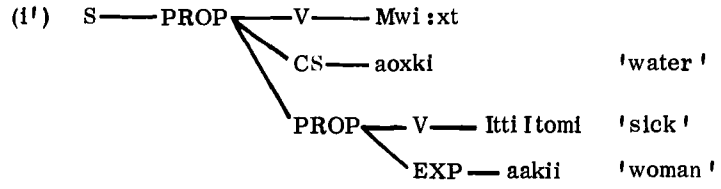
The configuration underlying (h) is (h'):



Deletion of the embedded Agent (we will show later (4.3.3) why it must be the embedded Agent that is deleted), Proposition Consolidation, and movement of Instrument out of PROP will give us the following derived structure:



The underlying configuration for (i) is (i'):



After application of Proposition Consolidation, we require that Non-Instigative Cause be moved out of the Proposition because, like Source, Goal, Location, Time, Instrument, or an S, it can never become actor or goal (this statement is true as a general rule; there may be verbs which idiosyncratically choose one of these roles as actor or goal). We can formalize the extraction of these as follows:

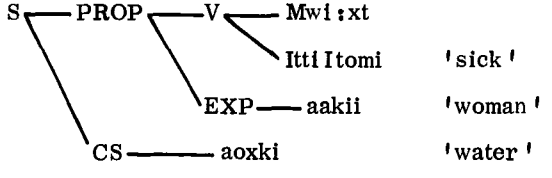
Peripheral Role Extraction

$$[X;\ [X;\ \left\{\begin{array}{c}T\\L\\GL\\SC\\CS\\I\\S\end{array}\right\}\ ;\ X\ ]_{PROP}\ ]_S$$

1 2 3 4 ⟶

1 3[2 ∅ 4]$_{PROP}$

The structure that we are left with after all the above rules have applied to (i'), corresponds to (i):



But what of the situation leading to an actorless transitive verb (see 2.2.2) such as the following?

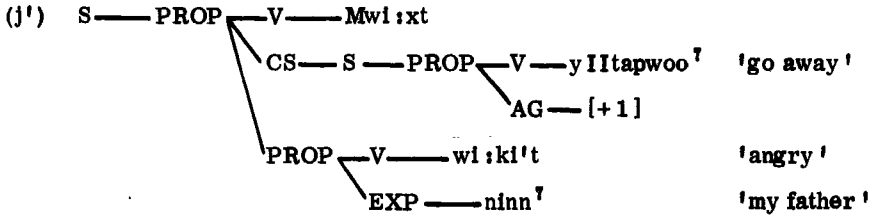
iihtawayakiaawa	iimitaawa	miistsisi
with-hit-⟶3	dog-3	stick [+spec]

'the stick hit the dog'

In 3.5.2 we noted that such a sentence is ambiguous; either 'the stick' is Non-Instigative Cause and there is no Agent (in the situation where a stick fell from a tree, e.g.) or the 'the stick' is Instrument and an unidentified Agent is understood and, hence, present in the underlying configuration. In the latter case, the rules we have discussed in this section will treat the unidentified Agent just as they did the Agent in (h'). (The same is true of examples 2.2.2 (a) and (c).) In the case

of the underlying configuration corresponding to the interpretation where no Agent is assumed, our rules as they stand would erroneously make 'dog' actor (as they did, correctly, with 'woman' in (i') above), so at the stage where transitivity transformations (see 3.1) apply, 'dog' must somehow be defined as goal. One possible way to achieve this is outlined now. Verbs whose first (highest ranking) argument is optional, and yet whose next argument cannot become actor, must be marked. An ad hoc transformation might then insert a dummy element in the proposition where the optional first argument would be, whenever these marked verbs occur without the role that would normally become actor. The second argument would then be treated correctly by our earlier rules. Later, agreement transformations would have to treat this dummy element exactly the same as an unspecified actor. Of course, neither the dummy nor the unspecified actor will have any overt representation in the surface form of the sentence. [6]

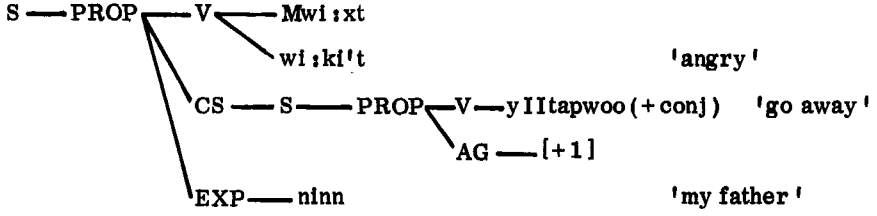
Example (j) above is the first we have dealt with, from a generative point of view, which contains more than one surface clause. We posit the following underlying structure:



The first argument, Non-Instigative Cause, is a sentence rather than a noun phrase as in all of our previous examples. The verb of such sentences will take inflectional affixes from the conjunct paradigm (see 1.5.3), and may be nominalized to form a conjunct nominal (also 1.5.3). We will not speculate here as to what might trigger the nominalization, but we will assume that the verb of an S dominated by CS acquires the feature [+conj]:

$$[+V] \longrightarrow [+\text{conj}] \;/\; [[[\_\_]_{PROP}]_S]_{CS}$$

Application of Proposition Consolidation to (j') will give us the following:



Peripheral Role Extraction will move the S as CS outside the Proposition, leaving us with the correct structure for (j).

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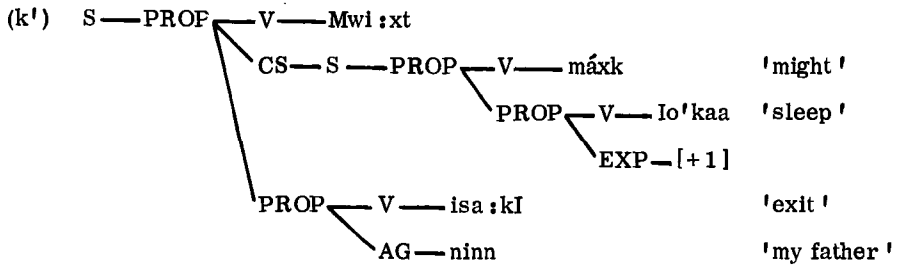
[6] As far as syntactic treatment is concerned, it would be simpler to require an Agent (identified or not) for 'hit', but this would not account for the ambiguity of interpretation of the role of 'stick', an ambiguity not possible with verbs that require an Agent, such as 'buy', 'eat', etc.

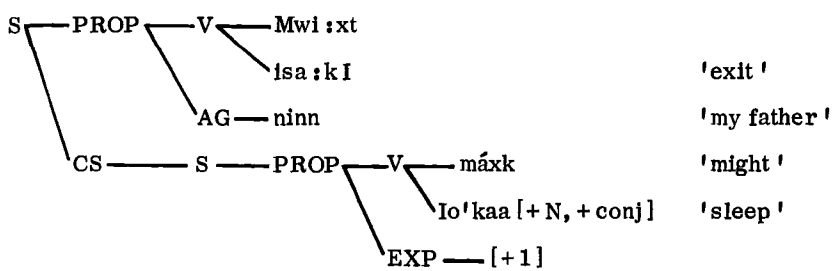
[7] We ignore for now the fact that both yIItapwoo and ninn are complex.

Example (k) has a slightly more complicated underlying structure, due to the presence of the dependent root máxk (which we will gloss 'might' for want of a better word). As explained in 1.5.3, máxk marks a purpose clause if that clause is in combination with an independent clause whose verb has Mwi:xt. We consider the predicate máxk to take only one argument: a PROP, as shown in (k'). (We ignore until 4.3.3 the preverb ⟦it⟧ which follows ⟦máxk⟧ in (k).)



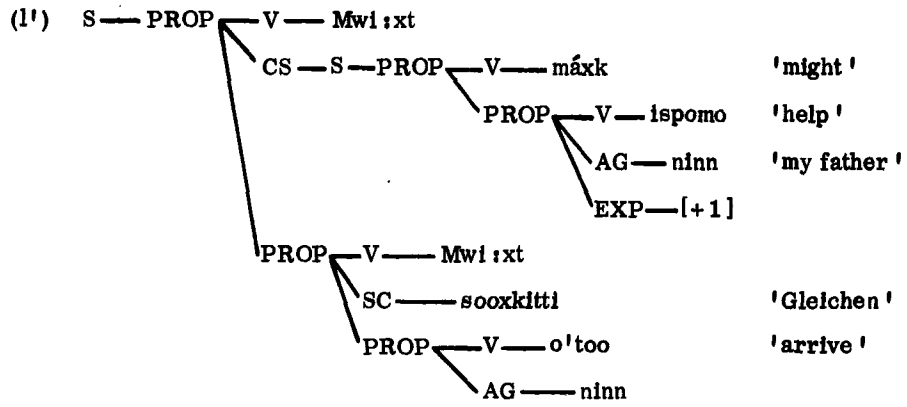
The application to (k') of rules we have discussed in this section is straightforward, except that while a purpose clause dominated by CS can simply have its verb inflected by conjunct order affixes, it more often will additionally have a nominalizing suffix in place of the xs cluster characteristic of the conjunct paradigm (the second /n/ on /náxkitso'kaani/ of (k) is the nominalizer)--see 1.5.3.

Notice that Proposition Consolidation will apply to (k') twice: once to the most deeply embedded PROP (as argument for máxk), and once to the PROP as argument for Mwi:xt. The application of this rule and others in this section will leave less structure:

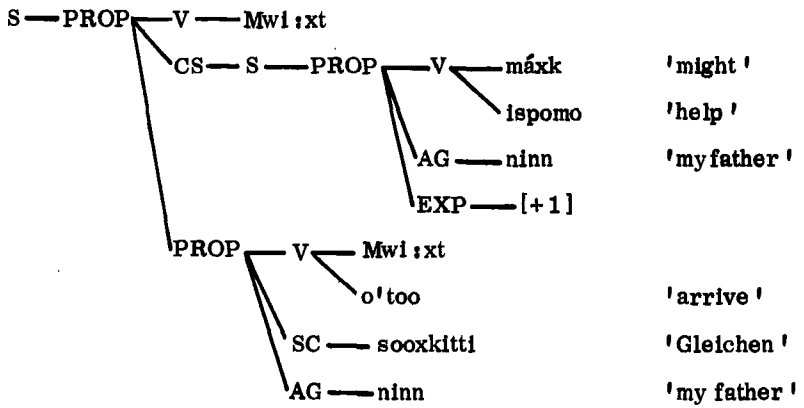


(We have provided for the nominalizer by addition of feature [+N] which will later cause it to be spelled.)

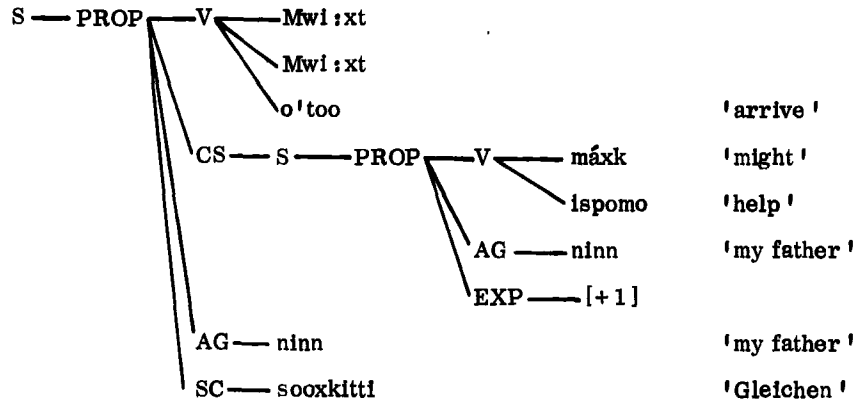
Example (l) has two occurrences of the formative ⟦Mwi:xt⟧. One of these originates in the matrix sentence and the other in the embedded PROP as argument for the first occurrence:



After Proposition Consolidation has applied to the two most deeply embedded Propositions of (1') (arguments of máxk and of Mwi:xt), the configuration will be as follows:



Reapplication of Proposition Consolidation will give us the following:



Peripheral Role Extraction will move the Source and Non-Instigative Cause (the purpose clause) out of the Proposition. The verb of the purpose clause, in this partic-

ular example, receives the feature [+conj] (but not [+N] as was the case in the preceding example). The independent clause is left with ninn 'my father' as actor, and speaker as goal. After agreement transformations have applied, one occurrence of ninn will be deleted (by a rule something like T_{delete} assumed in 3.3).

Example (m) has exactly the same underlying structure, except that where (l') has SC (soohkitti 'Gleichen'), (m') would have I (aipottaawa 'airplane'). Exactly the same steps apply to arrive at the structure corresponding to (m).

We sum up this rather lengthy discussion and demonstration of the uses of Mwi:xt by indicating the subcategorization of Mwi:xt in terms of roles:

$$\text{Mwi:xt} \quad [\_\_ \left\{ \begin{matrix} \text{AG+I} \\ \text{CS} \\ \text{SC} \end{matrix} \right\} \quad + \text{PROP}]$$

If we find no reason to keep I and CS separate, combining them under label Means (M) will give a slightly simpler representation:

$$\text{Mwi:xt} \quad [\_\_ \left\{ \begin{matrix} \text{(AG) M} \\ \text{SC} \end{matrix} \right\} \quad + \text{PROP}]$$

We must somehow add a condition requiring that when an Agent is present, it must be coreferential with an Agent in PROP. This could be indicated as follows:

[__ AG: x + PROP:AG:x]

(Henceforth in the thesis, connective '+' is considered to be more major that ':'; thus in this condition, PROP is not a constituent of AG, because there is a major constituent break at '+'. If PROP were a constituent of the leftmost AG we would need brackets to indicate the scope of domination of that AG as [__ AG: [x+PROP:AG:x]].)

If we prefer not to allow one predicate to have such a range of meanings as illustrated above, we should probably say that there are at least two predicates realized by the formative [[Mwi:xt]]: one which takes SC+PROP as arguments, and another which takes (AG) M+PROP as arguments.

We should perhaps point out that a sentence with Mwi:xt that has an Agent as actor can be at least three ways ambiguous depending upon the roles present in the underlying structure. (g), for example, was glossed with the assumption that both the matrix and embedded structures had underlying Agents; thus the 'airplane' is understood to be an Instrument. But if the underlying matrix PROP had no Agent, the 'airplane' could be either Non-Instigative Cause or Source, and the sentence (g) could be glossed either 'I came on account of the airplane' or 'I came from the airplane', respectively.

Finally, we call attention to the fact that one relatively simple rule, Proposition Consolidation, serves the purpose of the two rules, instrument verb attachment (3.5.1) and non-instigative cause verb attachment (3.5.2), required under the model used in earlier chapters. And this same rule serves equally well for all the other illustrated uses of the predicate Mwi:xt. We will see in 4.4 that Proposition Consolidation will also account for a good deal more of the phenomena we have dealt with in earlier chapters, as well as much that we have not yet dealt with.

4.2. Generalized Predicate Grammar. In 4.1.3 we introduced the terms 'predicate' and 'argument' for verbs and the roles which occur with them, the combination comprising a Proposition. Lakoff and Postal have assembled evidence (presented in Lakoff 1965) for considering adjectives and verbs to be members of a single lexical category in English; add to their arguments the fact that free adjectival stems are verbs in Blackfoot surface structure, and we see that treatment of adjectives as predicates which take various roles as arguments is the obvious move. In fact, we have already so treated one in (j') of 4.1.3, where wi:ki't 'angry' has Experiencer as an argument. Bach 1968 argues convincingly that nouns, too, should be considered predicates[8] in underlying structure. He proposes that every noun be introduced into a noun phrase in English as what is traditionally termed a 'predicate nominal'. We will postpone a fuller explanation of just what can be an argument for a noun until 4.6, but we can illustrate the Blackfoot counterpart of predicate nominals at this point. In (a), ninaayawa 'they are chiefs' is a verb in surface structure; it has the 3 pl verbal suffix, in agreement with the actor 'my sons':

(a) nohkoiksi ninaayawa
my-son-3pl chief-3pl 'my sons are chiefs'

(For an as yet unexplained reason, in an independent clause such verbalized nouns with 3 actor do not have the 'theme' suffix -yi found otherwise:

nitsinaayi 'I'm (a) chief'.)

At this stage of the exposition we can give (a') as the simplified configuration underlying (a):

(a') S — PROP — P — nInaa 'chief'
ESS — noxko [+pl] 'my sons'

ESS abbreviates Essive (a previously unmentioned role) which we define as the role of a participant being identified by the predicate (P) for which it is an argument. Notice that we have no category symbol N dominating nInaa, nor will we any longer have V dominating verbal roots as predicates of a proposition as we did in 4.1. From this point on, rather than nouns and verbs, there are only predicates as 'contentives' (Bach 1968) in underlying structure; each of these predicates will be directly dominated by a PROP which also dominates the roles which are arguments for that predicate. (For ease of exposition, we will allow role categories to directly dominate nouns and person and number features in examples until 4.6; for the present we can consider a noun directly dominated by a role as a simplification of a PROP with the noun as predicate and a referential index as the Essive argument. Thus (a') is a simplification of

S — PROP — P — nInaa
ESS — PROP — P — noxko
ESS — y

where y indexes a discourse referent.) Verb or noun status is thus considered

[8] Which, of course, most are in symbolic logic (see e.g., Carnap 1958.5,6).

superficial (there will still be root classes which may be termed nominal or verbal depending upon, among other things, which derivational rules apply to them when they end up as surface structure nouns or verbs; e.g., verbal roots take a nominalizer when they are nouns in surface structure). A verb is any contentive which is not transformationally removed from the predicate position (thus 'chief' is a verb in (a)), while, in general, a noun is a contentive which is an argument for a predicate (at a particular late stage in the derivation) or is transformationally assigned nominal status (as, e.g., in the derivation of 4.1.3 (k)).

Underlying structure, then, is viewed as a tree structure composed of propositions made up of predicates and their arguments. The arguments, in turn, may be Sentences, propositions, or role categories which dominate either propositions (identifying the participants) or speaker/addressee identifiers; additionally, the role Non-Instigative Cause (or, if we combine CS and I, Means) may dominate a Sentence. Obviously, the category Sentence (S) is not to be equated with the surface structure entity that goes by that name. (Grimes 1968 [see also Grimes and Glock, 1970] points out that when we broaden our scope to consider discourse structure, the surface structure unit 'sentence' must be considered to be transformationally determined; the number of surface sentences that correspond to a given underlying discourse configuration may be variable.)

4.3. Proposition Linkage Constraints. At the end of 4.2 we stated some of the requirements for well-formedness of underlying structure. These and other constraints we will term well-formedness conditions. Such conditions can be formally stated in a number of ways.

4.3.1. Positive Conditions. Rewrite rules, such as those in 2.1, generate a string as the last line of a derivation, and from that derivation a tree may be constructed. But following McCawley 1968, we will dispense with the notion of derivation in tree generation, and formalize the requirements stated at the end of 4.2 in terms of unordered node admissibility conditions. Using the colon to mean 'directly dominates', those particular conditions may be formalized as follows:

$$S : PROP$$

$$PROP : [P + A^*]$$

$$A = \{ ROLE, PROP, S \}$$

$$ROLE = \{ AG, EXP, O, GL, SC, M, ESS, T, L \ldots \}$$

$$ROLE : \{ PROP, [+1], [+2] \}^*$$

$$M : S$$

The equal sign is to be read "is a", so that while PROP :[P + A*] admits direct domination of a predicate and its arguments by PROP, the symbol A will not appear in any tree, but rather it indicates the place of an actual argument. Likewise, ROLE will not appear in any tree to dominate a PROP or [+1] or [+2], but a role label will. (We are attempting to differentiate what are actual categories that need to appear in the trees of underlying configurations, from sets of these categories which we wish to define partially in terms of permissible configurations. If we were to make

A and ROLE categories of underlying structure, the trees and transformational rules applying to those trees would be needlessly complicated.)

The asterisks indicate unlimited replication; domination of more than one item by a role leads to surface conjunction and/or plurality.

(While it is not at all clear that S and PROP must be distinguished, we will make use of the distinction to capture certain kinds of constraints in the next section; in 4.6 we will make further use of it. In addition, the category S serves as a dominant symbol after constituents have been moved outside a PROP by Peripheral Role Extraction (4.1.3) or Extra Role Extraction (4.4).)[9]

The rationale for treating speaker and addressee referents differently from other referents in the various roles is that while other referents usually require identification (in the form of a proposition--see 4.6), the speaker and addressee never do (note that, like 'proper nouns', they never take restrictive relative clauses). In other words, they are constants by virtue of their participation in the actual act of communication which is matrix for the discourse.[10]

Because the node admissibility conditions are not process statements, any one rule is not necessarily exhaustive; e.g., ROLE : { PROP, [+1], [+2] } * doesn't say that a role has to dominate a PROP or a speaker/addressee identifier, but rather that such nodes are admissible. Thus while this rule says that M, like all the other roles, may dominate PROP, [+1], or [+2), we are free to add an additional admissible node, M : S to the conditions. But once all the conditions are stated, any configuration containing a node that is not admitted by the conditions is, by definition, ill-formed.

The contextual conditions of predicates (see below) are a little different in this regard, because they refer to more than a single node. They state that if a given predicate appears in a configuration, certain conditions must be satisfied. If these conditions are not satisfied, the configuration is ill-formed.

There will be no predicate insertion rule; the conditions associated with each predicate in the lexicon merely limit the class of configurations which may contain it. (The arguments listed with each predicate are obligatory unless enclosed in parentheses, in which case they are optionally present; no other arguments are permitted.) For example, the causative predicate ipi (3.5.3) requires an Agent, an Experiencer, and a proposition as arguments. We can indicate these constraints as:

ipi [P: _ +AG+EXP+PROP]

We saw in 3.5.3 that for an S with ipi as main predicate, the actor (or what would be actor were it not embedded) of the embedded PROP (we called it an S in 3.5.3)

---

[9] A dominating symbol could be provided by 'Chomsky-adjoining' (Ross 1968) the removed roles, but the result of such adjunction often seems counter-intuitive to me, precisely because of the added distinguished symbol.

[10] Perhaps we should allow for other constants ('proper 'nouns?) to be directly dominated by roles, as follows:

ROLE : { PROP, k } *

k = { +1, +2, name, ...}

On the other hand, names might all be introduced as arguments of a predicate such as NAME or CALL.

must be coreferential with the goal of the matrix PROP. It might be argued that this is evidence that actor and goal, rather than semantic roles, are after all, the valid functional notions to be defined in underlying structure. But recall (3.7) the role ranking system which determines actor and goal assignment in surface structure. Since roles must be listed in some order in the contextual condition of each predicate anyway, they can be listed according to rank. Then we can use this order to define the role that would be actor were this predicate not an embedded one. [11] This allows us to incorporate the coreferentiality requirement of the ipi predicate into the role-environment condition:

ipi [P:_+AG+EXP:x+PROP:A_1:x]

(for all $n \geq 1$, there are n-1 arguments between P and A_n of PROP).

Here, as in 3.4, two or more occurrences of a lower case letter represent the same referent. [12] That is, the first argument of whatever predicate is the main predicate of the embedded PROP must be coreferential with the Experiencer of the matrix PROP.

Notice that in generating well-formed configurations in terms of conditions rather than derivation (including lexical insertion as a process) we avoid such problems as being forced to decide whether to insert verbs first and restrict noun insertion in terms of co-occurrence restrictions with them, or vice-versa (Cook 1968.38ff). Unlike lexical insertion viewed as a process, there is no sequential relation between contextual constraints stated as conditions on well-formedness of configurations containing particular predicates.

4.3.2. Negative Conditions. There is at least one other kind of constraint that must be placed on underlying configurations. Recall that at the end of 3.6 we indicated the need for restrictions on dominance relations between various predicates. In particular we were concerned with the following: a PROP containing the accompaniment predicate cannot dominate a causative predicate; PROPs with the causative and benefactive predicates cannot dominate one another; nor can PROPs with the benefactive and accompaniment predicates dominate one another.

The conditions we have dealt with in 4.3.1 were stated positively; every node of any underlying configuration must conform to one of the unordered set of positive conditions there, and every predicate in a configuration must be in an environment that is compatible with the contextual conditions of the predicate.

But to use positive conditions to restrict dominance relations between predicates, it would be necessary to state all permissible combinations of predicates. Obviously, the non-permissible combinations and dominance relations make up a shorter list (since the number of permissible combinations is non-finite!). We must introduce

---

[11] A similar use of order in the lexical entries of English predicates may allow a 'case grammar' (Fillmore 1968a) of English to capture such 'deep structure constraints' on coreferentiality, which thus far have been expressed in terms of subject and object (Perlmutter 1968 [of which I've seen only the first two chapters]). English predicates show considerable idiosyncracy in their selection of subject, so a wide variety of orderings would be found; e.g., like [_EXP+O], please [_O+EXP]. See Fillmore 1968a,b,c.

[12] Alternatively, we can use different lower case letters (x and y) and add a condition of coreferentiality (x = y). We will follow this latter course in the sample lexicon of 4.5.

negative conditions which indicate that a portion of a configuration is ill-formed if it matches the negative condition.

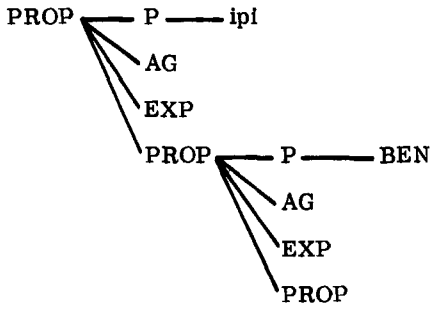
Thus the restrictions stated earlier in this section may be accounted for by the following three negative conditions (BEN represents the benefactive predicate. Where there is possibility of confusing two uses of the colon, we will underline all predicates):

$$\sim [\, P : \underline{wi:xpok+im} \;\; +X \;\; +PROP \;:\; P \;:\; \left\{ \begin{matrix} \underline{atti} \\ \underline{ipi} \end{matrix} \right\} \;\;]$$

$$\sim [\, P \;:\; \left\{ \begin{matrix} \underline{atti} \\ \underline{ipi} \\ \underline{wi:xpok+im} \end{matrix} \right\} +X \;\; +PROP \;:\; P \;:\; \underline{BEN} \;\;]$$

$$\sim [\, P \;:\; \underline{BEN} \;\; +X \;\; +PROP \;:\; P \;:\; \left\{ \begin{matrix} \underline{atti} \\ \underline{ipi} \\ \underline{wi:xpok+im} \end{matrix} \right\}]$$

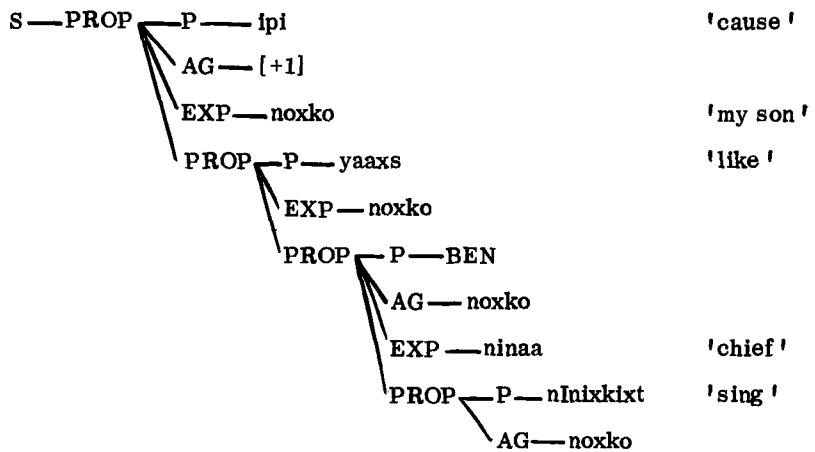
(These could be combined by abbreviatory conventions, of course.) In tree format, the second negative condition, e.g., declares any configuration to be ill-formed which includes the following configuration as a sub-part:



Descriptively stated, the second negative condition declares that a tree is ill-formed if it contains a predicate ipi or atti or wi:xpok+im which has as one of its arguments a proposition with BEN as its predicate.

But these restrictions are too weak, in that they only prevent immediate dominance relations between certain predicates and propositions containing certain other contentives as main predicate. This would still allow configurations with an intervening PROP such as the following: [13]

[13] To simplify diagrams, we continue to allow roles to dominate nouns until 4.6, even though the node admissibility conditions permit roles to dominate only PROP or [+1] or [+2].



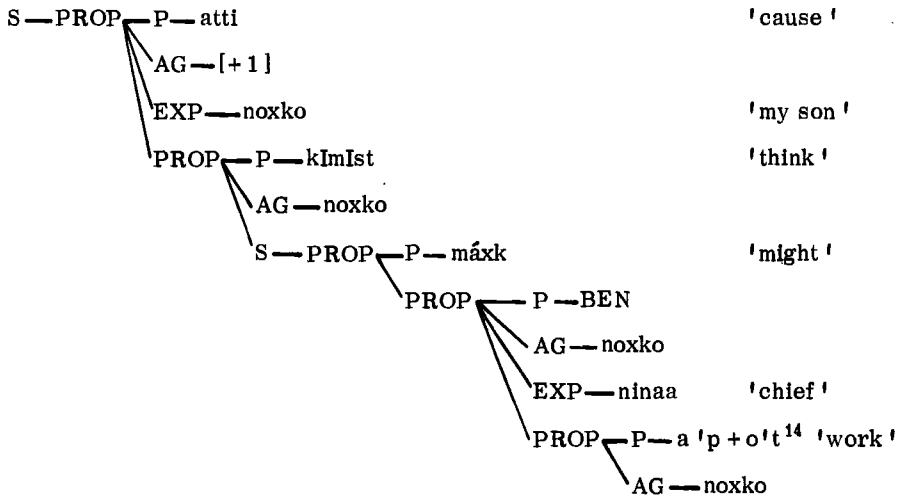
But such a configuration must also be blocked. This could be accomplished by adding a notational convention which means simply 'dominates' alongside the use of a colon to mean 'directly dominates'; for this we will adopt the symbol '>'. Our three negative conditions will now read:

$$\sim [\, P\colon \underline{wi\colon xpok+im} \;\; +X \;\; +PROP \;\; > \;\; \left\{ \begin{array}{l} \underline{atti} \\ \underline{ipi} \end{array} \right\} \;\;]$$

$$\sim [\, P\; : \left\{ \begin{array}{l} \underline{wi\colon xpok+im} \\ \underline{atti} \\ \underline{ipi} \end{array} \right\} \;\; +X \;\; +PROP \;\; > \;\; \underline{BEN} \;\;]$$

$$\sim [\, P\; : \;\; \underline{BEN} \;\; +X \;\; \underline{+PROP} \;\; > \;\; \left\{ \begin{array}{l} \underline{wi\colon xpok+im} \\ \underline{atti} \\ \underline{ipi} \end{array} \right\} \;\;]$$

One problem remains: These constraints now rule out sentences which contain the forbidden combinations of predicates even when such predicates are in different clauses. Thus the following configuration would be disallowed by the second constraint; yet the corresponding surface structure below it is perfectly acceptable:



nitsiksimstattsaawa nohkowa mahka'po'tomoahsi ninaayi

I-think-cause-→3 my-son-3 might-work-ben-3→4(conj) chief-4

'I made my son think about working for the chief'

Up to now the feature [+dep] was what distinguished roots such as ipi 'cause' that trigger Proposition Consolidation, from roots such as kImIst 'think' which take dependent clauses as complements. But if, instead, we indicate that such root classes are distinguished by whether they take a PROP or an S as argument (as we have shown them in the preceding configuration) we can adequately weaken the negative constraints above by adding the following metatheoretical constraint on the variable represented by '>': an S is not a member of the chain of domination represented by '>'. Another possible way of stating these constraints makes use of the notion 'command' (Langacker 1966). If we define command in our model in terms of PROP which is the counterpart of the S in Langacker's definition of command, our negative constraints could be stated quite briefly:

$$\sim [\ \{\underline{\text{atti}} / \underline{\text{ipi}}\}\ \text{COMMAND}\ \underline{\text{wi:xpok+im}}\ ]$$

$$\sim [\ \underline{\text{BEN}}\ \text{COMMAND}\ \{\underline{\text{wi:xpok+im}} / \underline{\text{atti}} / \underline{\text{ipi}}\}\ ]$$

$$\sim [\ \{\underline{\text{wi:xpok+im}} / \underline{\text{atti}} / \underline{\text{ipi}}\}\ \text{COMMAND}\ \underline{\text{BEN}}\ ]$$

[14] 'work' is treated as two roots, because the durative aspect formative /a/ may appear between them: a'pao'takiwa 'he works'.

(A commands B if neither A nor B dominates the other, and the first S above A dominates B.)[15] We can further abbreviate these constraints by making use of the 'mirror image' asterisk notation proposed by Langacker 1969. This allows us to combine the second and third conditions as follows:

$$\sim\ [{}^{*}\underline{\text{BEN}} \qquad \text{COMMAND} \qquad \left\{ \begin{array}{l} \underline{\text{wi:xpok+im}} \\ \underline{\text{atti}} \\ \underline{\text{ipi}} \end{array} \right\} \qquad]$$

The number of such negative constraints upon predicate combinations will probably be quite large in any comprehensive grammar.

4.4. The Generality of Proposition Consolidation.

4.4.1. For Benefactive, Instigative Cause, and Comitative. Let us reconsider some of the stem formation prooesses of Chapter 3 under the model revisions we have made thus far. Near the end of 3.6 we observed that benefactive (3.4), instigative cause (3.5.3), and comitative (3.6) constructions all required movement of an embedded verb to main verb position. We there noted that the same T-rule could handle the causatives and comitatives, but not the benefactives. Taking these constructions up again, we will look at their underlying configurations within a predicate grammar model utilizing role categories, and then consider what rules will give us the correct surface structures.

We first consider a benefactive.

(a) nitaapiksistomoa' nohkowa pokoni

I-throw-ben-→3 my-son-3 ball-4

I threw the ball for my son'

The simplified underlying configuration for this benefactive construction will be as follows:

(a') S—PROP—P—BEN
AG—[+1]
EXP—noxko[16] 'my son'
PROP—P—aapikIt 'throw'
AG—[+1]
O—wixpokoN 'ball'

---

[15] A formal definition of 'command' is as follows:

A COMMAND B $\equiv\equiv$ $\sim(A > B) \cdot \sim(B > A) \cdot \exists S_a\,([S_a > A] \cdot [S_a > B] \cdot \sim \exists S_b[(S_b > A) \cdot (S_a > S_b)])$

(In this definition, '>' means simply 'dominates'; i.e., the convention mentioned earlier about '>' not including an S is not in effect.)

[16] noxko represents a proposition with oxko as predicate, [+1] as EXP (see 4.4.3) and a referential index as ESS.

Because BEN is a dependent root, (a') meets the SD of Proposition Consolidation, which we repeat here from 4.1.3 with two changes: substitution of P for V in the SD to make it consistent with our generalized use of the category P, and elimination of the need for the [+dep] condition, in accordance with the decision to distinguish dependent verbal roots by the fact that they take PROP as an argument.

Proposition Consolidation

$$[\,[X]_{P_1} \;;\; X \;;\; [\,[X]_{P_2} \;;\; X]_{PROP_1}\,]_{PROP_2}$$

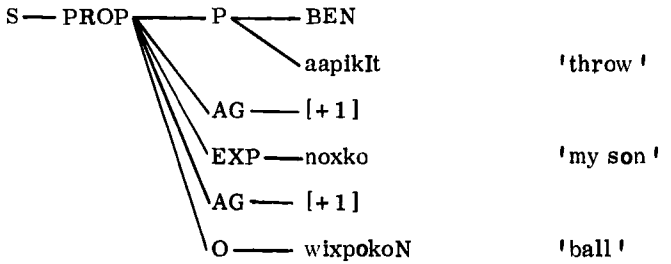
1 2 3 4 ⟶

1+3 2+4 ∅ ∅

Condition: P_1 is sibling to $PROP_1$.

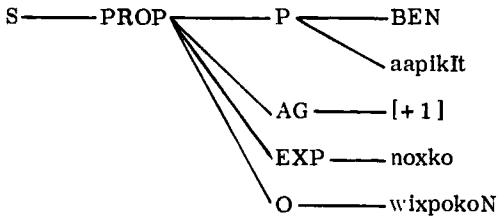
Application of Proposition Consolidation to (a') gives the following:

(b)



One of the coreferential Agents must be deleted to give (c). (This deletion is triggered by coreferentiality or possibly by the fact that there is more than one Agent, but both conditions are not required as we shall see when we reconsider Causatives in this section.)

(c)



We are left with three participants within PROP, whereas only the two highest ranking must remain to be actor and goal.[17] Peripheral Role Extraction (4.1.3) does not apply to any of these roles, so a rule is needed which will extract roles until no more than two remain in PROP:

[17] In 4.6 we will propose a way to account for agreement of a verb with a non-goal adjunct (illustrated in 1.1).

Extra Argument Extraction

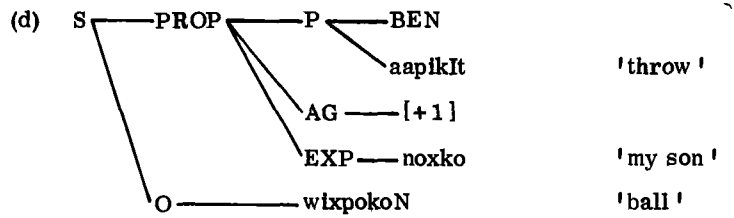
$$[X\ ;\ [P\ ;\ \text{ROLE ROLE}\ ;\ X]_{PROP}\ ]_S$$

1 2 3 4 ⟶

1 4[2 3 ø]$_{PROP}$

This rule must not apply until after Proposition Consolidation is no longer applicable, or it will distort structures with more than 2 arguments in a PROP. (We assume a formalism which allows such rules to refer to the definition of ROLE in the node admissibility conditions of 4.3.1.) The application of this rule to (c) gives (d):

(d)



(d) is the near-surface structure corresponding to (a), except that the order of the roots of P is incorrect. A rule is needed which moves certain dependent roots[18] to stem-final position:

Stem-final Positioning

$$[\ \{\text{wIxk, atti, ipi, im, BEN}\}\ ;\ X\ ]_P$$

1 2 ⟶

ø 2 1

If we consider braces in the SD of such a rule to abbreviate conjunctively ordered sub-rules, BEN and im will correctly end up in last position if either co-occurs with one of the other three dependent roots mentioned in this rule.

We turn now to instigative cause.

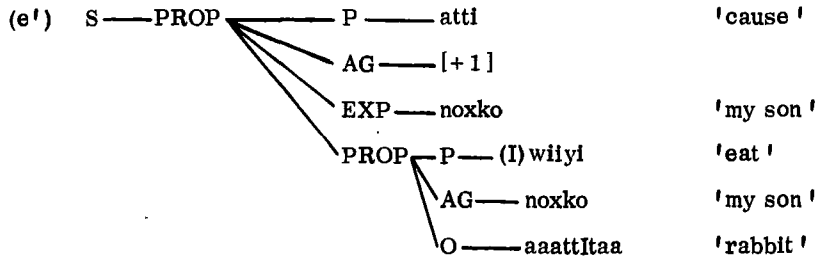
(e) nitsooyattsaawa nohkowa aattsistaayi

I-eat-cause-⟶3 my-son-3 rabbit-4

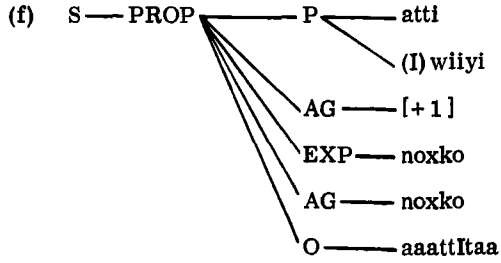
'I made my son eat the rabbit'

[18] Bloomfield called such formatives 'verb finals'.

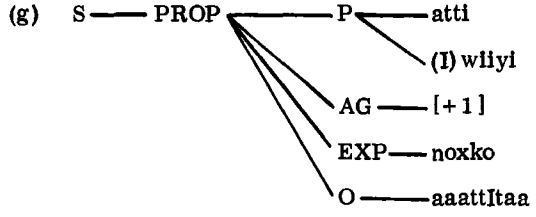
We consider (e') to be the correct simplified underlying configuration for (e):



Application of Proposition Consolidation to (e') would give (f):



There are two roles (EXP and embedded AG) with the same referent, and two referents ([+1] and noxko) with the same role. A rule to eliminate either duplication by deleting a participant (AG — noxko) which originated in the embeded PROP would give us the correct result, (g):



Extra Argument Extraction and Stem-final Positioning will convert (g) into the near-surface structure corresponding to (e).

Notice that it had to be a participant originating in the embedded PROP which was deleted above, else the wrong roles would have remained for actor and goal selection.

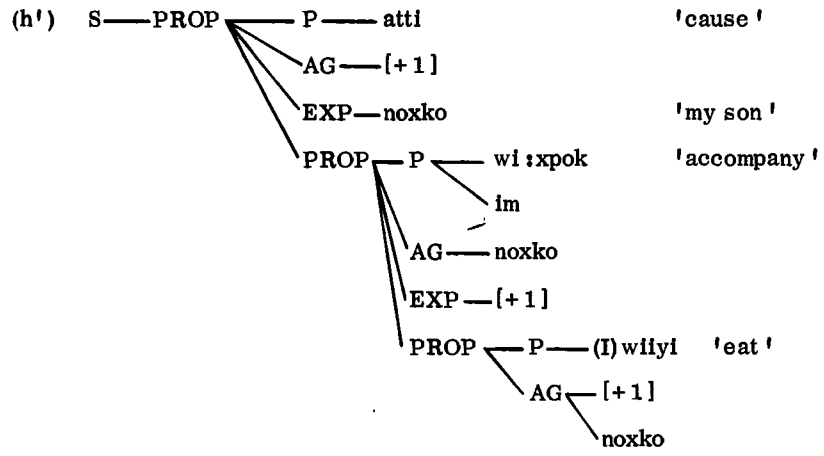
We can demonstrate that this deletion must take place before application of Proposition Consolidation, and, at the same time, show that (in all the combinations of the predicates we have considered, at least) it is the first argument of the embedded PROP which is deleted. To do this we take up sentence (h) which includes both causative and comitative:

(h) nitohpoksooyattsiima' nohkowa niistoyi

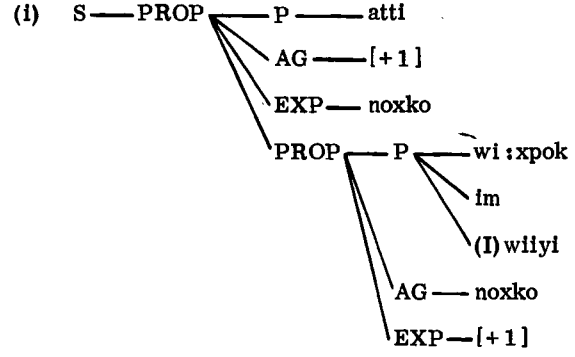
I-accomp-eat-cause-→3 my-son-3 I

'I made my son eat with me'

The structure underlying (h) is (h'):



(Notice that we are now treating the discontinuous predicate 'accompany' as consisting of two conjoined roots.) By either criterion, role duplication or coreferentiality, the conjoined referents as Agent in the most deeply embedded PROP must be deleted. Then after Proposition Consolidation applies once, (i) results:



In order to end up with the correct configuration, only the embedded Agent must be deleted from (i); the embedded Experiencer [+1] must remain to become the 'second object' (niistoyi) of surface structure (h). Thus our rule for deletion must delete only the first embedded argument, despite the fact that both arguments participate in role duplication and have coreferential participants in the main PROP. Because the concept 'first argument of the embedded PROP' is formally definable only before Proposition Consolidation has applied, the rule to carry out the deletion must apply before Proposition Consolidation. Tentatively choosing coreferentiality as the factor

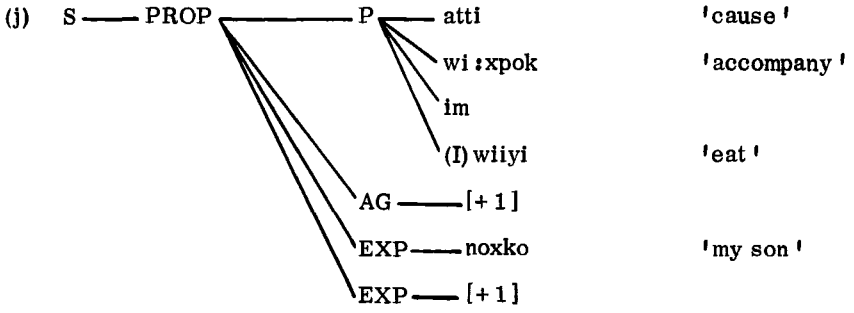
which triggers this kind of deletion, we formulate the rule as follows:

Embedded Role Deletion

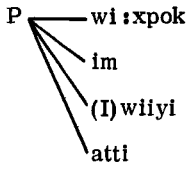
[X ;	ROLE : x ;	X ;	[P ; ROLE : y ;	X]$_{PROP}$]$_{PROP}$	
1	2	3	4	5	6	⟶
1	2	3	4	∅	6	

Condition: x = y (i.e., 2 and 5 are coreferential).

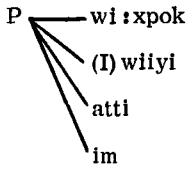
Following this deletion and the second application of Proposition Consolidation, (i) has become (j):



Extra Argument Extraction will move the third argument out of PROP. Stem-final Positioning will apply twice; the first time moving atti to stem final position to give:

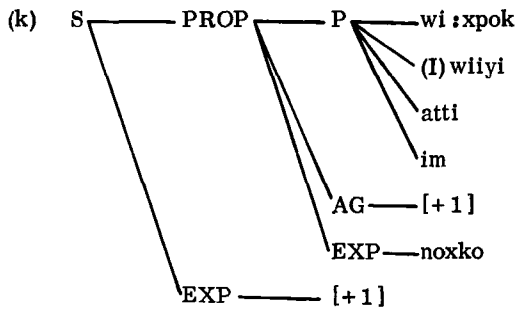


and again to move im to stem final position:



This is the order of roots in the verb stem of (j). We are left with (k), the near-surface structure corresponding to (h) [which we repeat beneath (k)]:

(k)



(h) nitohpoksooyattsiima' nohkowa niistoyi

I-accomp-eat-cause-→3 my-son-3 I

'I made my son eat with me'

Because (h) included the comitative predicate, we will treat an additional example only very briefly.

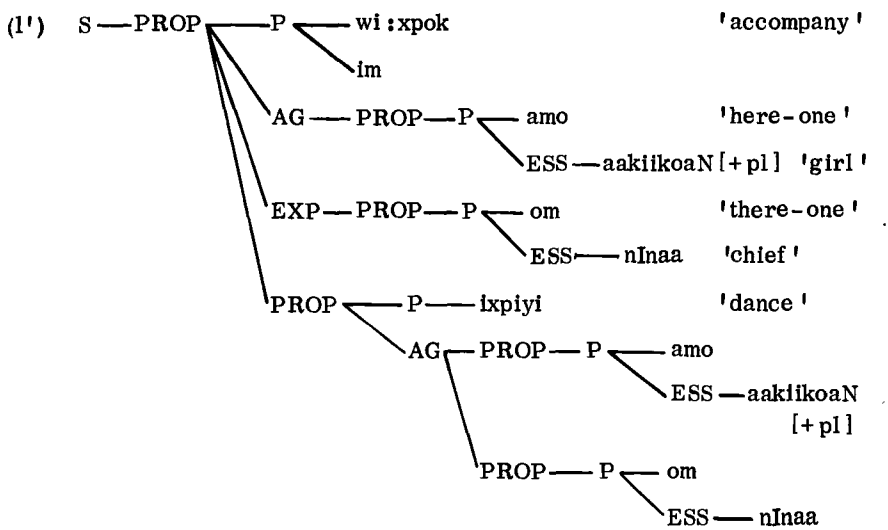
(l) amooksi aakiikoaiks iihpokihpiiimiiyaw omi ninaayi

those-3pl girl-pl accomp-dance-3pl-→4 that-4 chief-4

'Those girls danced with the chief'

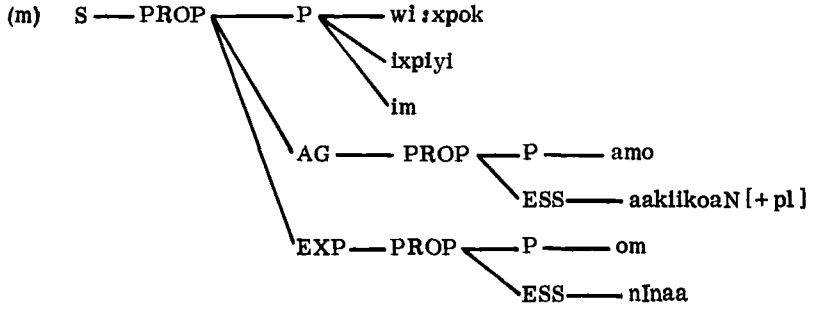
The underlying structure is (l'):[19]

(l')



[19] The source of the plural feature in a case such as this with a given set of referents is not dealt with in this thesis. [+pl] could be a predicate which has the remainder of the identificational PROP as its argument, but this poses additional problems. Another possibility is mentioned in 4.6.

(We have tentatively treated the demonstratives as predicates which take Essive as an argument [we are forced to change this in 4.6]. They will acquire person, number, and gender features of their arguments, perhaps by the same agreement transformation that carries actor features to intransitive verbs.) The rules that will apply to (1') are as follows: Embedded Role Deletion, Proposition Consolidation, and Stem-final Positioning. The result is the near-surface structure (m) corresponding to (1):



The reader may have noticed that the transformations discussed in this section cannot simply be either ordered or unordered. Peripheral Role Extraction and Extra Argument Extraction must be applied in that order. These two and Stem-final Positioning cannot apply until Proposition Consolidation is no longer applicable. And if applicable, Embedded Role Deletion must always apply before Proposition Consolidation. Thus the combination of Embedded Role Deletion and Proposition Consolidation make up a cyclic subset, applying alternately until neither is any longer of effect. Then Peripheral Role Extraction applies until no longer of effect. Next Extra Argument Extraction applies until no longer of effect. Stem-final Positioning applies anytime after the cyclic set is no longer of effect, but none of the conjunctively ordered subrules it abbreviates may apply more than once.

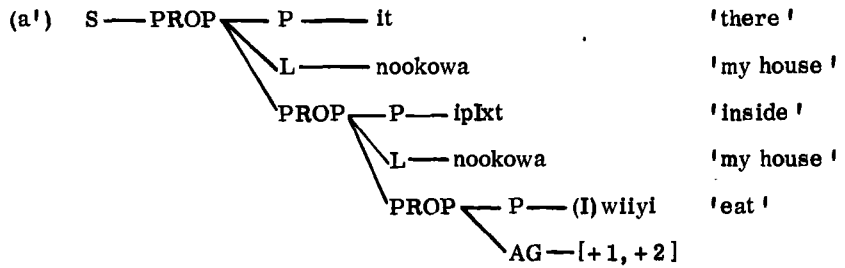
4.4.2. For Preverbs and Attributive Roots. In 1.4 we mentioned that there is a large number of preverbal elements which signal such things as aspect, manner, spacio-temporal relations, etc. When we consider these preverbal roots to be predicates (in the sense of this chapter) we find that we need no new rules to account for structures which contain them. We will look at a few such structures as examples (the term 'preverb' will be used from this point on to include what Taylor 1969 calls 'attributive roots').

A. Locational preverbs

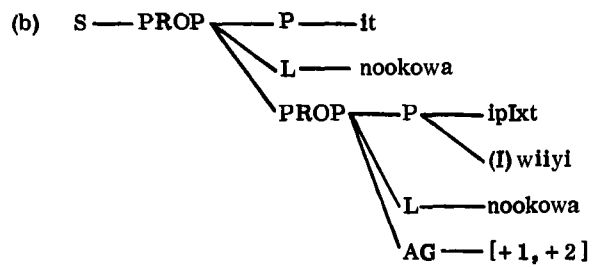
(a) itsipsstsooyo'pa nookowayi
there-inside-eat-12 my-house [+spec]
'we(12) ate in my house'

This example includes two locational preverbs, [[it]] 'there' and [[ipIxt]] 'inside'. Both are predicates which take the role Location (L) and PROP as arguments.

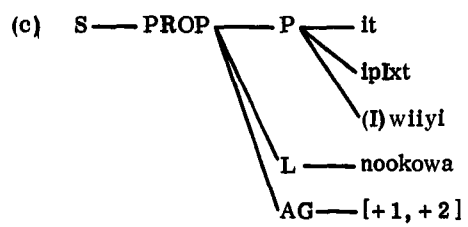
(a') underlies (a):



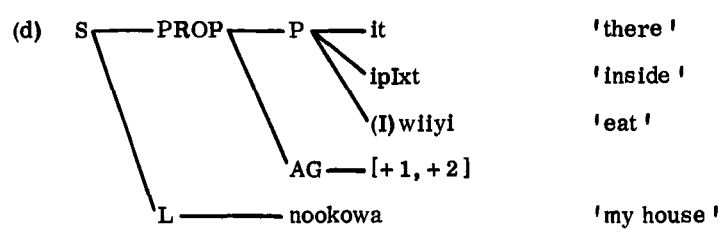
Proposition Consolidation applies to the most deeply embedded PROP to give (b).



Embedded Role Deletion removes the embedded L, and Proposition Consolidation applies again to give (c):



Peripheral Role Extraction moves L out of PROP and the result (d) corresponds to (a), including the correct order of the roots within the verb stem:



The lexical entries for these preverbs must include the following information:

it [P:_+L+PROP]

ipIxt [P:_+L(PROP)]

The contextual feature for ipIxt indicates that it may occur without an embedded PROP, to give sentences such as (e):

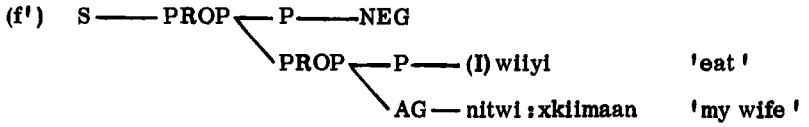
(e) aipsstsiwa 'he's inside'

Such dependent roots occurring 'independently' are extended by a 'theme ending', in this case apparently [[yi]].

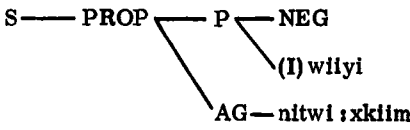
B. Negative preverb[20]

(f) matsooyiwaats (iksi) nitohkiimaana
neg-eat-3 [non-affirm] my-wife-3
'my wife didn't eat'

The underlying structure for (f) is (f'):

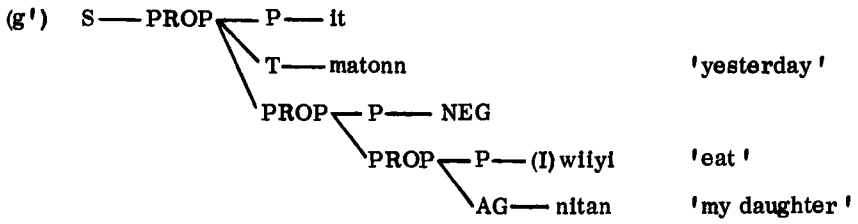


Proposition Consolidation gives the following configuration corresponding to (f):



NEG has the form [[mat]] in independent verbs such as (f) when not preceded by a preverb (see 1.1).

(g) matonni itsayooyiwa nitana
yesterday then-neg-eat-3 my-daughter-3
'my daughter was fasting yesterday'



Notice that this configuration, which also includes temporal preverb [[it]], accounts for the fact that the scope of NEG in (g) is less than the entire sentence. Proposition Consolidation applies two times, after which Peripheral Role Extraction moves T out of PROP to leave (h), the near-surface configuration corresponding to (g):

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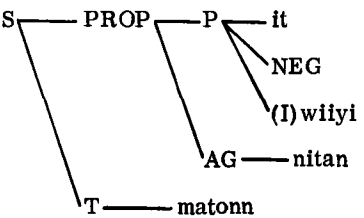
[20] See Taylor 1969, Section 752.6.

(h)



The shape of NEG here is ⟦sa⟧, because it follows a preverb.

(An interesting pair, which evidently differ only in scope of NEG, differ somewhat unexpectedly in English translation:

matakohkottsooyiwaats

neg-fut-able-eat-3 [non-affirm] 'he can't eat'

aakohkottsayooyiwa

fut-able-neg-eat-3 'he shouldn't eat (judgement)'

C. Quantifier preverb

(i) omiksi saahkomaapiiks iihkanaa'passkoyiaw omiksi aakiikoaiks

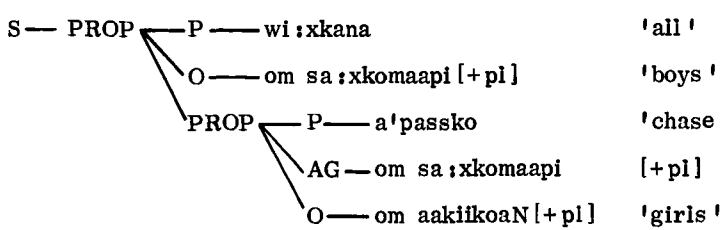
those boys-pl all-chase-3pl-→4 those girls-pl

'the boys all chased the girls'

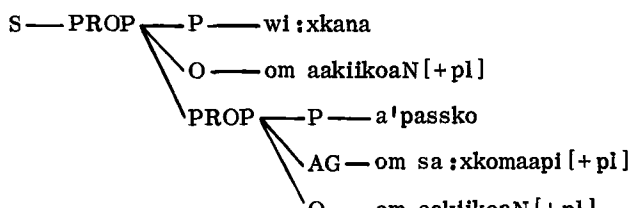
or 'the boys chased all the girls'

Sentence (i) is ambiguous because ⟦wi:xkana⟧ 'all, every' may quantify either the set as actor or the set as goal in (i). The two (tentative) underlying structures which lead to (i) are (i') and (i''):

(i')



(i'')



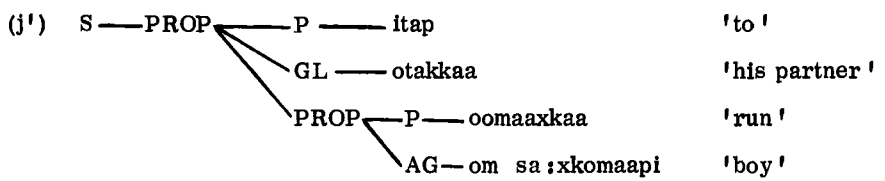
If these are the correct underlying configurations for such sentences,[21] our rules dealing with role deletion must be modified. As they stand now, Embedded Role Deletion would erroneously make no deletion in (i''), and would erroneously delete the Agent of (i'). (Nor will making role duplication rather than coreferentiality the criterion for deletion eliminate the problem; this would give the correct result in (i''), but would still fail in (i').) Evidently such a quantifier requires exceptional treatment so that the first argument of the quantifier is always deleted; if this is done, Proposition Consolidation and Peripheral Role Extraction will then give us the correct result.

D. Directional preverbs

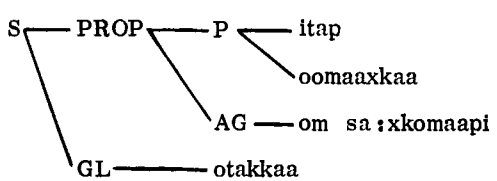
Several locative roots have preverbal counterparts ending in ⟦ap⟧ which are directional. Examples follow:

(j) oma saahkomaapiwa itapoomaahkaawa otakkaayi
that boy-3 to-run-3 his-partner-4
'that boy ran to his partner'

In (j), otakkaayi 'his partner' has participant role Goal; the verb itapoomaahkaawa is intransitive and inflected to agree with the third person actor. The simplified underlying structure is (j'):



Thus we consider itap to be a predicate which takes two arguments, a Goal and a PROP. (There is a relationship between presence of ⟦ap⟧ on certain preverbs and a semantic component of motion. Whether ⟦ap⟧ should itself be treated as a predicate, or is automatically added to such preverbal roots when they occur with a Goal or with a verb of motion, remains to be determined.) Proposition Consolidation and Peripheral Role Extraction will transform (j') into the near-surface structure corresponding to (j):



[21] Within a model utilizing role categories (as we are), the arguments of quantifiers probably should have a unique role; or, more likely, quantifiers should simply take variables (see 4.6) as arguments.

(k) nitsitapsskonaki kiistowa
I-to-shoot you 'I shot at you'

(l) kitsitapsskonaki niistowa
you-to-shoot I 'you shot at me'

(m) kitsipoohsapsskonaki
you-Iward-shoot 'you shot at me'

Examples (k) and (l) have underlying structures similar to (j'), and the same transformations will apply. They are included for comparison with (m), which is a near-paraphrase of (l) but has no overt Goal; the meaning of the preverb pooxsap is 'toward speaker'. Thus the underlying predicate takes only PROP as an argument.[22] The underlying structure for (m) is (m'):

(m') S — PROP — P — pooxsap 'I-ward'
PROP — P — Ixkonaki 'shoot'
AG — [+2]

Proposition Consolidation will give the correct near-surface structure.

E. Manner preverbs

(n) ikkini'poyiwa oma pookaawa
slow-speak-3 that-3 child-3 'the child spoke slowly'

(n') S — PROP — P — Ikkin 'slow'
AG — om pookaa 'the child'
PROP — P — I'poyi 'speak'
AG — om pookaa

(n'), the simplified configuration underlying (n),[23] will be transformed to a near-surface configuration corresponding to (n) by Proposition Consolidation. Note that the configuration (n') corresponds to the interpretation of (n) where the child deliberately spoke slowly; in a case where he is unable to speak otherwise, there would be no Agent in the matrix PROP.

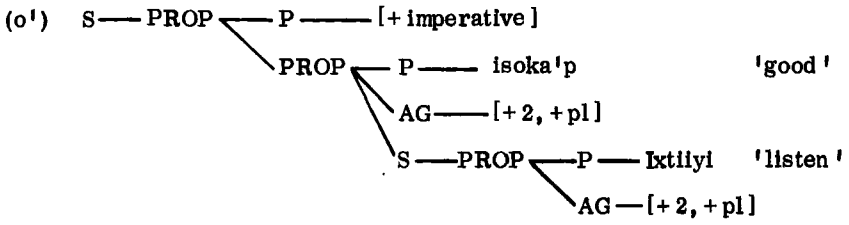
Consider now a manner preverb in an imperative form, (o):

(o) soka'pisstsiiyika
good-listen-2 pl(imp.) 'listen well!'

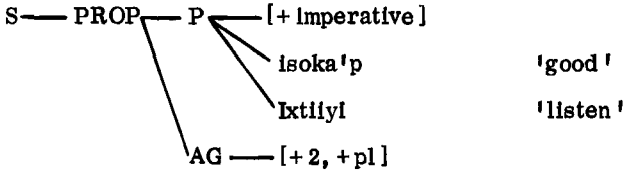
---

[22] Alternatively, we could require that this predicate occur with speaker as Goal and subsequently trigger deletion of that Goal. Still another alternative, more compatible with the generative semanticist position, would withhold predicate status from pooxsap; it would be a formative optionally inserted by the lexicon in place of the combination of itap and speaker as Goal.

[23] See Lakoff 1965.F-3ff concerning treatment of manner adverbials in English.



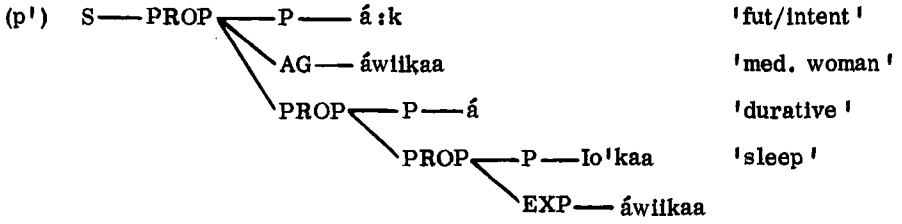
Here we see further reason for an Agent as an argument of the manner adverbial, for the abstract predicate [+ imperative] generally dominates a PROP whose main predicate has addressee as Agent.[24] Embedded Role Deletion and two applications of Proposition Consolidation to (o') give the near-surface configuration corresponding to (o):



F. Aspectual preverbs

Five of these were discussed in 1.4. We will illustrate using an example that contains two of them:

(p) aakayo'kaawa aookaawa
fut-dur-sleep-3 medicine woman-3[25]
'the medicine woman will be sleeping'



Underlying configuration (p') corresponds to the 'intentive' interpretation of [[á:k]] in (p); the same configuration without an Agent would correspond to the simple future interpretation of (p). Without the Agent, Proposition Consolidation alone would apply; with the Agent, both Embedded Role Deletion and Proposition

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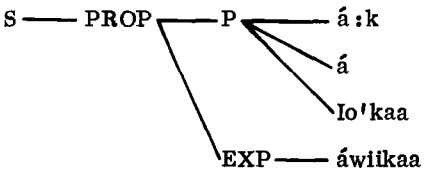
[24] It is probably more accurate to say that the imperative predicate presupposes that the addressee is, to some extent, able to initiate the embedded proposition. This explains why verbs such as 'sleep', 'see', 'hear', etc., sometimes occur in the imperative, even though they don't take Agent.

We must assume that the 'incantation' use of imperative forms, such as sayootat 'rain!', has a slightly different source.

[25] The word glossed 'medicine woman' is a verb ('she sponsors-a-medicine-lodge') used as an agent noun.

Consolidation apply. In either case, the near-surface configuration corresponding to (p) results:



Summarizing our treatment of preverbal elements, we have considered each of them to take PROP as an argument. In making use of Proposition Consolidation to account for the resultant surface structures, we are claiming that, in general, a preverbal formative has as its scope all formatives to its right in the same stem. This seems to be confirmed by the meanings of verbs containing these preverbs.

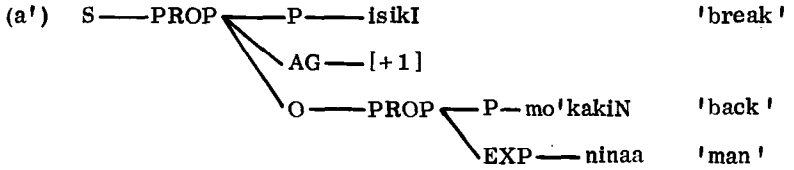
4.4.3. Noun Incorporation Reconsidered. A completely unexpected result of the model revisions we have made thus far is that the rule termed Proposition Consolidation, which accounts for so much in earlier sections, can be considered to account for the phenomenon we labeled 'noun incorporation' in 3.7. In that section we related sentences such as 3.7(a) and 3.7(b), repeated below as (a) and (b), by what we termed Possessor Elevation, after which we assumed the existence of a rule termed Noun Incorporation which further modified the structure underlying 3.7(b) to that corresponding to 3.7(c), repeated below as (c).

(a)? nitssiksiihpa oma ninaawa o'kakini
I-break(TI)-it that-3 man-3 his-back[+spec]

(b) nitssiksisstoaw oma ninaawa o'kakini
I-break(TA)-→3

(c) nitssiko'kakinaw oma ninaawa
I-break-back-→3
'I broke the man's back'

Within the model of this chapter, as we have outlined it thus far, the underlying structure for (a) would be as follows:

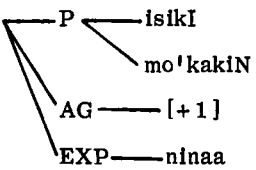


mo'kakiN 'back' is a predicate within a PROP, as will be all nouns in 4.6 (most nouns will have Essive as one of their arguments). Fillmore 1968a, in a very interesting discussion of "the grammar of inalienable possession", has given good reason to treat the possessor of a 'relational' noun as a participant in the role of

Experiencer (called 'Dative' in Fillmore 1968a). In a generalized predicate grammar, this Experiencer is an argument of the possessed noun. For 'obligatorily possessed nouns' (1.3.1) EXP will be an obligatory argument; for 'inherently possessed nouns' (1.3.2) it will be optional. Hence the underlying configuration (a') above has EXP as an argument of the predicate mo'kakiN.

If we optionally relax the condition on Proposition Consolidation (p. 97) for roots, such as isikI 'break', which allow incorporation of certain nominal roots (body parts, primarily), we find that it converts (a') to (d), which is the near-surface structure corresponding to (c):

(d)



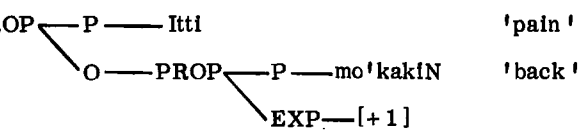
Notice in this treatment of the relationship between (a) and (c) we do not make use of an intermediate step corresponding to (b). Thus while Possessor Elevation and Proposition Consolidation both result in a possessor becoming goal, they are separate and mutually exclusive processes if we accept the suggestion of this section.

What of the other examples of noun incorporation in 3.7? The relationship between 3.7 (h) and 3.7 (i), repeated here as (e) and (f), adds further evidence for the correctness of the above suggestion:

(e)	no'kakini	aisttsiwa	
	my-back	dur-pain [-an]	'my back hurts'
(f)	nitaisttso'kakini		
	I-dur-pain-back		'I have a backache'

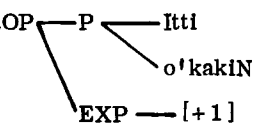
The predicate structure underlying (e) is (e'):

(e')



Application of Proposition Consolidation (with the condition relaxed) gives us (f'), the near-surface configuration corresponding to (f):

(f')



Again we see that 'noun incorporation' of 3.7 can be considered an example of a much more general process, previously disguised by the noun/verb distinction and by use of functions actor and goal in underlying structure.

4.5. Predicate vs. Lexical Formative. Near the end of 3.7 and again in 4.4.3 we related two semantically equivalent sentences, which we repeat here as (a) and (b):

(a)	no'kakini	aisttsiwa	
	my-back [+ spec]	dur-pain [-an]	'my back hurts'
(b)	nitaisttso'kakini		
	I-dur-pain-back		'I have a backache'

We considered (a) to be more basic, and said that (b) was the result of a kind of 'noun incorporation'. While the number of predicates which permit such noun incorporation is relatively small, we could list numerous examples of each, and in most cases the root that is incorporated will be a body part. We would need to list very few, however, before it would become evident that a large number of the roots have a different shape when incorporated than they do when 'independent'. Compare (c) and (d), and also (e) and (f).

(c)	no'tokaani	aisttsiwa	
	my-head [+ spec]	dur-pain [-an]	'my head aches'
(d)	nitaisttsisspi		
	I-dur-pain-head		'I have a headache'
(e)	noohkatsi	aisttsiwa	
	my-foot [+ spec]	dur-pain [-an]	'my foot aches'
(f)	nitaisttsiika		
	I-dur-pain-foot		'I have a footache'

In (c) and (d) 'head' is ⟦mo'tokaan⟧ and ⟦Ixpi⟧, respectively; in (e) and (f) 'foot/leg' is ⟦mooxkat⟧ and ⟦Ika⟧, respectively.[26] If we are correct in relating pairs such as (a) and (b) by optional transformations, we should surely so relate the pairs (c), (d) and (e), (f).

Now, the lexicon as we presently conceive it is a listing of predicates. A part of each predicate entry is a set of conditions which constrain the configurations which may contain that predicate. Additionally, each entry contains a specification of the underlying phonological shape of the predicate. (See Fillmore 1968c.66, for a listing of other types of information that the lexicon must include.) In the case of suppletion such as that just illustrated, the shape of a given root is not determinable until after the optional transformation which incorporates the noun has either applied or been bypassed. When lexical insertion is viewed as a process as in Chapter 2 (and as in Chomsky 1965), sufficient information is inserted with the predicate to

[26] Voegelin 1940 pointed out the existence of these doublets as a "special development" of Blackfoot "in contrast to the Central Algonquian languages".

later determine its correct shape(s). But if the lexicon were to 'spell' formatives after application of the aforementioned transformational rules, the problem of suppletion would be greatly simplified.

Before elaborating on this revision of lexicalization, let us consider some other facts that may be relevant to such a change. Recall that as long as we considered only simple verb stems we were able to account for regular transitivity derivational processes by T-rules (transitivization and pseudo-intransitivization; see 3.1) in terms of presence or absence of a [+specific] goal. But when we dealt with benefactives (3.4), instigative cause (3.5.3), and comitatives (3.6), we found that there was no stage in the derivation of sentences containing these verbs when the transitivity transformations would always give the correct results. We found, instead, that the shape of the stem with regard to transitivity was conditioned by presence of the benefactive, causative, and comitative finals; this means that the transitivity transformations must apply after Proposition Consolidation combines all the roots of a complex verb, and they must be sensitive to presence of these verb finals. The shape of irregular verb roots, too, is a function of presence or absence of these finals.

We found in 3.3.2 and 3.3.3 that regular stems have their 'transitive animate' shape before the reflexive and reciprocal formatives; but rather than rely on underlying structure to account for this fact, as we did in 3.3, we could as well predict their shape post-transformationally in terms of presence of the transformationally inserted reflexive and reciprocal formatives. For stems which are irregular in this regard, we must determine their shape post-transformationally.

It is possible to view all such stem-shape prediction as part of the spelling-process of predicates which, as we have suggested, takes place after most transformations have applied.

Formatives which are present in surface structure but are not themselves predicates and hence are not present in the underlying configuration, may either be given their phonological shape by the same rule that inserts them or be spelled later. Both the reflexive and reciprocal formatives evidently have a constant underlying shape in all contexts, so either treatment is adequate for them. But many inflectional affixes have shapes determined by surface syntactic environment (e.g., the verb paradigm 'order'--see 1.5); this is why in 2.1 we had transformations add features rather than affixes and later used spelling rules to give the features substance as affixes. Recent work by generative grammarians (see, e.g., Jacobs and Rosenbaum 1968, Chapter 11) makes use of 'segmentalization' rules to add abstract affixes (feature bundles) to stems in the proper order, in accordance with the features present in the stem. Then a 'second lexical pass' inserts formatives for these abstract affixes according to both the features in the bundle and their context. This same second lexical pass may also be used to 'respell' suppletive formatives in terms of their environment.

Now, the surface shapes which correspond to predicates really have no place in underlying structure; the latter is a linkage of propositions which express the meaning of a discourse. And because a 'second lexical pass' seems to be necessary anyway, why not more clearly distinguish the two functions of what is called the lexicon: (1) inventory of predicates with information relevant to underlying configurations which may contain them and to applicability of transformations to those

configurations; (2) spelling of formatives which correspond to abstract entities in near-surface structure. (Bach 1968.117 proposed such delayed insertion of phonological shapes in the following hypothesis:

"... that the base component does not actually add a phonological representation to the complex symbols of deep structure but merely develops the sets of semantic and syntactic features, which are then mapped into phonological shapes after the operation of the transformational rules [or some part of the transformational rules]."

Here, however, we maintain the need for a language-specific inventory of entities [the predicates] with semantic and syntactic properties rather than a 'development' of sets of features by the base as the above quote seems to suggest.)

Distinguishing the two functions of the lexicon, we can conceive of it as consisting of two parts with links between their members. Schematically, these can be represented as two lists: a list of predicates, and a list of formatives in their (redundancy-free?) systematic phonemic shape. Most predicates will be linked to one formative and vice-versa, but many predicates will have disjunctively ordered realizations ('allomorphs'); other predicates (Lakoff's 'abstract predicates') will have no surface realization. Some formatives will have no link to a predicate because they are purely transformational in origin. Configuration portions made up of more than one predicate may be realized by a single formative (Gruber 1967a and b, Grimes and Glock 1970).

Many derivational transformations, such as the transitivity transformations of 3.1, can be viewed as capturing generalities in the spelling of stems by the formative part of the lexicon. So such transformations are not really 'post-lexical' but lexical. This is true of derivational processes in general; thus the addition of suffix [[xsiN]] ~ [[n]] to a Blackfoot verbal root which is in nominal function in surface structure is part of the process which replaces the verbal predicate by a formative. Stems which show the result of derivation in irregular ways do not require separate rules as such; it is just that they do not participate in the generality captured by a derivational 'rule' in the lexicon and so are spelled by the lexicon without benefit of the savings afforded by the general rule (see 4.5.2).

Thus a grammar of English, e.g., will not use a special rule to change full to fill when the latter has been substituted for the abstract developmental predicate (Langendoen 1969.107-109, 129 [the term 'inchoative' is used there for developmental]); rather fill will be spelled by the lexicon without benefit of any savings afforded by rules applicable to classes of formatives which have more general 'changes' in this environment. [27]

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[27] full and fill will not be completely different formative entries in this portion of the lexicon. They will be combined, somewhat as follows (using standard English orthography):

FILL	f	i / u	ii	/	[+DEVEL] / elsewhere

(I first saw such a technique proposed for partial suppletion in Fidelholtz 1968, which referred to Gruber's proposals for lexical insertion.) Actually, the 'elsewhere' in the rule is superfluous because the sub-rules will be considered disjunctively ordered. See below (4.5.1).

Nor will fast have a 'zero' realization of the 'suffix' -ly that is added to adjectives such as slow when they end up in adverbial function in surface structure. The lexicon merely inserts the formative fast in that particular environment; the lexical rule which captures the generality for other adjectives in that environment is inapplicable.

Summary. Because many morphemes of a given language cannot be spelled until their post-transformational context is determined and, indeed, many morphemes are actually inserted by transformations, we propose that all spelling (insertion of phonological information) of formatives take place post-transformationally. This leads to greater distinction between the two main roles of the lexicon: first, it is an inventory of the predicates that may appear in underlying configurations of the language; second, it is a listing of formatives corresponding to post-transformational entities (predicates in particular surface syntactic functions, derived entities such as the reflexive, and segmentalized feature complexes). There are formal links between those predicates which have overt surface realizations and their corresponding formatives. Thus all predicates in underlying configurations are abstract (semantic) entities, and remain so until after most transformations have applied. (The only transformations which clearly do not precede formative insertion are those dealing with generalities of formative spelling itself, and thus are themselves part of the lexicon. Reordering transformations which have no effect on the choice of formatives probably apply after formative insertion.)[28]

Henceforth all Blackfoot predicates, though represented in a particular transcription for identification, will be underlined to indicate their abstract nature until the point where formative insertion takes place.

4.5.1. Formative Insertion. We close this section with a few sample lexical entries and informal description and exemplication of the process of formative insertion. At first our sample will not take advantage of savings provided by derivational rules. Then we will show how such savings are effected in the lexicon.

As stated earlier (4.3), predicates are not 'inserted'. Rather, PREDCOND_i (see the sample lexicon on the next two pages) is a context sensitive node admissibility condition (McCawley 1968) for well-formed underlying configurations containing the corresponding PRED_i. To most predicates there corresponds a set of one or more formatives; this correspondence is indicated in the sample lexicon by placing the set of formatives to the right of the corresponding predicate:

$$\text{PRED}_i \qquad \text{PREDCOND}_i \qquad \left\{ \begin{matrix} \text{FORM}_{i,j} \\ \text{FORM}_{i,j+1} \end{matrix} \right\} \qquad \text{FORMCOND}_{i,j}$$

Thus $\text{FORM}_{i,j}$ is one member of the set corresponding to PRED_i. The distribution of members of one formative set is given as a disjunctively ordered set, so that $\text{FORM}_{i,j}$ is inserted in the post-transformational environment specified as $\text{FORMCOND}_{i,j}$. Because the set is ordered, the last member of the set FORM_i occurs in all environments except those specified for the previous members.

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[28] The derivational stage at which formative insertion takes place is a likely candidate for the label 'shallow structure' (Lakoff [forthcoming]).

Sample Lexicon (without savings provided by LT rules)

PRED (predicate)	PREDCOND (predicate condition)	FORM (formative)	FORMCOND (formative condition)
I:n (see)	P:_ + EXP:x + O:y	I:no I:n	$\left[\frac{\quad}{<[X],[+an]>}\right]_P$
it (then/there)	P:_ $\left\{\begin{matrix}L\\(T)\end{matrix}\right\}$ PROP	It it	$\#\left[\frac{\quad}{-indep}\right]_P$
Iyimmi (smile, laugh)	P:_ + AG	IyimmixsiN Iyimm Iyimmi	ROLE:___ [_PRED]$_P$
a'ki (hit, strike)	P:_ + AG:x + O:y [± spec]	a'kia:kixsiN a'kia:ki a'ki	ROLE:_ $\left[\frac{\quad}{<[X],[-spec]>}\right]_P$ or [X_ $\left\{\begin{matrix}\underline{atti}\\\underline{ipi}\end{matrix}\right\}$]$_P$ or [wi:xpok + X_X]$_P$

Sample Lexicon (continued)

wi:xpomm (buy)	P:_ + AG:x (O:y [± spec])	wi:xpommaan	ROLE: ____
		wi:xpommatw	$\left[\overline{\quad\quad}\right]_P$ <[X], [+spec]>
		wi:xpommaa	[X_ {(i) mwi / REFL / RECIP}]$_P$
nInaa [+an] (chief)	P:_ + ESS	nInaa	#____
		Inaa	
mwimii [+an] (fish)	P:_ + ESS	mamii	#____
		wimii	
ipi (cause)	P:_ + AG:x + EXP:y + PROP:A_1 :z (see 4.3.1) y=z	ipi	C____
		V_1pi	V_1____
itan [+an] (daughter)	P:_ + EXP:x + ESS:y x≠y	itan	
kipita (old)	P:_ + EXP	kipita	#____
		Ippita	

Thus the formative insertion rule replaces $PRED_i$ (in the tree) by the first member of the set $FORM_i$ which is not distinct from the context of $PRED_i$. For example, in the near-surface structure (a),

(a) S——PROP——P——I:n [< [+1], [+3, +an] >] 'see'
EXP——[+1]
O——wi:mitaa [+3, +an] 'dog'

the context of I:n 'see' matches (is a sub-set of the contexts defined by) the first FORMCOND corresponding to PRED I:n in the sample lexicon. (Recall [from 2.1] that angle brackets enclose an ordered pair.) Thus ⟦I:no⟧ is inserted for I:n. Likewise, in (b),

(b) S——PROP——P——a'ki [< [+1] [-spec] >] 'hit'
AG——[+1]
O——wi:mitaa [-spec, +an] 'dog'

a'ki would be replaced by ⟦a'ki⟧ if 'dog' were [+spec], but because the object is [-spec], a'ki is replaced be ⟦a'kia:ki⟧.

4.5.2. Lexical Transformations. As we said in 3.1, the ⟦a:ki⟧ extension is very common and so a generality would be missed by listing, as we did above, both extended and unextended formatives for predicates such as a'ki. We also said in 3.1 that the class of such predicates seems to be the one we termed Transitive and defined by subcategorizational feature [+VP: _ NP]; i.e., those which always take an object but which object may be [-spec]. In the model of this chapter, this class of roots is defined as those which take at least two arguments, the second of which may be [-specific]:

[___ x+y [± spec]]

To capture the generalization for this class of predicates, we make use of a lexical transformation (LT) which applies to the formative before it is inserted. Such a transformation may refer both to the context of the $PRED_i$ to be replaced and to the $PRECOND_i$ associated with the lexical entry i.

Formative insertion, then, selects the first $FORM_{i,j}$ whose $FORMCOND_{i,j}$ is non-distinct from the context of $PRED_i$, then checks $PREDCOND_i$ and the context of $PRED_i$ against the SD of all LTs; after any applicable LTs have applied, the resultant formative shape is inserted.

This allows us to simplify the lexical entries for all predicates whose formatives participate in regular derivational processes. The entry for a'ki, e.g., will be simplified from that shown above to the following:

a'ki P: _ AG:x+O:y [± spec] { a'kiaakixsiN ROLE: _ ; a'ki }

The lexical transformation which makes this saving possible is as follows (because the condition for these rules is more complex than the rule itself, we use a slightly different rule format):

Intransitivization

$$\underline{\text{IF}} \quad \left\{ \begin{array}{l} \left[\begin{array}{l} \text{PRED}_i \\ <[\text{X}], [-\text{spec}]> \end{array} \right]_{\text{P}} \\ [\text{X} + \text{PRED}_i + \underline{\frac{\text{atti}}{\text{ipi}}}]_{\text{P}} \\ [\underline{\text{wi:xpok}} + \text{X} + \text{PRED}_i + \text{X}]_{\text{P}} \end{array} \right\} \quad [\text{PRECOND}_i = [\_\ \text{x} + \text{y}\ [\pm\underline{\text{spec}}]]]$$

$$\underline{\text{THEN}} \quad \text{FORM}_i \longrightarrow \text{FORM}_i + \text{a:ki}$$

(read the dot '.' as 'and')

We have added contexts other than occurrence with a [-spec] object to the condition for this rule; recall that in 3.5.3 and 3.6 we found that occurrence with causative or accompaniment predicates also calls for the intransitive form of such roots.

Notice in the sample lexicon that a'ki also has another formative shape when it occurs in surface nominal function. Comparing this with the shape of other intransitive verbal predicates in nominal function, we find that there are two extensions which are in complementary distribution: ⟦n⟧ ~ ⟦xsiN⟧ ; the former occurs with stems ending in ⟦aa⟧, the latter elsewhere. We note also that ⟦xsiN⟧ is added to verbal formatives like ⟦a'ki⟧ after they have been extended by Intransitivization. Thus we add the following context to the condition for Intransitivization:

ROLE: $[\text{X} + \text{PRED}_i]$

And we order Nominalization after Intransitivization:

Nominalization

$$\underline{\text{IF}} \quad [\text{X} + \text{PRED}_i]_{\text{ROLE}} \ . \ [\text{PREDCOND}_i = \left\{ \begin{array}{l} [\_\ \text{x} + \text{y}\ [\pm\underline{\text{spec}}]] \\ [\_\ \underline{\text{x(y)}}] \\ [\_\ \underline{\text{x}}\ ] \end{array} \right\}]$$

$$. \ (\text{FORM}_i = [\ \ldots\underline{\text{aa}}])_a$$

$$\underline{\text{THEN}} \quad \text{FORM}_i \longrightarrow \text{FORM}_i + \left\{ \begin{array}{l} (\underline{\text{n}})_a \\ \underline{\text{xsiN}} \end{array} \right\}$$

(portions in a subscripted parentheses are mutually null or non-null)

A lexical transformation can also account for the transitivizing extension ⟦atw⟧ which occurs with roots (such as wi:xpomm 'buy') we termed Pseudo-intransitive in 3.1. In this chapter these will be defined as roots with PREDCOND [_ x(y)]. Such roots are extended by ⟦atw⟧ when they occur with a goal, or if they occur with the reflexive or reciprocal. And if we distinguish, as two predicates, the two benefactives (i)mwi and o (3.4), we can add (i)mwi to the list of factors calling for transitivization.

Transitivization

IF $\left\{ \begin{array}{l} \left[\begin{array}{l} \text{PRED}_i \\ <[X], [+\text{spec}]> \end{array} \right]_P \\ [\text{PRED}_i \left\{ \begin{array}{l} (\text{i})\text{mwi} \\ \text{REFL} \\ \text{RECIP} \end{array} \right\}]_P \end{array} \right\}$. $[\text{PREDCOND}_i = [\_ x(y)]]$

THEN $\text{FORM}_i \longrightarrow \text{FORM}_i$ + atw

We can further simplify lexical entries by use of more abbreviatory conventions. E.g., the formatives for those nominal roots which have a nasal increment when initial can be listed as follows, taking 'chief' as an example:

nInaa (chief)	P:_ + ESS	n)$_a$ Inaa	(#)$_a$ ___

The a subscript indicates that both sets of parentheses are mutually empty or non-empty. Roots with more extensive variation can still offer some savings:

kipita 'old'	P:_ + EXP	ki / Ip	pita	# ___

A variation on the treatment of derivational processes outlined above should be mentioned here. If the lexical transformations were to apply just previous to lexical insertion rather than as part of it, they could add abstract entities, representing the derivational portion of formatives, to predicates. Then these abstract entities would be replaced by formatives from the lexicon. E.g., Nominalization would have the following form:

$[X ; + [X]_{\text{PRED}_i}]_{\text{ROLE}}$

1 2 $\longrightarrow$

1 2+NOM

Conditions: $\text{PREDCOND}_i = \left\{ \begin{array}{l} [\_ x + y [\pm \text{spec}]] \\ [\_ x(y)] \\ [\_ x] \end{array} \right\}$

ROLE directly dominates 1+2

The lexicon would then contain an entry for NOM:

NOM (derived) $\left\{ \begin{array}{l} \text{n} \\ \text{ixsiN} \end{array} \right\}$ Xaa_

We would still call the derivational rules 'lexical transformations', because they occur just prior to lexical insertion and may refer to information listed in the lexicon.

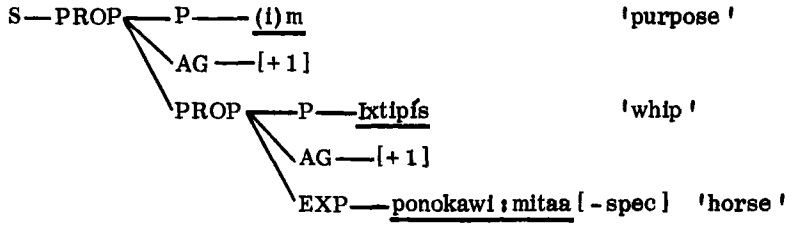
We tentatively choose the former variant of derivational treatment because it does not require the extra lexical entries for derivational formatives.

4.5.3. 'Purposefulness' as a Predicate. At this point we are able to describe the status of the 'purposefulness' suffix (3.2). Recall that in 3.2 we had difficulty deciding at what point in the generation of a sentence the element should be chosen. In the model of this chapter, there is only one course possible: because choice of the element is meaningful, it is a predicate, present in the underlying configuration. Thus the configuration underlying 3.2(c), repeated here as (c), is (c'):

(c) nitaisstsipisimaa ponokaomitai

I-dur-whip-purp horse [-spec]

'I whip horses (purposefully)'

(c') 

In 3.2 we contrasted (c) with 3.2 (d), repeated here as (d):

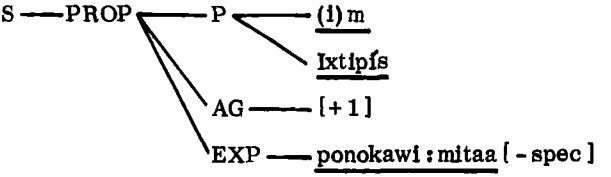
(d) nitaisstsipisimataw amo ponokaomitaawa

I-dur-whip-purp-trans-→3 this-3 horse-3

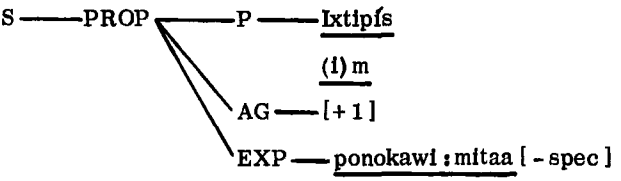
'I whip this horse (he requires it)'

The configuration underlying (d) differs from (c') only in that 'horse' is [+3], rather than [-spec] as in (c').

Embedded Role Deletion and Proposition Consolidation convert (c') into (e):

(e) 

(i)m must be added to the list of finals which are moved to the end of a verb by Stem-final Positioning (4.4.1); its application will then give us (f):

(f) 

In the 'intransitive' context of occurrence with a [-spec] object, (i)m is replaced by formative ⟦(i)maa⟧ (the ⟦i⟧ is present only after a consonant). In the derivation

of (d), with a [+spec] goal, (i)m is replaced by formative ⟦(i)matw⟧. Thus the lexical entry for im would be as follows:

(i)m P: _ + AG:x + PROP:[AG:y + A_2:z [±spec]] ⟹ {(i)matw [<[X], [+spec]>]$_P$ / (i)maa}

x = y ≠ z

The condition 'y ≠ z' is necessary because (i)m never occurs in reflexive constructions. (i)m will also participate in a number of negative conditions of the type discussed in 4.3.2.

(Instead of ⟦(i)matw⟧ we could list ⟦(i)m⟧ and modify LT Transitivization so that it adds ⟦atw⟧ to (i)m as well as to [_x(y)] verbs; this would not seem to offer any saving, but it does capture a generalization of sorts.)

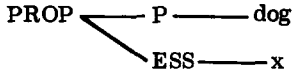
Nominalization also may apply to verbs with (i)m:

aisstsipisimaani 'purposeful whipping'

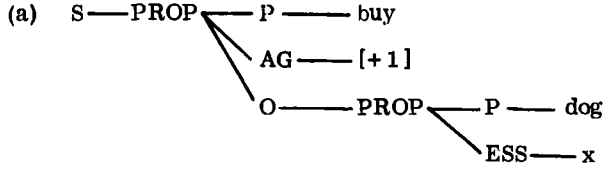
4.6. Variables and Reference.

4.6.1. Further Model Revision. Bach 1968 introduced the use of variables into deep structure to serve a dual purpose: they are arguments for predicates, and they serve as referential indices. Because he proposed that all nouns be introduced into deep structure by way of relative clauses, the variables were necessary to serve as the 'head' constituents of those relative clauses. For example, in the sentence I bought a dog, the NP a dog has a source paraphraseable as 'x, such that x is a dog'. The fact that the variables also have referential identity serves to define coreferentiality for purposes of pronominalization, deletion, etc.

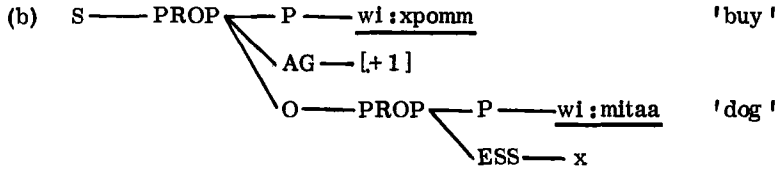
In the predicate model as we have developed it thus far, the equivalent of 'x is a dog' is a proposition with 'dog' as predicate and x as Essive argument.



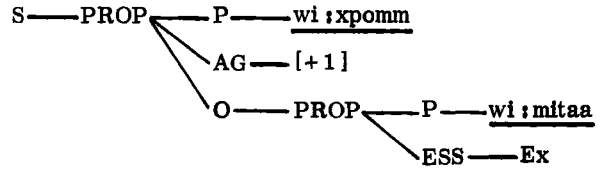
The sentence 'I bought a dog' would have the following underlying configuration (ignoring tense):

(a)


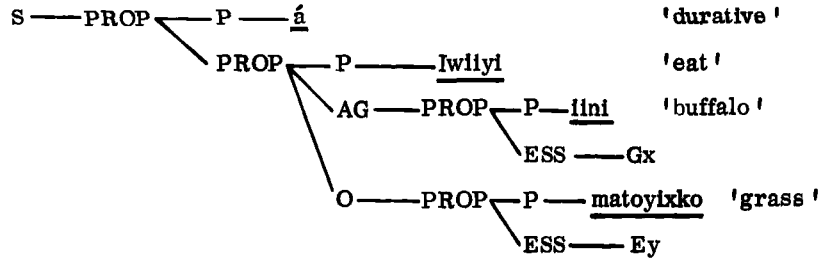
([+1] is the referential indicator for the speaker--see 4.3.1). For Blackfoot the configuration would be the same if the speaker has a particular referent in mind which he is identifying as a dog:

(b)


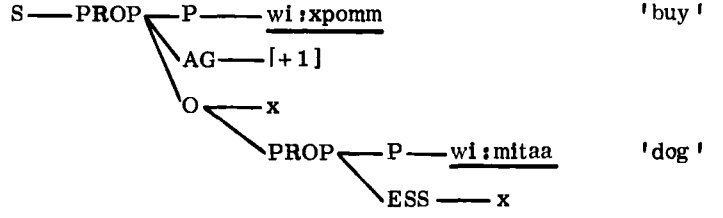
If, on the other hand, the speaker has no particular dog in mind, but merely wishes to express the fact that he made a dog-purchase, the sentence will have the following configuration:[29]

(c)


We are using the symbol 'E' in place of the '∃' of symbolic logic; the latter is known as the 'existential quantifier' and usually means 'there is at least one'. This is approximately the meaning we have previously ascribed to the feature [-spec], and so we incorporate this operator (E) along with the use of variables into our model. Variables which represent specific referents will have no operator. We will also need an operator corresponding to the [+generic] feature (1.2 and 2.1); we can symbolize it as G. The Blackfoot equivalent of 'buffalo eat grass' will then have the following underlying configuration:[30]

(d)


We have said that we are incorporating variables into our model, but thus far we have used them only as referential indices. Returning to the NP 'a dog' used earlier, notice that we have accounted for only the last part of the paraphrase 'x, such that x is a dog'. If we were to follow Langendoen 1970.109 and allow variables to have propositional complements, we would be in a position to treat the variables (and their complements) as arguments in any of the roles. 'I bought a (particular) dog' would then have the following underlying structure:

(e)


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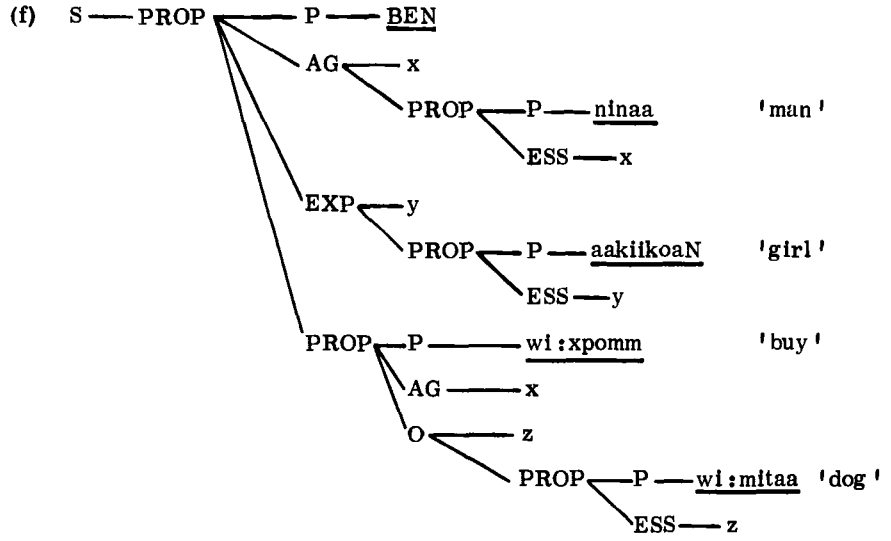
[29] Recall (from 1.2) that verbs with non-specific objects are intransitive with regard to stem shape and inflection.

[30] This is not equivalent to (x) [buffalo(x) ⊃ (∃y)[grass(y) . (eat (x,y)]] as most texts on symbolic logic would have it; the latter approximates configurations with predicates all and wi:xkana (4.4.2) in English and Blackfoot, respectively.

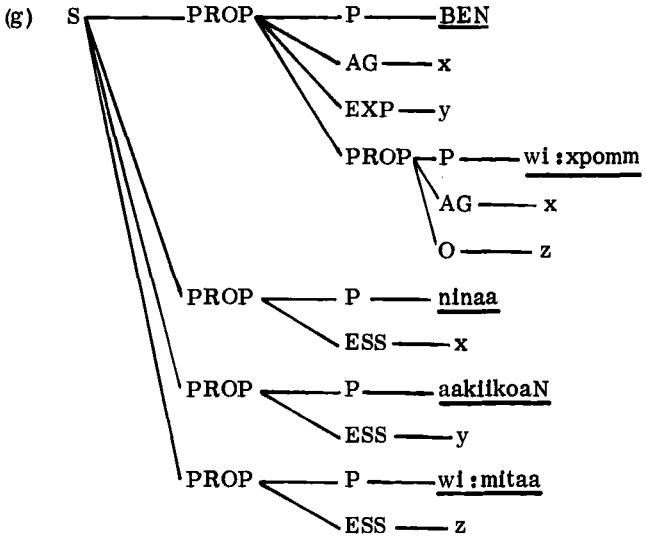
This formulation allows us to require coreferentiality in well-formedness conditions and transformation structural descriptions without concern about identity of the expressions which are coreferential. Thus in the underlying configuration for 'the man bought the dog for a (particular) girl', ninaa 'man' no longer need appear twice as Agent, as it would have in our earlier treatments; we require only that the variable corresponding to this referent occur in both places:

(f)

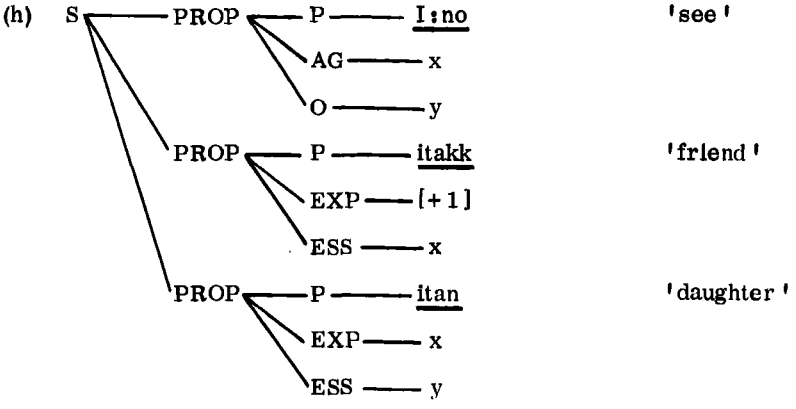


But the question immediately arises as to why the identification of the referent x as a man is shown to be a constituent of a particular argument of BEN. McCawley 1970 says that referential indices represent conceptual entities which exist in the mind of the speaker, and that noun phrases in discourse serve the purpose of establishing or identifying such conceptual entities for the addressee. In accord with this line of thinking, McCawley proposes that only variables occur as arguments for predicates, and the information which assists referential identification of variables is attached to a node which dominates the propositions in which those variables occur.[31] Retaining the propositional form of such referent identification, the underlying configuration above will be revised to the following:

[31] Not the least of the advantages of such a treatment is that it seems to resolve the pronominalization dilemma posed by sentences discovered by Emmon Bach which require infinite antecedent-chasing (sometimes erroneously called 'Bach-Peters sentences'). See Bach 1968.110, Bach 1970, McCawley 1970, and Langendoen 1970.119-120 for examples and discussion; see Karttunen 1969 for discussion of still deeper problems.



We have attached the identificational propositions to the dominant S. In configurations consisting of more than one S, we require only that an identificational proposition be attached to an S which dominates all occurrences of the variable it identifies.[32] Notice that this wording permits appearance of a variable (x, e.g.) in an identificational proposition for another variable (y, e.g.) even if that proposition is a sibling to the proposition which identifies the first variable (x). Consider the following underlying configuration for the Blackfoot sentence corresponding to 'my friend saw his daughter':



The relational predicates itan 'daughter' and itakk 'friend' each require two arguments, Experiencer and Essive (as do all 'obligatorily possessed nouns'--see 1.3A and 4.4.3). In this example, the Experiencer (x) as argument for 'daughter' is identified as the speaker's 'friend' in a sibling proposition.

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[32] See McCawley 1970 for discussion of ambiguities that may be explained according to scope of domination by the S to which identificational information is attached.

This revision requires changes in the node admissibility conditions of 4.3. S must now be able to dominate an unlimited number of propositions, and roles may dominate only variables (v) or the constants [+1] or [+2], whereas we allowed roles to dominate propositions in 4.3. The revised conditions are as follows:

S: PROP*

PROP: [P + A*]

A = { ROLE, PROP, S }

ROLE = { AG, EXP, O, GL, SC, M, ESS, T, L,... }

ROLE: { v, [+1], [+2] } *

M:S

It is not yet clear whether it will be necessary to distinguish more formally the identificational propositions from the others (McCawley 1970 does not even consider them to be propositions, but a special entity which he labels NP). Formal distinction between identificational propositions and non-identificational propositions would provide a natural way to distinguish between so-called restrictive and non-restrictive (appositional) relative clauses when such are attributive to established referents. It seems that the main function of such restrictive relative clauses is to help identify established referents by mentioning properties that the addressee already knows or can readily discern about them. Non-restrictive relative clauses (and most appositional noun phrases), on the other hand, provide additional (new) information about the referent; this information can later be referred to in identificational propositions, as can anything said or implied about the referent earlier in the discourse (the reason for using 'implied' just now will be seen below). Perhaps examples from English will clarify what we have said. Consider the following portion of a possible discourse:

> (a) Those girls are all my neighbors. (b) The tall one, still a teenager, is married and has two sons. (c) One son is very clever, but his brother is a dolt. (d) The son who is clever is very sickly, however. (e) A friend of the mother, who is mature for her age, thinks the teenager was foolish to marry so young.

In (a), the demonstrative (and probable accompanying gesture) are identificational, as is girls, because the speaker assumes the addressee already knows that the members of the group he wishes to refer to are girls. Of course, the information that they are neighbors is non-identificational. In (b), tall is identificational, for the speaker is assuming the addressee discerns one girl's comparatively superior height. The appositional phrase still a teenager, however, is non-identificational, but adds new information which is later referred to by way of identification in (e). In (c), son is identificational, referring to a referent established in (b). His brother is also identificational; it makes use of information implied in (b) by virtue of the fact that two sons of the same parent are brothers. In (d), the restrictive relative clause who is clever is obviously identificational, making use of information the addressee learned about the referent in (c). (It is the fact that the referent has already been established which calls for the definite article.) In (e), friend of the mother introduces a new referent (this calls for the indefinite article) by stating her relationship to the girl identified by the mother; the relative clause who is mature

for her age is non-identificational, and hence non-restrictive (the fact that the referent represented by who is ambiguously either the friend or the mother notwithstanding).

It appears that the distinction between identificational and non-identificational predication is quite basic and, no doubt, universal. In view of this, we will introduce a new category ID to distinguish identificational propositions. Thus the first node admissibility condition will be changed to the following:

S : PROP* (ID)

And we will add an additional condition:

ID : PROP*

The identificational propositions will be transformationally substituted for the variables which they identify, according to certain yet-to-be-investigated conditions. Looking back at (h), e.g., we see that to get an acceptable output, the PROP identifying x must be substituted for the variable as Agent of 'see', and must not be substituted for the variable as Experiencer of 'daughter'; also, the PROP which identifies y must be substituted for the variable as Object of 'see'. Thus instead of the deletion of NPs required in previous sections as the Blackfoot counterpart of English pronominalization (see 3.3.1), we now have non-substitution for variables under conditions which previously required such deletion, and optional substitution for variables when the deletion was optional. When an identificational proposition is not substituted for a variable, that variable must still acquire person, number, and gender features of the referent.

(There is now no similarity between Embedded Argument Deletion [4.4.1], which deletes a variable completely, and the counterpart to English pronominalization which leaves a variable with only certain features of the referent.)

This particular view of underlying structure provides an elegant means of accounting for a problematical phenomenon of Blackfoot discourse. The speaker, when introducing a new entity, the referent for which he assumes has not been established in the mind of the addressee(s), may refrain from making the otherwise obligatory substitution for the corresponding variable (the variable still acquires the features of the referent, as in other cases of non-substitution), and the identificational proposition remains an immediate constituent of S. The predicate of the unsubstituted identificational proposition then fits the surface structure definition of a verb and is so inflected.[33] (Notice that this circumstance which results in a nominal predicate inflected as a verb, is one of the circumstances which call for the indefinite article in English.)[34]

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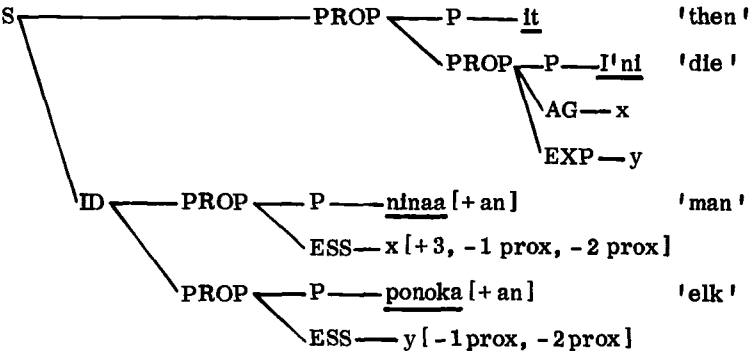
[33] Taylor was reluctant to consider such forms to be verbs when they occurred in environments where nouns are expected; this, combined with other factors, led him to establish a 'non-specific plural' category, marked by a suffix homophonous with the third plural verbal suffix (1969.192). (Because the third singular verbal and nominal suffixes are homophonous, singular nouns establishing a new referent could be considered to have either the nominal or the verbal suffix.) Recall, though, that I claim the non-specific category is neutral for number.

[34] Recall that we distinguish 'non-specific' from 'indefinite' (Karttunen 1968).

4.6.2. Illustrative Derivations. We will illustrate the conclusions of this section by sketching the derivation of a few Blackfoot sentences. The first will exemplify the phenomenon last discussed.

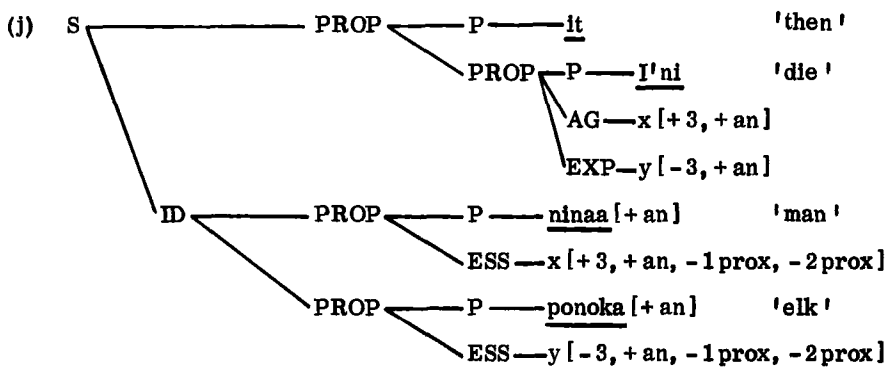
(i) itsi'nitsiiwa oma ninaawa omi ponokayini
then-kill-3→4 that-3 man-3 that-4 elk-4(vbl.)
'then the man killed an elk'

(i') 

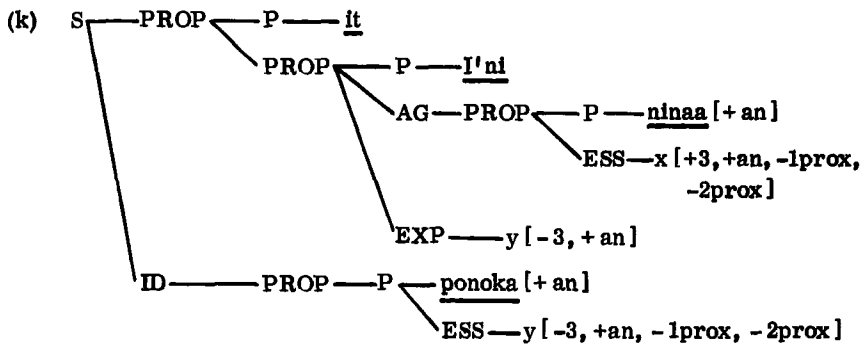
We can no longer maintain our earlier tentative treatment of demonstratives as predicates, because we no longer allow propositions to be directly dominated by roles.[35] The deictic character of the demonstratives suggests that they are surface realizations of variables which express proximity information. We have indicated this proximity information by use of combinations of features [± 1prox] and [± 2prox], representing proximity (or lack of it) to speaker and addressee, respectively (see 1.6). [± an] (gender) is, of course, an inherent feature of nominal predicates. We have indicated the primary animate topic with the feature [+3]. (Of course, the [+3] feature must be constrained to occur with the referent of only [+an] predicates. This would be a serious problem for a theory which had only universal semantic features as predicates, rather than language-specific predicates capable of gender classification, because the major animate topic must be selected in the underlying configuration.)

One of the first rules to apply will copy the gender feature of nominal predicates onto their referents. Then animate referents which co-occur with [+3] referents receive the obviative feature [-3]. Next, person, number, and gender features of Essive referents are carried to the corresponding variables. These changes would convert (i') to (j):

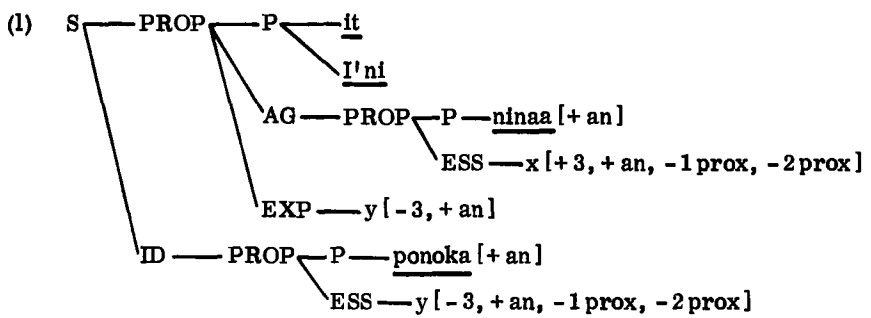
[35] We might still consider demonstratives to be predicates which dominate propositions if we added the condition that those propositions have Essive as an argument. This alternative deserves investigation.



Substitution of identificational propositions for the variables corresponding to the referents which they identify is the next step. Because this is the first mention of the 'elk' in the discourse from which this example was lifted, substitution is not carried out for the proposition which identifies it. The PROP identifying x, on the other hand, is substituted, to give (k):

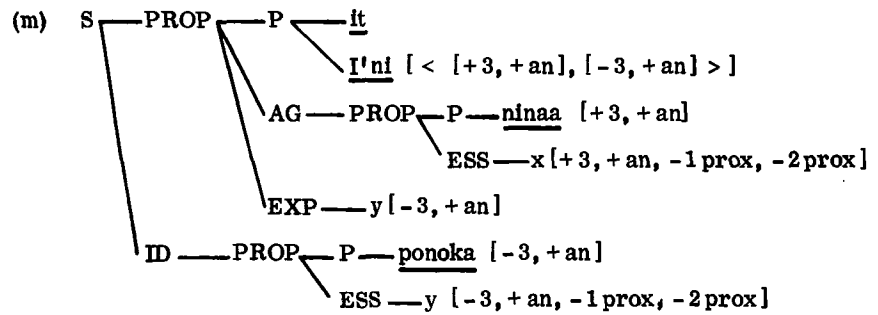


Proposition Consolidation is next to apply, to yield (l):



Agreement transformations add person, number, and gender features of the arguments of predicates to those predicates:

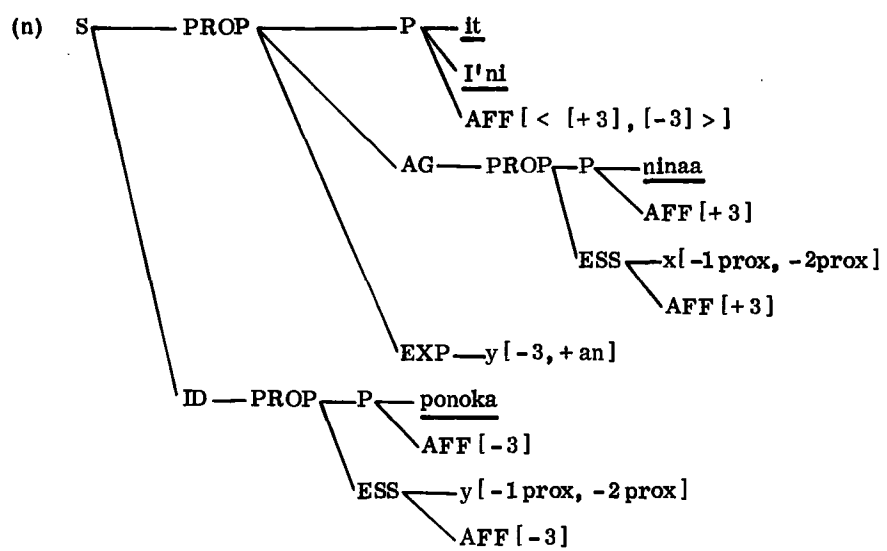
(m)



Notice that intransitive agreement applied first, to add referent feature to ninaa and ponoka. Then transitive agreement added an ordered pair of feature sets to the main predicate from its arguments. (In 4.6.3 we attempt to accomplish all agreement by one rule.)

Segmentalization is the next step. Rules, which we will not formulate here but which are fairly straightforward,[36] bundle features into segments that will later become affixes. (Though we do not show them in the diagrams, predicates still carry the features which were segmentalized; i.e., the affixed features are copies.)

(n)



Notice that variables with a proximity feature have a feature segment added.

Any node PROP which is directly dominated by a role should probably be automatically pruned before segmentalization to permit ease of definition of a noun at that point and for the process of lexical formative insertion. Such a rule would be quite simple:

ROLE: PROP : X ⟶ ROLE : X

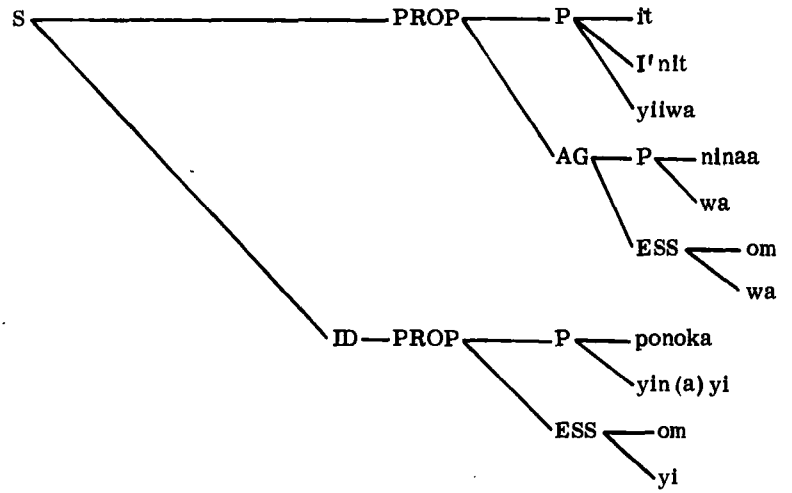
---

[36] A few are formulated in 4.6.3.

The lexicon now inserts the underlying shapes of predicates according to their contexts, as described in 4.5.1. Thus ⟦it⟧ is inserted for it ; ⟦I'nitw⟧ is inserted for I'ni in a transitive context; ⟦ninaa⟧ is inserted for ninaa; and ⟦ponoka⟧ for ponoka.[37]

The lexicon also adds the actual affixes to the segmentalized bundles of features: ⟦yiiwa⟧ to AFF[<[+3],[-3]>], ⟦wa⟧ to AFF[+3], ⟦yin(a)yi⟧ to AFF[-3] dominated by PROP: P (i.e., part of a surface verb), ⟦yi⟧ to AFF[-3] otherwise. The lexicon also replaces variables that have proximity features, by demonstrative stems corresponding to those features.

The structure of our sentence is now as follows (to simplify the diagram, we have omitted all features, though none have been eliminated. In fact, some phonological rules of 0.3 refer to those features):



(The second argument (y) of the first PROP has been deleted by convention because no formative could be inserted at its terminus.)[38] After movement of demonstratives around their corresponding nouns and application of phonological rules, the terminal string will be identical to our original sentence (i), repeated here:

(i)	itsi'nitsiiwa	òma	ninaawa	omi	ponokayini
	then-kill-3-→4	that-3	man-3	that-4	elk-4 (verbal)
	'then the man killed an elk'				

[37] In some contexts, 'elk' has a suppletive form ⟦Innoka⟧.

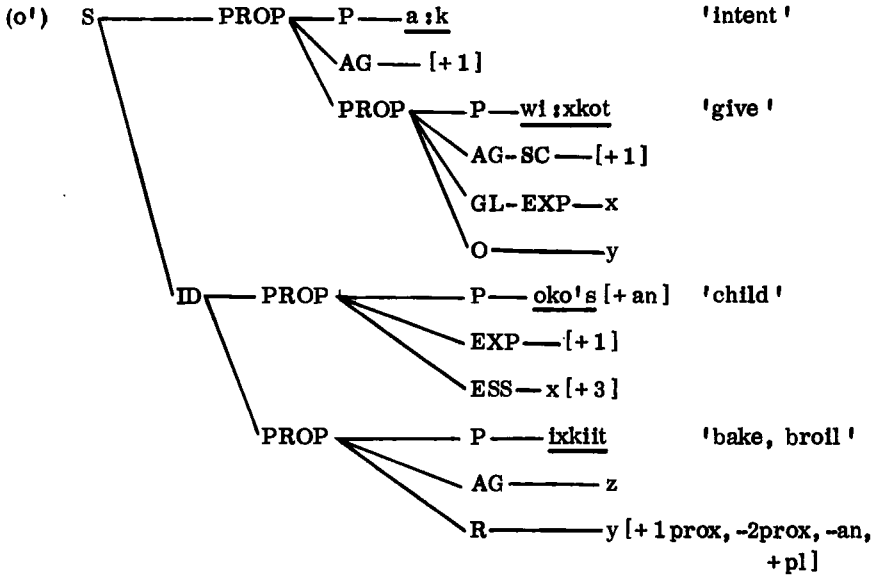
[38] In English, such variables will be replaced by pronouns.

The first of the next pair of examples will illustrate a nominalization; the second will illustrate how the proposals of this section provide a means of accounting for the phonomenon of verb agreement with non-goal adjunct illustrated in 1.1.2.

(o) nitaakohkotawa noko'sa amoistsi kiitaanistsi
I-fut-give-→3 my-child-3 these-pl [inan] bake-nom-pl
'I'll give my child these baked goods'

(p) nitaakohkotawaistsi noko'sa
I-fut-give-→3-pl [-an] my-child-3
'I'll give them to my child'

The underlying configuration for (o) is (o'):[39]



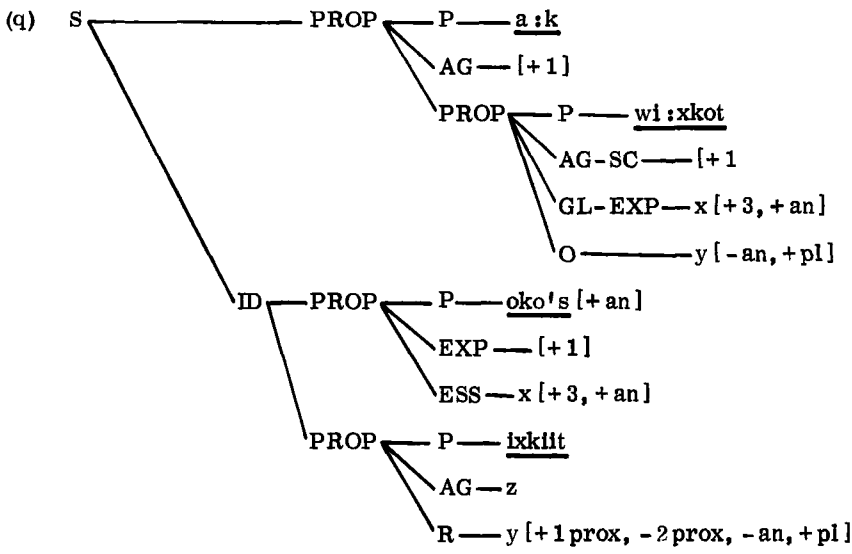
Notice that the only identificational information given for y is that it is very near the speaker and is the plural Result[40] of the predicate 'bake'; the Agent of 'bake' is unspecified, i.e., nowhere, in the discourse of which this sentence is a part, is the variable z identified.

As stated for our earlier example, the gender feature of nominal predicates is copied onto their referents. Then person, number, and gender features are carried to the corresponding variables; after these changes, (o') has been transformed into (q):

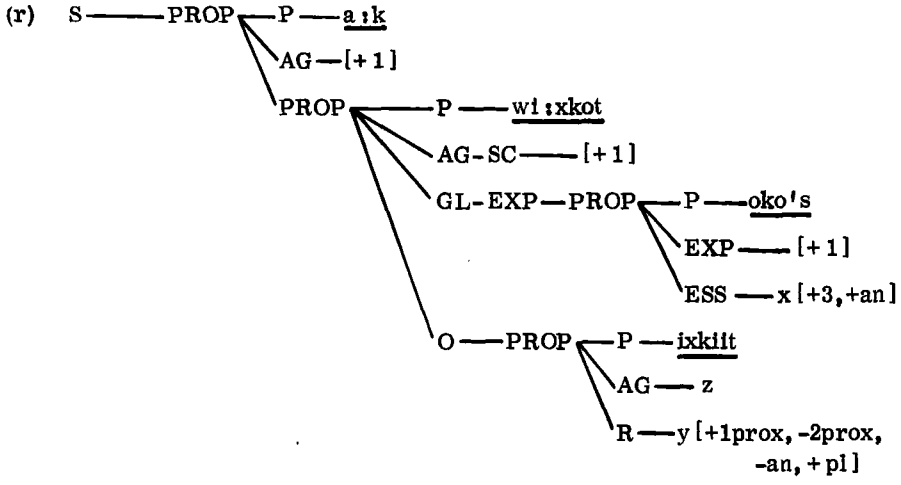
---

[39] We have not allowed for dual roles such as AG-SC or GL-EXP in the node admissibility conditions because it is not yet apparent whether they are basic or derived (see Fillmore 1968o.78, 79).

[40] Result (R) is the product or derivative of the predication. The predicate glossed 'bake, broil' may take an Object of either animate or inanimate gender, but requires that a Result be of inanimate gender.



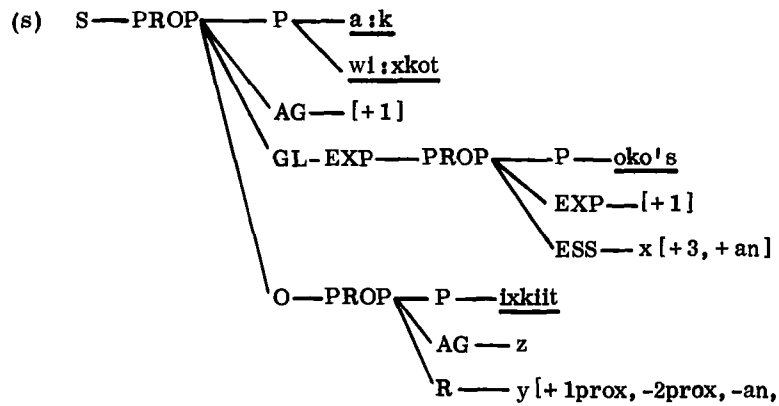
Identificational propositions are next substituted for the variables corresponding to the referents they identify, to transform (q) to (r):



Example (p) would occur in a context where the referential identity of y is clear (y would be identified by a proposition of a higher S or by a gesture). Thus there would be no substitution for y in the configuration leading to (p).

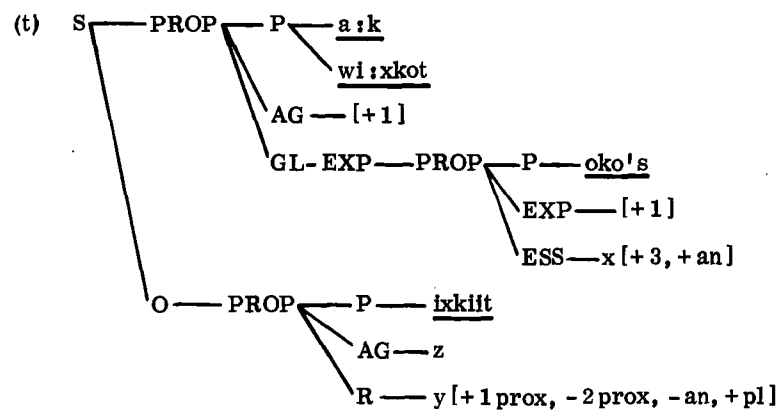
Embedded Role Deletion and Proposition Consolidation apply now, to change (r) to (s):

(s)



Extra Argument Extraction (4.4.1) moves the third argument out of the main PROP of (s) to give (t):

(t)



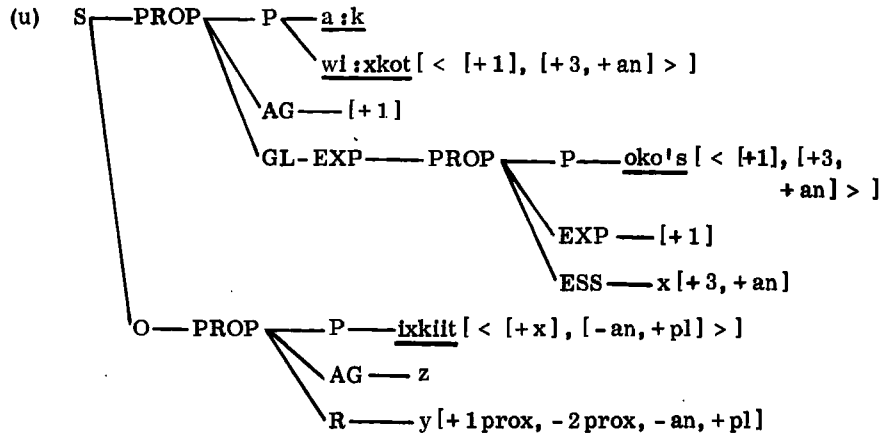
In the case of the configuration leading to (p), the third role would dominate only a variable. If we were to modify Extra Argument Extraction (see the revised version in 4.6.3) so that it is not applicable to a third role which does not directly dominate a PROP,[41] the features of the remaining variable as a third argument can later be added to the verb by agreement transformations (to account for verb agreement with this non-goal adjunct).

Returning our attention to (t), the agreement transformation(s) add person, number, and gender features of arguments to predicates. These transformations must be formulated in such a way that an ordered triple of feature matrices is added if a third argument remains in a proposition, as described in the preceding paragraph; see a first attempt in 4.6.3. Notice that an ordered pair of feature bundles is added to the relational predicate oko's just as to a transitive verb. (But we must somehow

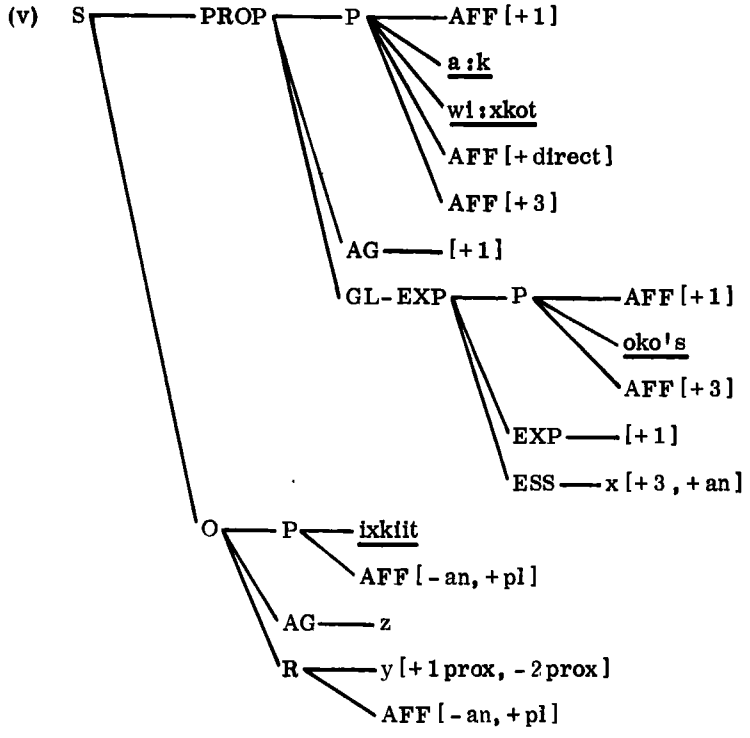
---

[41] We will also need to modify Peripheral Role Extraction (4.1.3) so that it does not apply to a Goal which doesn't dominate a PROP. For this transformation, a dual role is the same as its higher ranking member; e.g., GL-EXP is treated as an EXP.

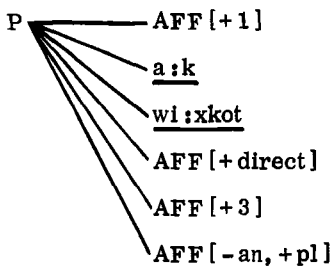
provide that only the second member of this ordered pair is added, on the next application of the agreement rule, to the next-higher predicate wi:xkot.)



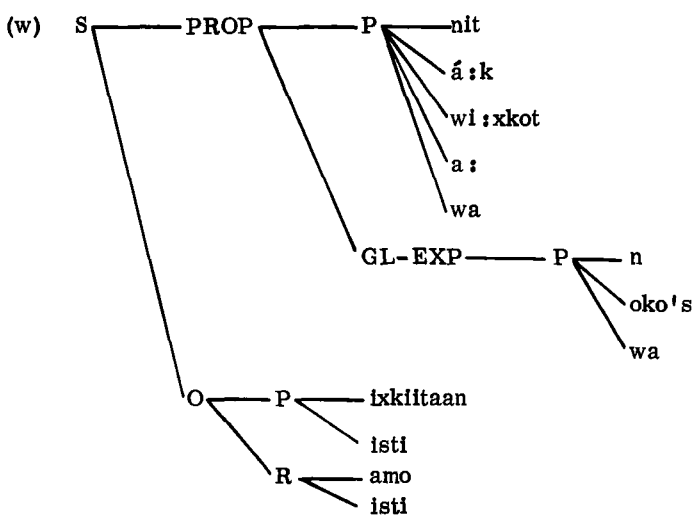
After all nodes PROP directly dominated by a role are pruned, segmentalization rules result in (v):



The topmost verb of the configuration leading to (p) would have an additional segment, agreeing with the non-goal adjunct:



The lexicon inserts the formatives for predicates and affixes according to their contexts. Thus in the verbal context of a P dominated by a PROP, AFF [+1] is spelled as ⟦nit⟧ (before most preverbs, ⟦n⟧ would be inserted instead), ⟦á:k⟧ is inserted for a:k, ⟦wi:xkot⟧ is inserted for wi:xkot, ⟦a:⟧ for AFF [+direct], and ⟦wa⟧ for AFF [+3]. In the nominal context of direct domination by a role, AFF [+1] before inherently possessed oko's is spelled as ⟦n⟧. oko's is replaced by ⟦oko's⟧, and ⟦wa⟧ is inserted for AFF [+3]. The nominal context of direct domination by a role calls for the intransitive 'theme' ⟦ixkiitaa⟧ of ixkiit and further calls for application of LT Nominalization to add the nominalizing suffix ⟦n⟧ (see 4.5), so ⟦ixkiitaan⟧ is inserted. ⟦isti⟧ is inserted for AFF [-an, +pl] in nominal contexts. The variable with [+1, -2] proximity features is replaced by the corresponding demonstrative stem ⟦amo⟧. The resultant structure is as follows:



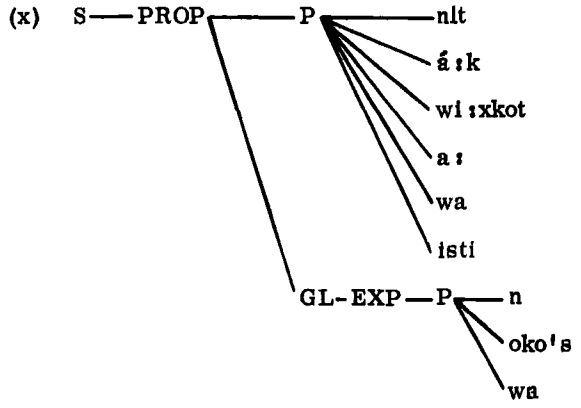
All branches which did not terminate in a lexical formative have been deleted by convention. The demonstrative must be moved around its head noun. (In order to result in a correct structural description of the surface structure, role nodes should probably be pruned.) The result will be a terminal string corresponding to (o), which we repeat here:

(o) nitaakohkotawa noko'sa amoistsi kiitaanistsi

'I'll give my child these baked-goods'

At the stage in the derivation of (o) where (w) is extant, the derivation of (p) would have (x):

(x)



We repeat (p) here for comparison:

(p) nitaakohkotawaistsi nokoʻsa

'I'll give them to my child'

We must point out that the means just used to account for verb agreement with a non-goal adjunct (as in (p)) is not compatible with the treatment of noun incorporation in 4.3.3. There we used Proposition Consolidation, with its condition relaxed, to conjoin a noun with the main verb. In the model of this section, this assumes that substitution of the identificational proposition containing that noun has taken place; otherwise, the noun would be outside the main proposition. But there are grammatical sentences which have both noun incorporation and verb agreement with a non-goal adjunct:

nitohpokonsskoawaiksi nohkowa

I-ball-provide-→3-4pl my-son-3

'I ball-provided them (those balls) for my son'

Here is the incompatibility:
In the generation of such a sentence using Proposition Consolidation, we require that identificational proposition substitution for the variable as Object of 'provide' take place, else Proposition Consolidation is not applicable; but to account for non-goal adjunct agreement (in the manner described just above), we require that the same substitution for the variable not take place. One possible way to reconcile the treatments is to have noun-incorporation leave a variable (with relevant features) behind. Subsequent rules would treat this variable the same as one which had never had an identificational PROP substituted for it.

4.6.3. Rule Summary. We close this chapter with a listing of the transformational rules we have assumed in the foregoing discussion. Rules that have actually been formulated will be given here in full (sometimes with slight revision), while others will merely be named in the order of application.

1. Inherent gender features of predicates copied onto their referential indicators.
2. Obviation (see 2.3).
3. Features of Essive referents copied onto the corresponding variables.
4. Substitution of identificational propositions for the variables they identify, subject to uninvestigated constraints similar to those for non-pronominalization in English. When an identificational proposition is substituted for a variable with an operator (E, G, or PL), the substituted referent receives a corresponding feature ([-spec], [+generic], or [+pl], respectively). Referents without [-spec] or [+generic] become [+spec].
5. Embedded Role Deletion

[X ;	ROLE:x ;	X ;	[P;	ROLE:y ;	X]$_{PROP}$]$_{PROP}$	
1	2	3	4	5	6	⟶
1	2	3	4	∅	6	

Condition: x=y (i.e., 2 and 5 are coreferential).

6. Proposition Consolidation

[[X]$_{P_1}$;	X ;	[[X]$_{P_2}$;	X]$_{PROP_1}$]$_{PROP_2}$	
1	2	3	4	⟶
1+3	2+4	∅	∅	

Condition: P_1 is sibling to $PROP_1$.
(Recall from 4.4.1 that rules 5 and 6 form a cyclic subset.)

7. Peripheral Role Extraction

X ; [X ;	T / L / GL:PROP / SC / CS / I / S	;	X]$_{PROP}$]$_S$	
1	2	3	4	⟶
1	3[2	∅	4]$_{PROP}$	

8. Extra Argument Extraction

[X ; [P ;	ROLE ROLE ;	[PROP]$_{ROLE}$]$_{PROP}$]$_S$		
1	2	3	4	⟶
1	4[2	3	∅]$_{PROP}$	

9. Stem-final Positioning

$$[\ \left\{\begin{array}{l}\underline{\text{wIxk}}\\ \underline{\text{atti}}\\ \underline{\text{ipi}}\\ \underline{\text{(i)m}}\\ \underline{\text{im}}\\ \underline{\text{BEN}}\end{array}\right\}\ ;\ X\ ]_P$$

1 2 ⟶

∅ 2 1

(where braces abbreviate conjunctive ordering)

10. Reflexivization

$$[\,[X]_P\,;[\,\left\{\begin{array}{l}x\\ [\text{ESS}:x]\end{array}\right\}_{\text{PROP}}\,]_{\text{ROLE}}\,;[\,\left\{\begin{array}{l}y\\ [\text{ESS}:y]\end{array}\right\}_{\text{PROP}}\,]_{\text{ROLE}}\,]_{\text{PROP}}$$

1 2 3 ⟶

1+REFL 2 ∅

Conditions: x = y (i.e., 2 and 3 are coreferential).

3 is not [-spec].

2 and 3 must each be directly dominated by ROLE.

11. Agreement (a first approximation)

$$[\,[X]_P\,;[\,[\gamma\,]\,]_{\text{ROLE}}\,;([\,[\delta\,]\,]_{\text{ROLE}}\,;([\,[\epsilon\,]\,]_{\text{ROLE}}))\,]_{\text{PROP}}$$

1 2 3 4 ⟶

1 2 3 4

$$<\left|\begin{array}{c}\gamma\\ +x\end{array}\right|,\delta,\epsilon>$$

(where δ and ϵ are feature bundles)

Conditions: γ is $\left|\begin{array}{l}\text{a feature bundle}\\ \left\{\begin{array}{l}\text{a variable as sole constituent of ROLE}\\ \text{the dummy 'actor' (see 4.1.3)}\end{array}\right\}\end{array}\right|$

ϵ is not [-spec]

If γ, δ, or ϵ is a member of an ordered pair, it must be the second member.

12. Pruning of nominal PROP node

ROLE : PROP : X ⟶ ROLE : X

13. Segmentalization rules--a sampling (in this illustrative sampling, all braces abbreviate disjunctive ordering)

a. first or second person prefix

$$[\ X\ ;\ \left\{\begin{matrix}[+2]\\[+1]\end{matrix}\right\}\ ]_p$$

$$1 \qquad 2 \longrightarrow$$

$$\left[\begin{matrix}AFF\\2\end{matrix}\right]^{\wedge}1 \qquad 2$$

Condition: 1 is not [+imperative]
nor [+subjunctive]

b. third person affixes

$$[\ X\ ;\ [+3, (+pl)]]_p$$

$$1 \qquad 2 \longrightarrow$$

$$\left(\left[\begin{matrix}AFF\\+3\end{matrix}\right]\right)_a{}^{\wedge}1\ {}^{\wedge}\left[\begin{matrix}AFF\\2\end{matrix}\right]\ 2$$

Condition a : $\left\{\begin{matrix}1 \text{ is } [+conj]\\1+2 \text{ is a ROLE}\end{matrix}\right\}$

(i.e., the prefix [+3], enclosed by a subscripted parentheses, is segmentalized only if condition a is true)

c. first or second person pluralizer

$$[\ X\ ;\ [\ \left\{\begin{matrix}+1\\+2\end{matrix}\right\}\ , +pl]]_p$$

$$1 \qquad 2 \longrightarrow$$

$$1^{\wedge}\left[\begin{matrix}AFF\\2\end{matrix}\right] \qquad 2$$

d. relator

$$[\ X \quad ; \quad <\ Y, ;\ Z\ >\ ]_p$$

$$1 \qquad 2 \quad 3 \longrightarrow$$

$$1^{\wedge}\left[\begin{matrix}AFF\\a \text{ direct}\end{matrix}\right] \qquad 2 \quad 3$$

Condition a : $\left\{\begin{matrix}2 \text{ is } [+2] \text{ and } 3 \text{ is not } [-spec]\\2 \text{ is } [+1] \text{ and } 3 \text{ is not } [+2]\\2 \text{ is } [+x] \text{ and } 3 \text{ is } [\pm 3]\\2 \text{ is } [+3] \text{ and } 3 \text{ is } [-3]\end{matrix}\right\}$

(a is '+' if condition true, '-' if condition false)

The following paradigms are relatively complete. A few of the entries are given with less confidence than others, especially some of the forms involving 4pl with a 3 or 3pl in the TA Subjunctive and Conjunct paradigms. (It should also be noted that some entries disagree with examples given by Taylor 1969.) The paradigms are included despite these imperfections, because nowhere else are they available in their entirety. Affixes are given in their underlying shapes (see 0.3).

INTRANSITIVE[1]

	Independent	Unreal
1	nit...	nit...Vxtopi
1pl	nit...xpinnaan	nit...xpinnaanopi
2	kit...	kit...Vxtopi
2pl	kit...xpoaawa	kit...xpoaawopi
12	...o'p	...o'topi
3	...wa	...(w)opi
3pl	...yiawa	...(w)opiyawa
4	...yin(a)yi	...(w)opin(a)yi
4pl	...yi	(?) ...(w)opiyi

	Conjunct[2]	Conjunct Nominal
1	nit...xsi	nit...xpi
1pl	nit...xsinnaani	nit...xpinnaani
2	kit...xsi	kit...xpi
2pl	kit...xsoaayi	kit...xpoaayi
12	...o'si	...o'pi
3	wit...xsi	wit...xpi
3pl	wit...xsiawa	wit...xpiawa
4	wit...xsi/xsiayi	wit...xpiayi
4pl	wit...xsi/xsiaikI	wit...xpiaikI

	Subjunctive	Imperative
1	...iniki	
1pl	...innaaniki	2 ...t
2	...iniki	
2pl	...inoaainiki	2pl ...k
12	...o'ki	
3/4	...si/sayi	
3/4pl	...sawa/sawayi	

[1] Where two suffixes are given, the second is used only when the actor is not overtly present in the immediate clause.

[2] The ⟦x⟧ in each of these forms may optionally be replaced by ⟦'⟧.

TRANSITIVE INANIMATE[3]

Independent[4]

	sg. goal	add for pl. goal:
1	nit...xp	-yiawa
1pl	nit...xpinnaan	-yiawa
2	kit...xp	-yiawa
2pl	kit...xpoaawa	-yiawa (replaces -wa)
12/x	...'p	-yiawa
3	...ma/ mayi	-Iti
3pl	...myiawa/ myiawayi	-Iti
4	...min(a)yi	-Iti
4pl	...myi/ myiaikI	-Iti

Conjunct

1	nit...xsi	-awa
1pl	nit...xsinaani	-awa
2	kit...xsi	-awa
2pl	kit...xsioaayi	-awa
12/x	...xsi	-awa
3/4	wit...xsi/ xsiayi	-aIti
3/4pl	wit. .xsiawa/xsiawayi	-Iti

Subjunctive

1	...mmiiniki	-awa
1pl	...mmiinainiki	-awa
2	...mmiiniki	-awa
2pl	...mmiinoainiki	-awa
12/x	...i'ki	-awa
3/4	...isi/ isayi	-aIti
3/4pl	...isawa/ isawayi	-Iti

Imperative

2	...t	-a(a)wa
2pl	...k	-a(a)wa

---

[3] Where two suffixes are given, the second is used only when the goal is not overtly present in the immediate clause.

[4] See fn 2.

TA INDEPENDENT

Actor ↓ / Goal →	1	1pl	2	2pl	12	3	3pl	4	4pl	5
1			kit- -o	kit- -oxpoaawa		nit- -a:wa	nit- -a:yiawa	nit- -a:yini	nit- -a:yi	
1pl			kit- -oxpinnaan	kit- -oxpinnaan		nit- -a:nnaanwa	nit- -a:nnaanyiawa	nit- -a:innaanyiawa	nit- -a:innaanyi	
2	kit- -Oki	kit- -Okixpinnaan				kit- -a:wa	kit- -a:yiawa	kit- -a:yini	kit- -a:yi	
2pl	kit- -Okixpoaawa	kit- -Okixpinnaan				kit- -a:oaawwa	kit- -a:oaayiawa	kit- -a:oaayini	kit- -a:oaayi	
12						-a:wa	-a:yiawa	-a:yini	-a:yi	
x	nit- -Okoo	nit- -Otixpinnaan	kit- -Okoo	kit- -Otixpoaawa	-Otixp	-a:wa	-a:yiawa	-a:yini	-a:yi	
3	nit- -Okwa	nit- -Okinnaanwa	kit- -Okwa	kit- -Okoaawwa	-Okiwa			-yiiwayi	-yiiwaikI	
3pl	nit- -Okyiawa	nit- -Okinnaanyiawa	kit- -Okyiawa	kit- -Okoaayiawa	-Okiyiawa			-yiiyiawayi	-yiiyiawaikI	
4	nit- -Okyini	nit- -Okinnaanyini	kit- -Okyini	kit- -Okoaayini	-Okiyini	wit- -Okwayi	wit- -Okoaawaikl -Okoaayiawa			-yiyin(a)yi
4pl	nit- -Okyi	nit- -Okinnaanyi		kit- -Okoaayi	-Okiyi	wit- -OkwaikI	wit- -Okoaayiawaikl			-yiyi

TA CONJUNCT

Actor ↓ / Goal →	1	1pl	2	2pl	12	3	3pl	4	4pl
1			kit- -Oxsyi	kit- -oxsoaayi		nit- -a:xsyi	nit- -a:xsyiawa		
1pl			kit- -oxsinnaanyi	kit- -oxsinnaanyi		nit- -a:xsinnaanyi	nit- -a:xsinnaanyiawa		
2	kit- -Okixsyi	kit- -Okixsinnaanyi				kit- -a:xsyi	kit- -a:xsyiawa		
2pl	kit- -Okixsyi	kit- -Okixsinnaanyi				kit- -a:xsoaayi	kit- -a:xsoaayiawa		
12						-a:xsyi	-a:xsyiawa		
x	nit- -Okooxsyi	nit- -Otixsinnaanyi	kit- -Okooxsyi	kit- -Otixsoaayi	-Otixsyi	-a:xsyi	-a:xsyiawa		
3	nit- -yixsyi	kit- -yixsinnaanyi	kit- -yixsyi	kit- -yixsoaayi	wit- -Okixsyi			wit- -a:xsyiayi	wit- -a:xsyiaikI
3pl	nit- -yixsyiawa	nit- -yixsinnaanyiawa	kit- -yixsyiawa	wit- -yixsoaayiawa	wit- -Okixsyiawa			wit- -a:xsyiawayi	wit- -a:xsyiawaikI
4						wit- -yixsyiayi	wit- -yixsyiaikI		

TA Conjunct Nominal paradigm is identical except for substitution of ⟦p⟧ for ⟦s⟧ in the ⟦xs⟧ cluster of each form; the two exceptions to this statement are the x→1 and x→2 conjunct nominals, which differ from the corresponding verb forms by deletion of the ⟦xs⟧ cluster.

Appendix: Verb Paradigms

TA SUBJUNCTIVE

Actor ↓ / Goal →	1	1pl	12	2pl	2	3	3pl	4
1			-iniki	-inoaainiki	-iniki	-a:iniki	-a:inikiaaw	
1pl			-innaaniki	-inoaainiki	-innaaniki	-a:nnaaniki	-annaanikiaaw	
2	-Okiiniki	-Okinnaaniki				-a:iniki	-a:inikiaaw	
2pl	-Okiinoaainiki	-Okiinoaainiki				-a:inoaainiki	-a:inoaainikiaaw	
12						-a:xki	-a:xkiaaw	
x						-a:xki	-a:xkiaaw	
3	-Otiiniki	-Okisi	-Okisi	-Otiinoaainiki	-Otiiniki			-a:sayi
3pl	-Otiinikiaawa	-Okisiaaw	-Okisiaaw	-Otiinoaainikiaaw	-Otiinikiaaw			-a:saawayi
4						-Otiiniki	-Otiinoaainikiayi	
4pl						-Otiiniki	-Otiinoaainikiaikl	

TA IMPERATIVE

Actor ↓ / Goal →	1	1pl	3	3pl
2	-Okit	-Okinnaan	-is	-isaaw
2pl	-Okit	-Okinnaan	-ok	-okaaw

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