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Cherokee Papers from UCLA

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Cherokee Papers from UCLA: An Introduction

Pamela Munro

1. Cherokee Studies at UCLA

This volume is a collection of papers begun during a UCLA graduate class in linguistic field methods on Cherokee during 1992-93. Together these eight papers constitute a survey of many important aspects of the grammar of Cherokee, based on work with our consultant, Mrs. Virginia Carey, who is originally from Tahlequah, Oklahoma. We hope you enjoy learning about Cherokee from them.

Cherokee is a language of the Southern branch of the Iroquoian family of American Indian languages, currently spoken primarily in North Carolina and Oklahoma (for a good survey of Iroquoian and Cherokee dialectology, see Scancarelli 1987: 7-14). Although the Cherokee people and their language fascinate many Americans,[1] there has been relatively little linguistic study of the language, perhaps because of its considerable morphological complexity and irregularity. Still, Cherokee is the subject of four fairly recent dissertations (King 1975, Cook 1979, Foley 1980, and Scancarelli 1987) and one excellent though brief dictionary and grammatical sketch (Feeling 1975 and Pulte and Feeling 1975, in one volume),[2] as well as a number of shorter works.

The history of Cherokee studies at UCLA goes back at least to 1984, when I taught a field methods class on Cherokee during the UCLA Linguistic Institute, with students from all over the world, again with Mrs. Carey as consultant. Normally, field methods at UCLA is an intensive two-quarter (six month) class which students take after several years of graduate study of linguistic theory in order to develop techniques for learning about a language by questioning a native speaker (in a mock "field" situation), rather than studying from books or tapes. My selection of Cherokee as the target language for a brief six-week course during the Institute, many of whose students have little background in linguistics, was quite naive, since the phonetic, phonological, and morphological complexity of the language made it hard for students to get to the point where they could understand and appreciate its syntactic structure. But my practice is to try to begin a field methods class as ignorant of the target language as my students, so I was unaware of what a difficult task I had chosen for us! Despite the problems, the class was successful, due largely to Mrs. Carey's talents as a consultant and the enthusiasm of the students. Two of them, Janine Scancarelli and Geoffrey Lindsey, were UCLA graduate students who continued working on Cherokee (with Mrs. Carey and later with other speakers) after the conclusion of the Institute. Scancarelli went on to complete a dissertation on the language (1987, cited in almost every paper in this volume), and Lindsey made use of extensive Cherokee phonological data in his own dissertation, a comparative study of intonation (1985).

I had never repeated a field methods language before, but the speaker of another language who had agreed to serve as consultant for my Winter-Spring 1993 class backed out two weeks before the class was to begin. Panicked, I called Mrs. Carey, who very kindly agreed to substitute.[3] Despite some health problems, she served once again with patience and good humor, continuing to work with many students on their papers after the class was over. We are extremely grateful to Mrs. Carey, to her husband Levi Carey (who worked briefly with some class

[1]Undergraduates in my general courses on American Indian languages consistently express most interest in three languages, Cherokee, Navajo, and Lakhota. Impressionistically, I would say as well that Cherokee is the Indian group most Americans claim descent from.

[2]In further discussion of this important volume and in our bibliography, I will call it "Feeling and Pulte 1975".

[3]Janine Scancarelli had suggested that I ought to teach another Cherokee field methods course following the regular UCLA model.

members), and to Janine Scancarelli (who made a brief but very helpful visit to our class) for all their assistance. Janine Scancarelli and Geoffrey Lindsey also provided us with copies of unpublished papers and advice.

Three of the papers in this volume address well-known problems in Cherokee grammar. Edward Flemming's and my papers concern the related morphophonological rules of laryngeal metathesis and alternation, while Michael Dukes's paper analyzes the unusual system of Cherokee agreement. The topics of the other five range from Richard Wright's study of Cherokee tonal phonetics and phonology, to Barbara Blankenship's description of the derivational morphology of Cherokee classificatory verbs, to Robert Williams's account of Cherokee possession, to Filippo Beghelli's investigation of Cherokee clause structure, to Brian Potter's paper on the syntax of Cherokee nominalizations.[4]

In the remainder of this Introduction, I will survey Cherokee phonology and the orthography used to write Cherokee in this volume and introduce some features of Cherokee morphology.[5] Following the Introduction is a list of the abbreviations we use in our papers.

2. Cherokee Phonology and Orthography

Cherokee has a complicated phonetic and phonological system, and has been written in a number of different orthographies. (Perhaps this is as good a place as any to note that we are sure there are some mistakes in transcription or spelling in this volume, though we have done our best to check each of the examples with Mrs. Carey.) The famous Cherokee Syllabary developed by Sequoyah in the nineteenth century continues to be used by native speakers, but has never been used for work by linguists. Most prior linguistic work (e.g. Cook 1979, Scancarelli 1987) uses an orthography which reflects the standard linguistic analysis that Cherokee aspirated stops are underlying clusters of unaspirated voiceless stops plus *h*: thus, for example, phonetic [t^h] is written *th*, and phonetic unaspirated [t] (a sound often perceived as [d], though seldom phonetically voiced) is written *t.*. While this system is analytically transparent, it seems not to reflect the intuitions of Cherokee speakers (which are perhaps influenced by the Syllabary; cf. Scancarelli 1992). Thus, various romanizations for Cherokee used by native speakers, as well as Feeling and Pulte (1975), represent the aspirated stops with *p-t-k* and the unaspirated stops with *b-d-g*. Our group decided to follow the Feeling-Pulte dictionary romanization for Cherokee consonants, while acknowledging that the unit symbols for unaspirated consonants can be analyzed as synchronic sequences in many cases. Here is a complete list of the consonant symbols we use:

stops	unaspirated	(b)	d		g	gw	'
	aspirated	(p)	t		k	kw	
affricates	unaspirated		dl	j			
	aspirated		tl	ch			
fricatives			s				h
laterals			l				
nasals		m	n				
glides		w		y			

[4]Three additional papers prepared for the field methods class were unfortunately not submitted for publication in this volume. These were studies of the phonetics of Cherokee final vowels and clitics by Victoria Anderson, of Cherokee reflexivization by Nhlanhla Thwala, and of the phonetics of Cherokee vowel length by Kimberly Thomas.

[5]I am grateful to Edward Flemming for comments on this Introduction.

The apostrophe ' represents the glottal stop. *Dl* and *tl* are unaspirated and aspirated lateral affricates; *j* and *ch* are alveolar or alveopalatal affricates. In earlier linguistic work *j* has been treated as a *ts* cluster; see Scancarelli (1987: 24-25) for arguments that it is a unit.[6] *Dl* and *gw* may be units as well or may arise as *d* + *l* and *g* + *w* clusters (see Scancarelli 1987: 23, 47-48). Like stops and affricates, all sonorants may also cluster with *h*. We again follow Feeling and Pulte (1975) and native speaker intuition in writing these as clusters.[7] (For more on all these alternations, see Flemming, this volume, and Munro, this volume.) *M* is rare, and *b* and *p* occur almost exclusively in loanwords.

Cherokee has a six-vowel system, plus length[8] and tone: in addition to the usual five vowel qualities, there is a low mid central vowel which is always nasalized. In all romanizations, this sixth vowel is written *v*.[9] Romanizations for Cherokee differ in how to represent the long vowels and the complex tonal system (called "pitch" by most previous investigators; cf. Wright, this volume, who analyzes Cherokee as having "lexically marked tone as well a metrically determined stress accent superimposed upon the normal tonal melody in certain forms"). Our group's work on Cherokee tonal phonology draws heavily on an important unpublished paper by Lindsey (n.d.).[10]

Scancarelli (1987: 28-29) writes a colon after long vowels, and represents pitch (or tone) with a system of (handwritten) iconic diacritics developed by Geoffrey Lindsey (though not used in Lindsey 1985). Feeling and Pulte (1975) write a dot under vowels whose shortness cannot be predicted by context,[11] and represent pitch with superscript numbers or number sequences.[12] We write long vowels doubled, in part to facilitate the representation of contour tones:

ii ee aa vv oo uu

There are two level tones, high and low, which may occur on either long or short vowels, and four contour tones, which occur only on long vowels. The superscript tone numbers are a fully adequate way to represent Cherokee's tonal contrasts (see Feeling 1975: xi-xii; Lindsey 1985 discusses some phonetic problems with this description), but they are difficult to type and invite omission. Lindsey and Scancarelli's system is iconically attractive, but untypable. To overcome these drawbacks, our group developed a system of typable tone diacritics.[13] We represent Feeling

[6]In addition to these arguments, there also appear to be phonetic contrasts between unit *ch* and cluster *t* + *s*.

[7]Our orthography is thus less consistent in this regard than the standard linguistic orthographies discussed earlier.

[8]Cherokee vowel length seems to be predictable in certain cases (cf. Foley 1980, Scancarelli 1987: 22, and suggestions by Kimberly Thomas). However, since it is contrastive on the surface and since phonological rules such as Laryngeal Metathesis (cf. Cook 1979 and Flemming, this volume) depend crucially upon it, we write it consistently, following the practice of King 1975, Cook 1979, Lindsey 1985, and Scancarelli 1987.

In addition to the long and short vowels, Cook (1979) also mentions a class of "extrashort" vowels. We have nothing to say about these. (I thank William Pulte for discussion of them, however.)

[9]The choice of *v* follows the general use of this letter in 19th Century missionary orthographies in Oklahoma to represent a deviant *a* sound — in Choctaw and Creek (Muskogean languages unrelated to Cherokee, but like Cherokee members of the group of Five Civilized Tribes), for example, it represents the often schwa-like short *a*.

[10]It is indeed disappointing that this important paper has not been published. I hope that the citations we provide here will make clear to the reader how seminal it is.

[11]Feeling and Pulte assume that vowels in closed syllables are always short, and that vowels in open syllables are generally long, but that short open syllable vowels can be indicated by underdotting. One way in which this system seems to be inadequate (in addition to its untypability and the ease with which underdots can be lost or ignored by the user) is that there are rare cases of long vowels in closed syllables.

[12]The authors (1975: iii) acknowledge Eunice Pike's help in developing this system.

[13]All members of the 1993 UCLA Cherokee group participated in working out this tonal orthography, but the basic concept is due to Richard Wright. I have since taught this system to two non-linguist UCLA students learning Cherokee (Carol Buswell and Ayisha Jamal, whom I thank for their patience); my observation is that it was easy for them to learn and use.

and Pulte's level pitch 2 with a grave (low) tone mark and level pitch 3 with an acute (high) tone mark. Unmarked vowels indicate peripheral tones: thus, descent from low to superlow (contour pitch 1) is represented with a grave on the first vowel and an unmarked second vowel, while rise from high to superhigh (contour pitch 4)[14] is represented with an acute on the first vowel and an unmarked second vowel. Our tone marks, with corresponding Feeling-Pulte pitch numbers, are exemplified below on the vowel a.

Level low (2)	short	à	long	àà	
Level high (3)	short	á	long	áá	
Low fall ("1", actually 21)			always long		àa
High fall (32)			always long		áâ
Low rise (23)			always long		àá
High rise ("4", actually 34)	short	a	long	áa	

(If special font diacritics are not available, tone can be marked following the vowel *v*, e.g. *v`*, *v´*, and so on.) According to Lindsey (1985), some speakers produce short nonfinal "4" tones; these rare examples can be written with unmarked short vowels, as above. The same unmarked symbol is available for the ubiquitous final 4, which most sources already write unmarked.[15] (For more about Cherokee tone, see Wright, this volume. Not all of the papers included in this volume mark tone.)

3. An Overview of Cherokee Agreement

Cherokee has a typologically unusual system of verb agreement, some of whose motivations and typological consequences are discussed extensively by Scancarelli (1987) and Dukes (this volume). In this section I will present a brief overview of this system for the benefit of readers unfamiliar with these sources. Terminology and analysis follow Scancarelli (1987).

Cherokee intransitive verbs used in the present tense may take one of two sets of pronominal subject agreement markers, called "A" and "B". While the distribution of these sets is somewhat reminiscent of intransitive agreement in an "active-stative" system, it is considerably less semantically regular than is usual with such systems,[16] and clearly must be lexically specified. First and second person distinguish three numbers, singular, dual, and plual, while third person distinguishes only singular and dual-plural; first person further distinguishes non-singular inclusive (includes second person) from exclusive (excludes second person). The intransitive subject agreement prefixes are listed on the next page:[17]

[14]In the description here we follow Lindsey (1985) rather than Feeling and Pulte (1975).

[15]See Wright, this volume. Hopefully at some point Victoria Anderson will write up her study of the phonetics of Cherokee final vowels.

[16]I am thinking of the distribution of "I" and "II" agreement in Muskogean or Siouan, e.g. in Chickasaw and Choctaw (Munro and Gordon 1982), Creek (Martin 1991), Crow (Martin 1991, Wallace 1993), or Lakhota.

[17]All of these prefixes are subject to phonological change when used on particular verbs. Choice of allomorphs, when more than one is given, is partly lexical, partly phonological. An * before a given morpheme indicates that it belongs to a class of morphemes conditioning the operation of the Laryngeal Alternation rule (see Munro, this volume, and sources cited there).

	A	B
1 singular	*ji-, g-	agi-, agw-
2 singular	hi-	ja-
3 singular	a-, ga-	uu-
1 dual exclusive	oosdii-	ooginii-
1 dual inclusive	ìinii-	ginii-
2 dual	sdii-	sdii-
1 plural exclusive	oojii-	oogii-
1 plural inclusive	ìidii-	ìigii-
2 plural	ìijii-	ìijii-
3 dual-plural	anii-	uunii-

Cherokee verbs have five separate basic stems: the present, imperfective, punctual, perfective, and infinitive. (All other forms are based upon these.) The choice of A or B prefixes on a given verb depends not only on that verbs lexical classification as an "A-verb" or a "B-verb", but also on the stem choice. B-verbs always use B prefixes. A-verbs use A prefixes with their present, imperfective, and punctual stems, and B prefixes with their perfective and infinitive stems. Below are some third-person singular examples (adapted from Scancarelli 1987: 66-67), with 'dance' (an A-verb) and 'laugh' (a B-verb):

present	àalsgíí'a 'he's dancing'	ùuyèètsga 'he's laughing'
imperfective	àalsgíísgóó'i 'he's always dancing'	ùuyèètsgóó'i 'he's always laughing'
punctual	àalsgi 'he (just) danced'	ùuyèétsa 'he (just) laughed'
perfective	ùulsgíísv`v^i 'he (has) danced'	ùuyèètsv`v^i 'he (has) laughed'
infinitive	ùùlsgìisdíi'i 'for him to dance'	ùùyèètsdíi'i 'for him to laugh'

Cherokee transitive verbs with third-person singular inanimate objects mark their subjects with the appropriate A and B prefixes (depending on the stem), as explained above.[18] All other combinations of subjects and objects are marked by prefix combinations, which are used with all transitive stems.

[18]There is also a rare group of transitive B verbs, which use only B prefixes with singular inanimate objects.

Abbreviations and Glossing Conventions

Because of the complexity of the data we are describing, we made the decision to use a uniform set of abbreviations and glossing conventions in our examples. In this section I describe the way we have glossed the agreement morphology described above, and provide a list of the abbreviations used in this volume.

The following abbreviations are used in glossing pronominal agreement morphology:

A = A agreement set
B = B agreement set
1 = first person
2 = second person
3 = third person
an = animate
inn = inanimate
s = singular
d = dual
p = plural (more than 2)
ns = nonsingular (more than 1)
exc = exclusive
inc = inclusive

The order used in our glosses is person, number/animacy information, agreement set (A or B, for intransitives). Thus for instance 1sA = first-person singular A, 1dexB = first-person dual exclusive B, and so on. Transitives are specified with the subject element followed by > followed by the object element, e.g. 1s>3san = first-person singular subject, third-person singular animate object.

In cases other than these, however, if two words are run together in a gloss, they are separated either by a period, a colon, or a semicolon (usage unfortunately varies), e.g. tie.up expresses the single morpheme "tie up". The rule we try to follow is that the number of hyphens (morpheme breaks) and spaces must match exactly in the data and the gloss underneath it.

Here are the rest of the abbreviations we use:

' = glottal grade
aca = animate covert argument
ambul = ambulative (see Scancarelli 1987)
ben = benefactive
C = compact classificatory group
cl = classifier (Navajo)
cnd = conditional
cs = causative
dat = dative
dis = distributive
F = flexible classificatory group
fpg = future progressive
fut = future
ft2 = future suffix
h = h-grade
hab = habitual
imp = imperfective
inf = infinitive
int = interrogative
ipr = imperative
irr = irrealis
iter = iterative (Navajo)
L = long classificatory group
N = animate classificatory group
neg = negative
nom = nominalization/nominalizer
np = non-punctual
obj = object
pl = plural
prf = perfective
prg = progressive
prn = pronoun
prs = present
pss = possessive
pst = past
Q = liquid classificatory group
Qm = question marker
rel = relative
rep = reportative
rfl = reflexive
sub = subordinator
transl = translocative (see Scancarelli 1987)
way = away from speaker

Tone and Accent in Oklahoma Cherokee

Richard Wright

Introduction

Oklahoma Cherokee has six surface tones in non-final position. Tone is thoroughly marked and there is a brief description of the tonal system in Pulte and Feeling (1975). Lindsey (1985, 1987) provides a full analysis of the tonal system in which Cherokee has a complex pitch accent system. This paper will present an analysis in which Oklahoma Cherokee is a language with lexically marked tone as well a metrically determined stress accent superimposed upon the normal tonal melody in certain forms. The data for this study is drawn primarily from the speech of Mrs. Virginia Carey, a native speaker of Oklahoma Cherokee. Examples will also be drawn from Pulte and Feeling (1975) and Lindsey (1985, 1987).

1. Description of tones

1.1 Transcribing tone. There is general agreement in transcriptions of four of the six surface tones of Oklahoma Cherokee. Pulte and Feeling use Eunice Pike's number system for marking tone: low level (2), high level (3), rising (23) and falling (32). Examples are given here with Pike's numbers for reference but in the rest of the study tones will be marked using L and H in formulating rules and using accent marks in orthographic representations (examples from Lindsey, 1985).

	L, LL = 2	H, HH = 3	LH = 23	HL = 32
	low level	high level	rising	falling
Example 1:	*àma* 'water'	*ááma* 'salt'	*sgòóya* 'bug'	*táàli* 'three'

The remaining two surface tones are a lowfall (1), sometimes referred to as a superlow, and a highrise (4), sometimes referred to as a superhigh. All contour tones are limited to long vowels. The lowfall is characterized by a declining pitch starting from the normal low tone range and by glottalization at the lowest part of the fall. Lindsey (1985) gives evidence that in many cases the low fall is derived from the loss of a glottal stop in coda position through an active process of vocalization. It also appears necessary to posit underlying laryngealization in some cases that appear to be derived historically from the loss of a glottal stop in coda position.

	lowfall (1)
Example 2:	*nv̀vya* 'rock'

The highrise is marked by a rise that begins at a variable pitch and rises above the normal high tone register. It is also characterized by an amplitude peak that corresponds to the peak of the pitch excursion. The rise in amplitude is not a characteristic of the regular high tone. Pulte and Feeling describe the highrise as a level superhigh, but Lindsey found that measures from narrow band spectrograms indicated that it rises. Measures taken from narrow band spectrograms of twenty tokens read in isolation show a clear pitch rise to above the normal high tone range in every case, confirming Lindsey's earlier measures measurements. The highrise is limited to certain syntactically determined forms: verbs in subordinate clauses, deverbal nouns, locatives and most adjectives. Its distribution is discussed further below.

	highrise (4)
Example 3:	*nóoya* 'sand'

The convention for marking tone arrived at for this volume is as follows:

low = *à, àà* high = *á, áá* rising = *àá* falling = *áà* lowfall = *àa* highrise = *áa*

1.2 Word final syllable tone. Feeling and Pulte leave the final vowel's tone unmarked because it is predictable. They describe it as a falling superhigh (4) except when it is preceded by a penultimate superhigh, in which case it is realized as a normal high. Lindsey on the other hand describes it as a boundary high tone (H%) with optional upstep. For this study measurements were made using narrow band spectrograms of tokens read in isolation. The data set consisted of five tokens each with the following penultimate tones: low, high and highrise. Results indicate that the final syllable is realized at or above the word internal high tone range. Again this agrees with Lindsey's (1985) measures. Whether this should be analyzed as a boundary tone that associates late in the derivation, as is normally the case (e.g. Goldsmith, 1990), or an underlyingly specified high tone is another question. For the purposes of this study it will be treated as an underlying high tone with phonetic upstep occurring.

2. The tone system

Lindsey (1987) treats Cherokee tone as a complex pitch accent system with the high tone, highrise and laryngealization as being forms of accent. While there is good evidence that the highrise is a result of accent, though metrically determined, the high and low tones are better analyzed as a tone system. Laryngealization is discussed in the section on the lowfall below. As the line between a tone and a pitch accent language is poorly defined, making this type of distinction may turn out to be empty in the end. Indeed it could well be argued that the difference between tone and pitch accent languages is the domain with pitch accent having a wider domain such as the word, resulting in a sparse tone specification, and tone having a narrower domain such as the morpheme, resulting in a dense tone specification. Still, even given this kind of continuum, there are three reasons for treating Cherokee as having a tone system.

First of all, in pitch accent systems there is generally at most one accent per word, although there may be none. On the other hand, Cherokee is more like tone systems in that the OCP allows only one underlyingly specified tone per morpheme (Goldsmith, 1989). In morphologically complex languages like Cherokee this results in the possibility of several underlyingly specified tones per word, although again there may be no underlyingly specified tone. Second, the rise in pitch and the catethesis following the accent usually seen in pitch accent languages (Pierrehumbert and Beckman, 1988) is not present in Cherokee, even within a morpheme. Finally, there is evidence for a floating high tone, an exclusive characteristic of tone languages. While these features could fit into a pitch accent system, it seems more straightforward to analyze them as a tone system.

2.1 Tone in accentless forms. Level high and level low tones are found in syllables with both long and short vowels but the rising (LH) and falling (HL) tones are found exclusively in syllables with long vowels. Given the usual restrictions of having one tone per tone bearing unit (TBU) and given that the mora is a unit of vowel length, this indicates that the mora is the TBU in Cherokee.

High tones are usually found in pairs except at the right edge of a word. That is, they are found as level high tones on long vowels (example 4), or they are found as a rising tone (LH) on a long vowel followed by a falling tone (HL) on a long vowel or by a high tone on a short vowel (example 5), or they are found as a high tone on a short vowel followed by a falling tone (HL) on a long vowel or by a high tone on a short vowel (example 6). Exceptions to this generalization are discussed below.

Example 4	Example 5	Example 6
góódvsga	*gvvgùúdíya*	*àagvvhálúùysga*
'I'm making a fire'	'he's sifting it'	'he's chopping it up'

There is no restriction on the number of low tones that can occur consecutively. The only restriction is related to the distribution of high tones: a low tone never appears following a rising tone or a high tone on a short vowel (i.e. *LHL). Lindsey notes that Pulte and Feeling give many apparent counterexamples to this last generalization, but he shows convincingly that all of these cases involve a mistranscribed highrise accent tone. Subjective judgments by several listeners support Lindsey's findings and are reflected in the transcription of tone in this volume.

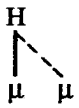
The distributional evidence for high and low tones points to a process of high tone spread limited to one TBU. If no spreading applied, then sequences of odd numbers of high tones should be attested in the data. Since only two consecutive moras may bear high tone, the domain of the spread is one mora. Lindsey (1985) presents further evidence from morphological alternation that high tone spreads rightwards. The following examples are from Lindsey (1985, 130-131):

	H	H H
	|	| |
Example 7:	ka + l + iisk + oo'i	aa + ktoost + iisk + oo'i
	3sA + take out + imp + hab	3sA + look at + imp + hab
	kààlíiskóò'i	*àaktòóstíiskóò'i*

In the first form there is one underlying high tone that results in two surface highs and in the second example there are two underlying highs that result in four surface high tones. In the first example *-iisk*, which is marked for a high tone on the second mora of its long vowel ends up with a rising tone. In the second example it ends up with a level high due to the high tone spread from the preceding syllable.

Although Lindsey's later analysis (1987) has the mora as the TBU, he formulates his rule using V to represent moras. This leads to difficulty in his analysis in separating laryngeal features that link to the Root node of the vowel and tonal features that link directly to the mora. The high spread rule is reformulated here using moras.

Figure 1
High Spread
Spread H rightwards noniteratively.



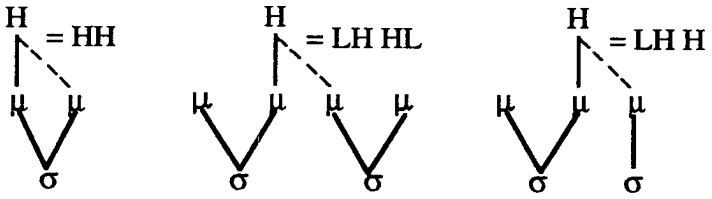
While High Spread correctly predicts that high tones can spread across any number of onset consonants and that it will spread only one mora to the right, it incorrectly predicts that it can spread to a mora dominating a coda consonant. In Oklahoma Cherokee there is evidence that only /// and /h/ may appear in coda position underlyingly and that they can bear a mora. The strongest evidence is that vowels tend to be short before /// or /h/ preceding a consonant. In addition, deletion of a glottal stop in coda position leads to compensatory lengthening of the vowel. Therefore it is necessary to reformulate High Spread so that there is no possibility of tone spreading onto a glottal stop or glottal fricative. This restriction turns out to have predictions that are borne out in the case of the non-derived falling tone discussed below.

High Spread reformulated

Spread H rightwards noniteratively
No mora dominating contrastive laryngeal features may bear high tone.

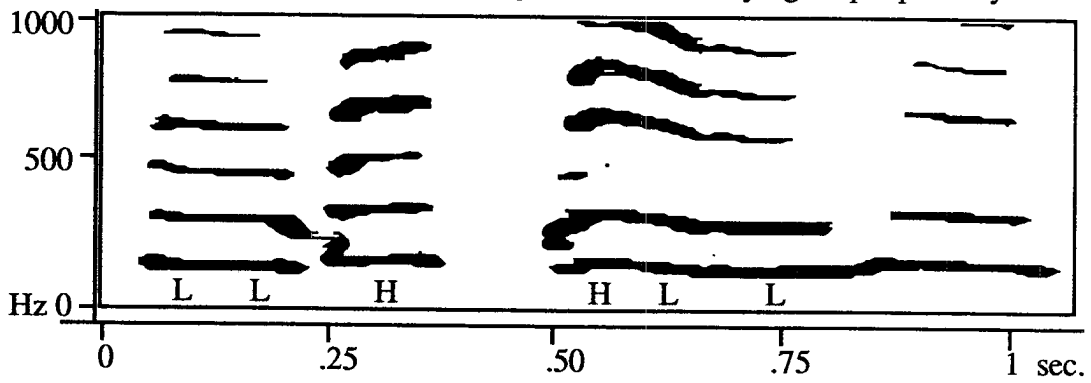
Given this rule, long level high, HH, is the result of the high tone specified for the first mora of a long vowel spreading onto the second mora. It can also result from high tone spread from a preceding syllable onto the first mora of a long vowel that is specified on its second mora for high tone as in the example above. Rising tone, LH, is the result of high tone specification for the second mora of a long vowel when there is no spread from a preceding syllable. The majority of examples that appear in Feeling and Pulte are derived from the spread of a preceding high tone onto the first mora of a long vowel. The nonderived forms are the result of laryngealization, underlying or derived, on the vowel blocking High Spread. Below are three examples illustrating the most common tonal patterns seen in Oklahoma Cherokee.

Figure 2 Three examples of High Spread



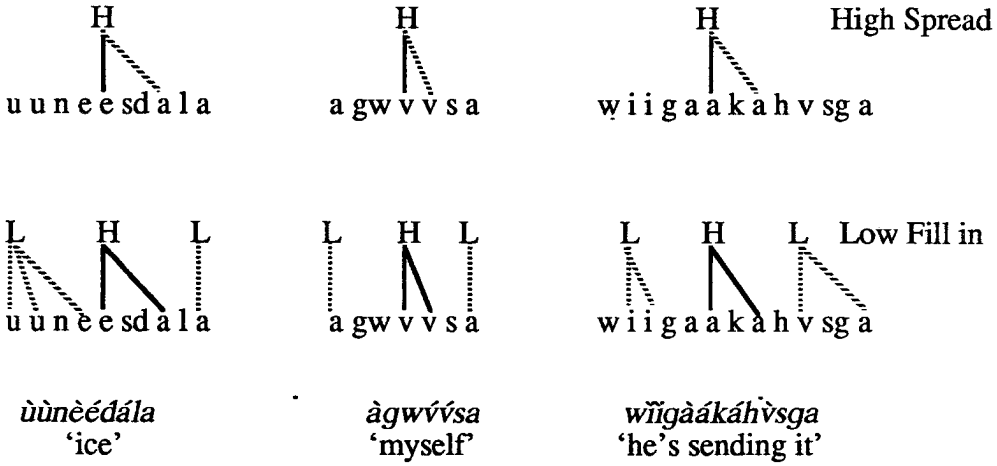
It would be nice to leave all the moras that receive no high tone unspecified at the output of the phonology to avoid fill in rules. However, the phonetic data do not support this type of analysis. As is noted in Pierrehumbert and Beckman (1988), the pitch of vowels that are unspecified for tone is dramatically affected by the tone of the adjacent tonally specified vowels. Interpolation between the word edge and the specified tone results in a contour. Measurements from narrow band spectrograms indicate that Cherokee vowels with low tone are level, even when adjacent to vowels bearing high tone. An example spectrogram is given in Fig. 3 below. Since the low tone vowels do not pitch interpolation low tone is analyzed as filled in.

Figure 3 Narrow band spectrogram: *dèègáhlvv̋ïha* 'he's tying it up repeatedly'



Low tone fill in is ordered after High Spread to avoid blocking the spread of high tones.

Fig. 4 Low tone fill in



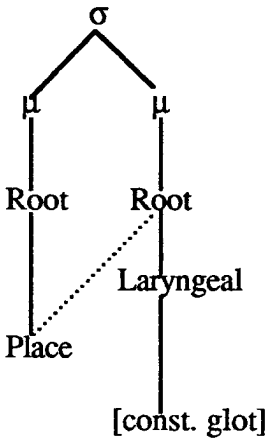
ùùnèédála 'ice'

àgwvvsa 'myself'

wĩĩgàákáhvsga 'he's sending it'

2.2 Laryngealization and tone. In addition to the familiar looking tone rules seen above, there are some interesting interactions between tone and laryngealization that result in the lowfall tone. As was noted above the lowfall is characterized by fall in pitch that starts at and ends below the low tone region. It is also characterized by creaky voice in the second half of the vowel where the pitch excursion reaches its lowest point. In Oklahoma Cherokee a coda glottal stop lenites. This results in the lengthening of preceding short vowels. It also results in laryngealization of the second half of the preceding long vowel. This process is termed *vocalization*. This process is analyzed here as spreading of the vowel's Place node onto the Root node of the coda glottal stop. When no high tone is specified for a mora within the syllable, the result is the lowfall tone described above (see example 8 below). When high tone is underlyingly specified for a mora within the syllable the characteristic glottalization is lost and the resultant tone is falling (HL) tone. This can be seen as a constraint that prohibits tautosyllabic high tone and constricted glottis from appearing in the same syllable.

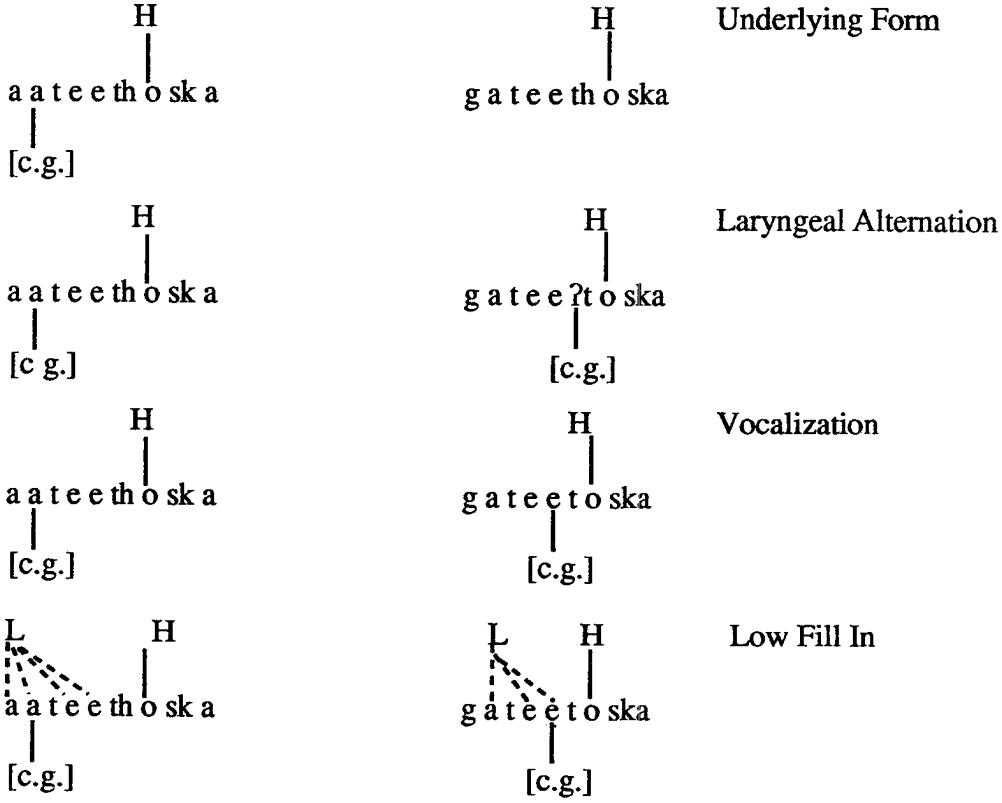
Figure 4 Vocalization by spreading of the V Place node



Evidence for laryngealization resulting from the lenition of the glottal stop comes from a process termed Laryngeal Alternation (LA). In Cherokee there is pronominal inflection, resulting in forms termed glottal grade by Scancarelli (1987), that turns the first /h/ of the verb stem into a glottal stop. This process is described in more detail in Munro (this volume) and so will be discussed in no further detail now. What is of interest here is that it provides evidence that much

of the laryngealization that results in the lowfall and the falling tones that aren't the result of high spread can be derived from the lenition of coda glottal stops. One piece of evidence is that when LA results in a glottal stop that is intervocalic, neither the laryngealization nor the resultant lowfall occur (see example 9 below). There is also reason to posit underlying laryngealization since some morphemes have the characteristic falling and lowfall tones but never surface with a glottal stop. Lindsey (1985) gives evidence that underlying laryngealization is historically derived from lenition of coda glottal stops. The 3rd singular present prefix in example 8 below is an case of underlying laryngealization.

Example 8: Laryngeal Alternation, glottal stop vocalization



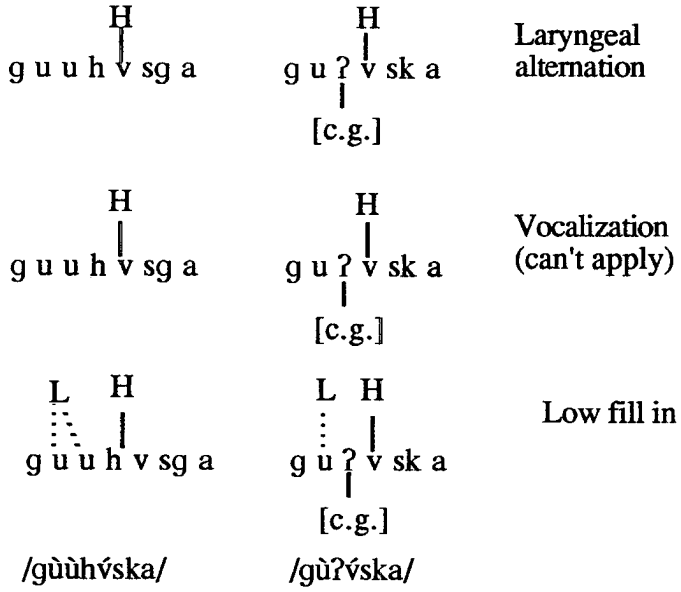
/àatèèthóska/
àadèètóska

/gàtèetóska/
gàdèedóska

verb stem =/-tèètóska/ *-dèèdosga* 'dive'

3s prs + verb stem	1s prs + verb stem
àadèètósga	*gàdèedósga*

Example 9: Laryngeal Alternation resulting in an intervocalic glottal stop



verb stem = /-hv́ska/ *hv́sga* 'put in water'

3s prs + verb stem	1s prs + verb stem
gùù+hv́sga	gù+'v́sga

In addition to the lowering and laryngealization of low toned vowels laryngealization interacts with high tone spreading rules to produce the high-falling tone that is seen in words where the high fall is not predictable. At first it is tempting to see the high fall and the low fall as the same tone depression effect. However, in the case of the high fall there is no evidence of the creakiness characteristic of the low fall and of laryngealized vowels in general. It is necessary, then, to find an alternative analysis for the high falling tone that results from laryngealization. Evidence for laryngealization resulting in the high-low falling tone comes from the association of floating high tone to long vowels that have underlying laryngealization. Lindsey (1985) notes that certain prefixes, such as the distributive, have the effect of raising the tones in the immediately following syllable. They are analyzed below as having a floating high tone that docks to the first TBU immediately to the right of the distributive prefix. When there is laryngealization on the syllable to which the high tone docks a falling tone (HL) results.

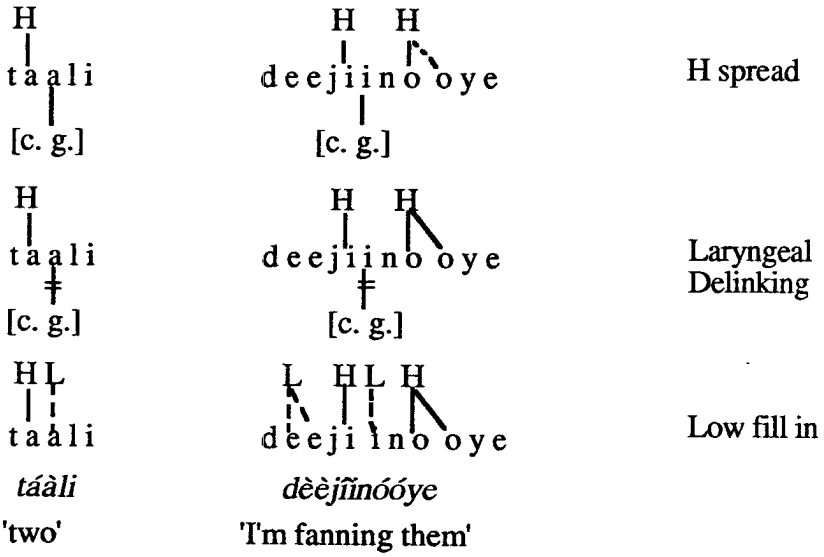
Example 10:	/jîinóóyèè'a/	/dèèjîînóóyèè'a/
	'I'm fanning him'	'I'm fanning them'

In the formulation of High Spread above, high tone is prohibited from spreading onto a mora that dominates contrastive laryngeal features such as [c. g.] or [s.g.]. This is motivated by the need to block high tone from spreading onto coda /h/ and ///, but it is also useful in analyzing the high-low fall; high tone is blocked from spreading onto the second mora of the long vowel. There must also be a rule to delink the laryngeal features from the vowel since they don't surface in the phonetics. The rule, called Laryngeal Delinking, delinks any laryngeal feature that is linked to a vowel that is also specified for high tone.

Laryngeal delinking
Delink [constricted glottis] in the presence of tautosyllabic high tone.

There is phonetic motivation for avoiding combining laryngealization and high tone on the same vowel: glottalization will tend to wipe out high tone. Some languages preserve underlying tone by tone rescue rules that relink stranded tones. Laryngeal delinking is part of a pattern of high tone preservation in Cherokee that, instead of rescuing, prevents processes that would strand tone. A second process that would obliterate high tone, were it not blocked, is vowel deletion due to spreading of [spread glottis] onto vowels (see Flemming this volume).

Example 11: The interaction of High Spread and [constricted glottis]



2.3 Floating tones. There is a complex set of affixes in Cherokee some of which affect the tonal pattern of the verb or noun to which they are adjoined. One such morpheme is the distributive prefix *dee-*. It is used to mark multiple acts of the same action or, in some cases, to indicate plural objects. When it prefixes to the verb a high tone appears on the first syllable of the verb. There are several allomorphs of this prefix that depend on the shape of the first vowel of the verb. In vowel initial verbs, the distributive appears as *d-* only and is not accompanied by a high tone.

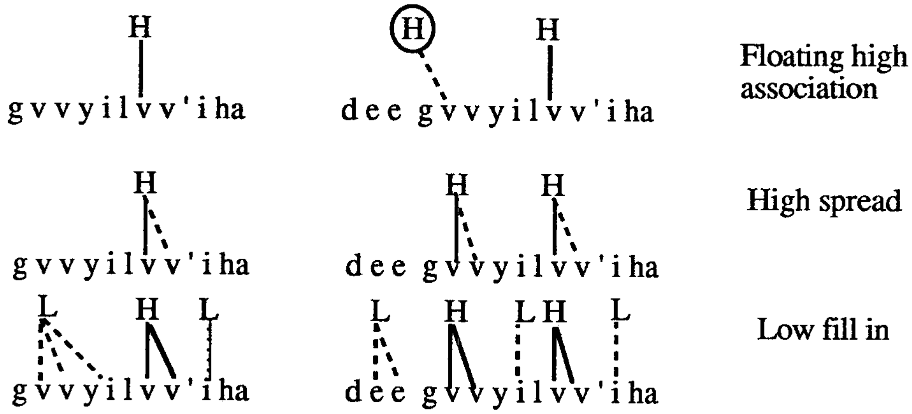
Example 12:	*kànóóyèe'a*	*dèèkánóóyèè'a*
	'he is fanning her'	'he is fanning them'

It is evident from the examples above that association of floating high tone associates to the first mora following the distributive prefix, and that it does so after laryngeal metathesis has taken place. Laryngeal metathesis, described by Cook (1979), a metathesizes a coda /h/ across short vowels without high tone resulting in an aspirated stop. A related process, vowel deletion is also blocked by high tone. In these examples if floating high were to associate prior to metathesis, it would bleed the environment that leads to metathesis.

Example 13: Association of floating high tone

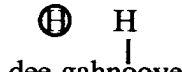
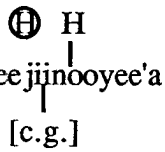
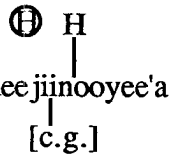
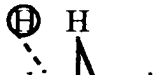
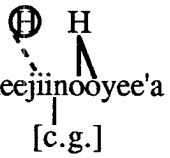
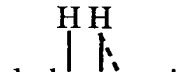
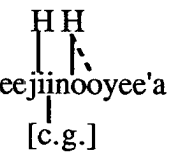
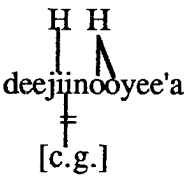
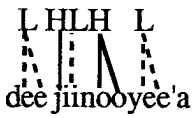
gv̀v̀ +yàlv́v́ɻíha — 1s>3s + ‘tying up’ (single act) — ‘I’m tying him/her up’

dèè +gv̀v̀ + yàlv́v́ɻíha — dis + 1s>3s + ‘tying up’ — ‘I’m tying him/her up repeatedly’



/gv̀v̀tĭlv́v́ʺiha/ /dèègv́v́yĭlv̀v̀ʺiha/

Example 14: Floating high association after laryngeal metathesis and laryngeal alternation

dee-ga-hnooyee'a dis-3sA-fan-prs 'he is fanning them'		dee- ji-hnooyee'a dis-1sA-fan-prs 'I am fanning them'
 dee gahnooyee'a	Laryngeal alternation	 deejiinooyee'a [c.g.]
 deekanooyee'a	Laryngeal metathesis	 deejiinooyee'a [c.g.]
 deekanooyee'a	Floating High Association	 deejiinooyee'a [c.g.]
 deekanooyee'a	High Spread	 deejiinooyee'a [c.g.]
 deekanooyee'a	Laryngeal Delinking	 deejiinooyee'a [c.g.]
 deekanooyee'a	Low Tone Fill in	 dee jiinooyee'a
/dèèkánóóyèè'a/		/dèèjíínóóyèè'a/

3. Accent in Cherokee

This last section analyzes the one remaining tone of Cherokee. Cherokee is said to have two accent systems, tonic and atonic. Unlike the other tones of Oklahoma Cherokee, the high rise, referred to in the literature 'atonic accent' is syntactically restricted: it appears only on verbs in subordinate clauses, on deverbal nouns, and on adjectives. Although it has been referred to as 'atonic accent' in the literature, for clarity it will be referred to simply as accent.

The phonological characteristics of accent also set it apart from the tonal system of Oklahoma Cherokee. Its distribution is restricted not by the presence or absence of other tones but rather is determined by factors that are normally associated with prosody. Only one accent may appear per word, and in the syntactically determined forms listed above at least one accent

must appear per word. Accent falls on the rightmost long vowel of a word or on the first syllable. It is characterized by a gradual rise in pitch that begins at a variable level and rises to a point above the normal high tone register and by a rise in amplitude. There is no parallel rise in amplitude for the normal high tone. Lastly it is imposed over the existing tonal pattern, overriding the melody of the syllable on which it occurs. All of these factors point to a metrically determined stress accent rather than pitch accent system.

Given the distributional data, it is proposed that Cherokee has quantity sensitive unbounded feet and assigns prominence with End Rule right (ER) (Prince 1983). The pattern of assigning accent to the first syllable in the absence of a heavy syllable is typical of many languages with unbounded quantity sensitive stress systems (Prince, 1983). The edge prominence rules can be broken down into two stages: edge prominence right EPR and edge prominence left EPL. EPR applies first and is quantity sensitive, EPL is quantity insensitive and applies only if EPR fails to assign accent.

EPR
Assign prominence to the syllable dominated by the rightmost grid peak

Example 15: Application of EPR

	*	
	x	
	x x	
'good'	**oo** sta	/óosta/
	*	
	x x	
	x x x x	
'sweeper'	h vv n **oo** s a sgi	/hvvnóosàgi/
	2nd sg+deverbal stem	

The highly restricted quantity sensitive stress accent in Oklahoma Cherokee is probably a remnant of an accent system that had a wider distribution in Iroquoian languages. Interestingly some of the Northern Iroquoian languages, such as Cayuga, still maintain an active metrical stress system (Prince, 1983). It may have survived in the forms that it has because Cherokee has an extremely free word order (Scancarelli, 1987) and little or no case marking on nouns. Furthermore, the only difference between many of the derived nouns and the habitual form of the corresponding verb is the presence of accent. While the classes of stress bearing words are restricted, the lexical items found in these classes are used frequently. For example, the derivational processes resulting in deverbal nouns and in adjectives is highly productive. Thus, maintaining the stress system can be seen as surviving in these forms as a necessary way of differentiating these highly similar forms. Such a system would also benefit from maintaining a phonological way of marking the difference between various syntactic structures such as matrix and embedded clauses.

4.0 Conclusion

Cherokee has been analyzed as a pitch accent language with two accent systems, tonic and atonic, that operate independently. This paper has proposed that what has traditionally been termed tonic accent, is in fact a tone system. This proposal is motivated by the fact that pitch in Oklahoma Cherokee has features that are more characteristic of tone languages than pitch accent languages. Additionally a metrically determined stress accent is superimposed over the existing tonal melody in certain forms. Further evidence for such a system comes from comparative data.

Prince (1983) analyzed Cayuga as having both tone and a metrically determined stress accent. The distribution of tones and their interaction with laryngealization form an interesting pattern that suggests that Oklahoma Cherokee has recently changed from being a predominantly stress accent language to being a tone language with stress accent restricted to certain forms. As such, it is an example of a language in which tone and stress systems interact.

Laryngeal Metathesis and Vowel Deletion in Cherokee

Edward S. Flemming

1. Introduction

'Laryngeal metathesis' is the label assigned to a complex set of metathesis and deletion processes conditioned by laryngeal features in Cherokee (Cook 1979, Scancarelli 1987).

An example of metathesis is given in (1):

(1) a. *àagì-hnààlv́v́'i* → *àakìnààlv́v́'i* 'I am angry'
1sB-angry;prs

cf. b. *ùu-hnààlv́v́'i* 'he is angry'
3sB-angry;prs

c. *àagì-gòòhv̀v́'i* 'I saw it'
1sB-see;pst

(1a) shows that the /h/ metathesizes across a short vowel, ending up adjacent to a voiceless unaspirated stop, forming an aspirated stop. (1b) provides evidence for the underlying form of the stem, which surfaces in the third person where metathesis does not apply. (1c) indicates the form of the 1sB agreement prefix when metathesis does not apply.

The case of deletion is exemplified in (2).

(2) a. *ùu-lv̀v̀gwòhdi̋i̋'i* → *ùulv̀v̀kwdi̋i̋'i* 'he likes it'
3sB-like;prs

cf. b. *jìì-lv̀v̀gwòodi̋i̋'i* 'I like him'
1sA-like;prs;'

(2a) shows the loss of underlying /o/, rendering /gw/ adjacent to /h/, which results in an aspirated labialized stop. (2b) shows the source of evidence for root-internal deletions of this kind: the 'glottal grade' of the stem. Certain agreement prefixes, including 1sA select the so-called glottal grade of a stem. The process of glottal grade formation is discussed in detail by Munro (this volume), but the crucial aspect here is that it typically involves replacing the first /h/ in the stem by a glottal stop, and since /h/ conditions metathesis and deletion, this change can remove the environment for these processes. In the dialect of our consultant, pre-consonantal glottal stops surface as glottalization and lengthening of the preceding vowel, so no actual glottal stop is transcribed in (2b), however the h-ʔ alternation can be seen clearly in forms such as those in (4) In any case, no /h/ is present so underlying /o/ surfaces undeleted. Comparison of glottal grade forms with their 'h-grade' counterparts thus provides useful evidence for the occurence of deletion.

(4) a. *àa-hv́v́'a* 'she's moving it'
3sA-move;prs

b. *jì-'v́v́'a* 'I'm moving it'
1sA-move;prs;'

Thus metathesis and deletion apply in a CVhX environment:

(6) Metathesis: CVhX → ChVX
Deletion: CVhX → ChX

Both processes are subject to complex conditioning factors outlined in (7).

(7) i. The identity of C - sonorant or obstruent
- aspirated or unaspirated
ii. The identity of X - sonorant or obstruent
iii. The length of V
iv. The tone on V

This paper has two goals: firstly, to show that the complex conditioning of metathesis and deletion can be analyzed as the result of the interaction of simple, general constraints, and secondly, to consider issues relating to the analysis of metathesis.

2. Optimality theory

The analysis will be formulated in terms of Optimality Theory (Prince and Smolensky 1993). Important features of this approach adopted here are as follows:

1. Phonologies consist of sets of ranked, violable constraints, e.g.
'Syllables must have onsets'
*[-back, +round]
'Align [+round] with the right edge of the word' (Spread [+round])

2. The output form of a given input UR is that representation which best satisfies the constraints. Thus constraint violation can be forced by a conflicting higher ranked constraint. For example, if *[-back, +round] is ranked above 'Spread [+round]' then spreading onto a front vowel will be blocked.

3. A crucial set of constraints are the 'faithfulness' constraints (cf. Prince and Smolensky 1993) which require the output to be similar to the input. Without constraints of this kind, the input could be replaced by a dramatically different, but otherwise extremely well-formed, output. The key families of faithfulness constraints adopted here, from Kirchner 1993, are ParseF and *Insert F, which can be formulated as follows:

(8) Parse F: do not delete feature F from the input representation.
*Insert F: do not insert feature F.

Optimality theory is adopted here as a tool which allows us to bridge the gap between the work of phoneticians such as Ohala (1983, 1992), Lindblom (1990), Stevens and Keyser (1989) and Kawasaki (1982) on providing substantive phonetic explanations for tendencies in phonological patterning, and the analysis of the phonologies of individual languages. For example, the tendency for front vowels to be unrounded, and back vowels to be rounded has been explained in terms of the acoustic effects of rounding. Back vowels differ from front vowels in having a smaller difference between the frequencies of the first and second formants. Rounding lowers the second formant, thus rounding a back vowel makes it more distinct from a front vowel. However, phonologists must analyze individual languages, not cross-linguistic tendencies, and some languages contravene the tendencies. For example Turkish has front rounded and back unrounded vowels.

In optimality theory, a phonological grammar consists of universal constraints ranked in

order of priority. If we regard the phonetic desiderata adduced to explain phonological tendencies as constraints, we can account for the failure of specific languages to observe them in terms of the ranking order. A superordinate constraint overrides the tendency to observe a lower-ranked constraint, as in the case of a language which has front rounded vowels, where constraints that favor making a large number of vowel contrasts available override the dispreference for front rounded vowels.

Thus optimality theory allows us to formulate specific phonological analyses in terms of general substantive constraints. The crucial elements of the theory from this point of view are that it uses constraints rather than rules, and that it provides a tractable mechanism for the resolution of conflicts between constraints, namely the ranking of constraints.

3. The analysis of metathesis

The analysis of metathesis in terms of optimality theory raises interesting issues. It is not difficult to see motivations for metathesis. For example the pattern of historical metathesis shown in (9) can be understood as being motivated by the well-established preference for open syllables (Ultan 1978). The question is what constraints restrict the application of metathesis.

(9) Metathesis in the development of French:

bre**b**is	< **v**er**v**ecem	'young lamb'
troubler	< **t**or**b**ler	'to disturb, worry'
fromage	< ***f**or**m**aticum	'cheese'

Clearly metathesis involves some kind of violation of faithfulness to the input representation, but the relevant constraints cannot belong to the family of Parse F and *Insert F constraints because nothing is added or deleted. Metathesis violates faithfulness to the temporal sequencing of the input, so we need constraints against altering ordering relations.

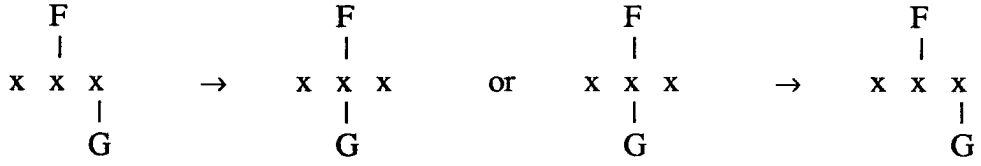
Standard autosegmental phonology recognizes two timing relations: association (which represents simultaneity or overlap) and temporal precedence. We will posit constraints relating to each.

(10) Parse Association: A feature in the input should appear associated to the same position in the ouput.

Parse Ordering: Do not reverse precedence relations.

Parse Ordering (Ordering) is formulated as shown to allow adjacent features to become associated to the same root node without violating this constraint. Similarly, features associated to the same root may be linearized into adjacent features without violating ordering (11). However, both of these changes would violate Parse Association.

(11)



Reversing the order of two features constitutes a violation of Ordering:

(12)

A final type of temporal sequencing constraint relates to epenthesis. Inserting a segment into an input does not alter any precedence relationships, but it does violate the contiguity of the sequence. Thus we will adopt the following constraint (cf. Kenstowicz 1994):

(13) Contiguity: Do not insert segments that are not present in the input[1]

4. [Spread glottis] sounds in Cherokee

Before we turn to the analysis of metathesis and deletion it is necessary to clarify the phonetic and phonological nature of the Cherokee sounds with particular relevance to these processes, those which involve the feature [spread glottis] ([s.g.]). Table one shows the representation of Cherokee sounds central to the present paper in orthography and in IPA, together with brief phonetic descriptions.

Orthography	IPA transcription	Description
d, g, j	t, k, tʃ	voiceless unaspirated stops/affricates ('g' can be voiced intervocalically)
t, k, ch	tʰ, kʰ, tʃʰ	voiceless aspirated stops/affricates
h	h, ɦ	breathy voiced intervocalically, voiced elsewhere
hw	w̤	breathy voiced labio-velar glide
hy	j̤, j̊	breathy voiced or voiceless palatal glide
hn	n̤	breathy voiced nasal (breathy closure, modal release)
hl	ɬ	voiceless lateral fricative

Table 1. Selected Cherokee sounds.

It is essential to realize that while the orthography includes sequences of sonorants and *h*, these are in fact conventional linearization of essentially simultaneous events. For example *hw* represents a breathy labio-velar, not a sequence of /h/ followed by a labio-velar. Thus I assume that the breathy glides are represented phonologically as identical to voiced glides apart from the addition of the [s.g.] specification.

Note that breathy sounds become partially devoiced before voiceless obstruents and are then spelled *wh, yh, nh* respectively in the orthography. However, I assume that this devoicing is a gradient phonetic effect, and that their phonological representations are essentially unchanged.

Realizing that [s.g.] occurs associated to sonorants eliminates some apparent cases of

[1]This constraint could be alternatively be formulated as 'do not alter immediate precedence relations', where immediate precedence is a relation defined only between adjacent elements.

metathesis suggested by the orthography. For example, the derivation in (14a) essentially involves vowel deletion. However, in the orthographic transcriptions given, deleting *i* leaves the sequence *lh*, whereas the actual result is written *hl*. So, orthographically, this derivation does involve metathesis of *h* across *l*. but in fact what is occurring is the merger of /h/ and /l/ to produce a [s.g.] lateral.

(14) a. *aa-lihtawo* → *àahltàwo* 'he's combing his hair'
3sA-comb.hair;prs

cf. b. *gà-lìitàwo* 'I'm combing my hair'
1sA-comb.hair;prs;'

More generally, the sequences [Ch] and [hC] are not well-formed unless C is a stop closure. Thus the segment /h/ appears only adjacent to a stop closure or intervocalically, as in (15).

(15) Intervocalic /h/:
àa-hv́v́'a 'she's moving it'
3sA-move;prs

nìhi 'you'

/h/ preceding a stop:
hìhdlíya 'you're sharpening it'

sàhkòónge 'blue'

ùlàasìhdéeni 'his foot'

Any underlying sequence consisting of /h/ and a sonorant will surface as a single segment with a [s.g.] specification, as discussed above. This distribution is analyzed in the following section.

Given the fact that the orthography obscures some important aspects of the phonological representation of words, it is important to keep orthographic and phonological representations distinct. To this end, orthographic transcriptions will be presented in italics, e.g. *àahltàwo*, while phonetic and phonemic transcriptions will be indicated by square brackets, e.g. [àaɬtàwo], and slant brackets, e.g. /àalìhtàwo/, respectively.

5. The distribution of [s.g.]

In this section we will consider the phonological representations of the [s.g.] sounds as the basis for an analysis of the patterns outlined above.

Following Steriade (1992a, 1993), I propose that stops and nasals are represented with two positions to which features may associate: a closure and a release, which has approximant or fricative stricture. A closure position is symbolized as A_0, a fricative as A_f, and an approximant as A_{max}. Partial representations of sample Cherokee stops and nasals are shown in (16):

(16)

unaspirated *b*.	aspirated *p*:	plain nasal *n*:	breathy nasal *hn*:
	[s.g.]		[s.g.]
	|		|
A_0 A_{max}	A_0 A_{max}	A_0 A_{max}	A_0 A_{max}
|	|	|	|
place	place	[nasal]	[nasal]
|	|		
labial	labial		

Breathy glides are represented as in (17):

(17) *hy*:

[s.g.]
|
A_{max}
|
place
|
dorsal

We turn now to the analysis of the generalization that the sequences [Ch] and [hC] are not well-formed unless C is a stop closure. Presumably general constraints on syllabification or phonotactics rule out tautosyllabic [Ch] and [hC] clusters, other than aspirated stops (18), since such clusters are cross-linguistically very rare, but for present purposes we will formulate a single constraint, *Ch, barring these clusters.

(18) Ill-formed clusters:

*.Ch (where C is an approximant or fricative)
*Ch.
*.hC
*hC.

Two further constraints are relevant to the correct resolution of an ill-formed input cluster:

(19) Parse [s.g.]: Don't delete the feature [s.g.]
Parse association: A feature in the input should appear associated to the same position in the ouput.

Given the ranking shown in (20), a cluster violating *Ch will be resolved by associating [s.g.] to C. This satisfies Parse [s.g.], but violates lower ranked Parse Association, since [s.g.] has been reassociated to the preceding segment (see 21).[2]

(20) *Ch, Parse [s.g.] >> Parse Association

[2]In Optimality Theory, the evaluation of a set of candidates with respect to a constraint ranking is conventionally presented in table form. The input representation is shown in the top left, with the output candidates in the column below it. The constraints are arranged along the top row from highest ranked, on the left, to lowest ranked. Constraints which are equally ranked are separated by a dotted line. An asterisk (*) in a cell indicates that the candidate at the left of that row violates the constraint at the head of that column. An exclamation point (!) after an asterisk indicates that the violation eliminates that candidate from contention. The optimal candidate is marked with an arrowhead (>) in the left column.

(21)

/hl/	*Ch	Parse [s.g.]	Parse Assoc
hl	*!		*
> [s.g.] | l			*
l		*!	

The two remaining possibilities, the heterosyllabic clusters C.h and h.C are ruled out by a dispreference for codas, formulated as the constraint *Coda:

(22) *Coda: syllables should not have codas.

This constraint is also ranked above Parse Association, so merging Ch and hC clusters is preferrable to creating a coda, even at the cost of violating Parse Association:

(23)

/hC[+son]/	*Coda	Parse [s.g.]	Parse Assoc
h.C	*!		
> [s.g.] | C			*

Thus whenever a cluster of a sonorant and /h/ arises, it will surface as a breathy sonorant. But in the case of clusters of /h/ and an oral stop closure, there is an additional higher ranked constraint against merging /h/ with the closure (24). Effectively, this constraint states that there are no preaspirated stops in Cherokee.

(24) *preasp. : *[s.g.]
|
A0
|
[-son]

(25) *preasp. >> *Coda

So, as shown in (26), in this case hC will be syllabified with /h/ in coda.

(26)

/hC/	*preasp.	*Coda	Parse [s.g.]
> h.C		*	
[s.g.] | C	*!		

Thus the only cases in which the sequences /Ch/ and /hC/ will surface is when C is a stop closure, and thus forms an aspirated stop in Ch, and is unable to merge with /h/ in /hC/.

6. Metathesis and deletion

There are two processes conditioned by [s.g.] in Cherokee: laryngeal metathesis and deletion. Methathesis involves the migration of [s.g.] from one consonant to another across an intervening vowel. Deletion applies to a vowel preceding a [s.g.] sound. The incidence of these two processes is summarized in (27). The table shows when the two processes apply to a CVhX sequence, depending on whether C is an unaspirated plosive or a sonorant, and on whether the

following sound, X, is a stop, sonorant, or vowel (the fricative /s/ is discussed below). Examples instantiating each cell in the table are given in (28)-(39).

(27) Incidence of metathesis and deletion in the configuration: CVhX

C\X	plosive	son	vowel
plosive	del	met	del
son	del	-	-

del = 'V deletes' met = 'h metathesizes across V'

Examples (T = any plosive, N = any sonorant):

TVhT → ThT	(28) *g-ahdiya* → 3sA-use;prs	*k-dí̀ya*	'he is using it'
	(29) *uu-lvvgwohdii'i* → 3sB-like;prs	*ùu-lv̀v̀kwdí̀i'i*	'he likes it'
TVhN → ThVN	(30) *aagi-hwasga* → 1sB-buy;prs	*àakì̀wàsga*	'I'm buying it'
	(31) *ga-hnaalvvsdi* → 3sA-make.angry;prs	*kànàálv́v́sdi*	'he's making him angry'
$TV_1hV_2 \rightarrow ThV_2$	(32) *da-hi-wooniisi* → fut-2sA-speak;fut	*tí̀wóónì̀isi*	'you will speak'
	(33) *aagi-hawoosdii'a* → 1sB-choke;prs	*àakàwóósdì̀i'a*	'I'm choking'
NVhT → NhT	(34) *aa-lihkooddi* → 3sA-shatter;prs	*àahlkòòddi*	'he's shattering it'
	(35) *aani-htoosadii'a* → 3pA-hang.up.long.object;prs	*àanhtóósàdí̀i'a*	'they're hanging it (long) up'
NVhN	(36) *d-úùnà-hnúùwa* dis-3p>3p-wear.shirt;prs		'they wear shirts'
	(37) *wàhya*		'wolf'
NVhV	(38) *nì̀hi*		'you'
	(39) *wàhv́sga*		'he is placing it'

The table indicates a fundamental split between the cases where the preceding consonant, C in CVhX, is a plosive and the cases where it is a sonorant. Where C is a plosive (a stop or affricate), either deletion or metathesis always applies, but if C is a sonorant, deletion only applies under restricted circumstances. We will analyze the incidence of metathesis and deletion in terms of two basic processes. One deletion process applies without regard to the identity of C, and is triggered by [s.g.] immediately preceding a plosive. This process accounts for the application of deletion in the leftmost column of (27), and will be labelled 'breathy vowel

deletion', in anticipation of the proposed analysis. The second process applies when C is a plosive, and may result in deletion or metathesis. This process accounts for the observations in the two rightmost cells in the top row of (27), and will be labelled 'metathesis', even though it results in deletion in some cases.

Evidence that there are two distinct processes operative here is provided by the fact that /s/ also conditions deletion of a preceding vowel, without regard to the nature of the preceding segment (40). I.e. breathy vowel deletion is triggered by /s/ as well as /h/ preceding a stop, whereas metathesis is triggered by /h/ or a breathy sonorant only.

(40)

TVs → Ts	*aagi-sgaasdaaneelv* 1sB-scare;pst	→	*àagsgáásdáànèèlv*	'he scared me'
NVs → Ns	*aa-danasiini* 3sA-crawl;prs	→	*àadànsi̋ini*	'he's crawling'
	aa-lisgi 3sA-dance;prs	→	*àalsgi*	'he is dancing'

The basis for the difference between the two processes can be analyzed in terms of the constraints that motivate them. Metathesis results from the attempt to associate [s.g.] to the optimal position, whereas breathy vowel deletion is motivated by a requirement to spread [s.g.] from a voiceless sound. In the remainder of this section we will consider first metathesis then breathy vowel deletion, accounting for the properties particular to each phenomenon, then we will turn to the factors that they have in common. We expect shared properties because both processes involve the feature [s.g.] and both involve deletion so constraints on [s.g.] and constraints on deletion will apply equally to both.

6.1. Metathesis. The first process can be understood as resulting from the attempt to associate [s.g.] to the optimal position. The best docking site for [s.g.] is on the release of a stop, where the high rate of air-flow allows the realization of salient cues to the state of the glottis (Kingston 1990). The alternative positions in which [s.g.] can appear are in isolation as [h], or associated to a sonorant. The feature [s.g.] is undesirable on a sonorant because it conflicts with the realization of sonorancy and voicing (Stevens and Keyser 1989). The segment [h] is also problematic. Post-vocalic [s.g.] preceding a stop (e.g. -iht-) has essentially the same spectral shape as the preceding vowel, and thus will be substantially masked by it (Bladon 1986). Inter-vocalic [h] also does not produce any major transitions in spectral shape or amplitude, especially if voiced (as in Cherokee), although there will be some widening of formant bandwidths, and loss of higher frequency energy. Thus it is unsurprising that the distribution of /h/ is often restricted (for instance, in English, /h/ may only occur as the onset of a word or stressed syllable).

6.1.1. Deletion in TVhV sequences. Conceptually, deletion and metathesis can result from the requirement that [s.g.] associate to the optimal position, the release of a stop, even at the cost of deleting an intervening vowel. The constraints required to formalize this analysis correspond to the considerations adduced above regarding the optimal placement of [s.g.]. So *[s.g., son] represents the fact that [s.g.] and [+sonorant] are antagonistic features, and *h represents the fact that [h] is also dispreferred. By contrast, [s.g.] on a stop release does not violate any constraints. Two 'faithfulness' constraints against deletion of vowels and [s.g.] are also required.

(41) *[s.g., son]: Avoid the feature combination [+s.g., +sonorant].
*h: Avoid [h].
Parse V: Do not delete vowels.
Parse [s.g.]: Do not delete [s.g.]

In Cherokee, these constraints are ranked as shown in (42). In a /TVhV/ sequence this results in deletion of the first vowel, leaving /h/ in the release position following the plosive (43).

(42) Parse [s.g.] >> *[s.g., son], *h >> Parse V

(43) $TV_1hV_2 \rightarrow ThV_2$ *da-hi-wooniisi* → *tíwóóníisi* 'you will speak'
fut-2sA-speak;fut

/tahi/	Parse [s.g.]	*[s.g., son]	*h	Parse V
tahi			*	
> t<a>hi		*		*!
ta<h>i	*!			

Deletion does not apply with a preceding sonorant (44). This is because deletion in this situation would result in a breathy sonorant, which is as marked as [h] (45).

(44) NVhV *nìhi* 'you'

(45)

/nihi/	Parse [s.g.]	*[s.g., son]	*h	Parse V
> nihi			*	
n<i>hi		*		*!
ni<h>i	*!			

6.1.2. Metathesis in TVhN sequences. Extending this analysis to the instances of metathesis requires refinement of this basic picture. First, we must allow for the possibility that a [s.g.] feature that originates on one segment can surface on another. Such a change is a violation of the temporal ordering.

Metathesis most transparently involves optimal placement of [s.g.]. Metathesis applies only to take [s.g.] from a sonorant, a dispreferred location, onto the release of a stop, the optimal location (46). This clearly involves violation of Parse Association, so this constraint must be ranked below *[s.g., son] (47).

(46) TVhN → ThVN *aagi-hwasga* → *àakìwàsga* 'I'm buying it'
1sB-buy;prs

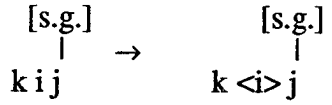
(47) *[s.g., son] >> Parse Association

Simply linearizing [s.g.] to precede a sonorant, then deleting the intervening vowel, as in the case of intervocalic /h/ above (4.1.1.), would not yield the correct output:

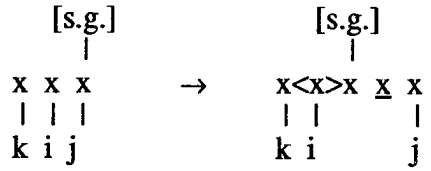
(48)
```
[s.g.]          [s.g.]
   |     →         |
k i j          *k <i> h j
```

I suggest that this output is ill-formed because, in a well-formed Cherokee consonant cluster, a consonant following a stop will be in the release position of that stop. In an aspirated

stop, this is also the position to which [s.g.] is associated, so a sonorant following an aspirated stop will be [s.g.]. Thus the ultimate output of (48) would in fact contain a breathy sonorant, as in (49), and thus represents no improvement over the input.

(49)


Cherokee does not contain any clusters in which a sonorant is second member except for the labialized stops [k^w, g^w]. This fact, and metathesis, can be accounted for if we assume that a vowel is epenthesized to prevent such clusters (50). Thus the apparent metathesis is analyzed as a minimal form of epenthesis: a vowel is inserted whose place features are provided by the deleted vowel. This reassociation of the vowel features is possible because the intervening [h] consists solely of a laryngeal specification, and therefore does not block the spread of vowel place features (cf. Steriade 1987).

(50)


6.1.3. Alternative analyses of metathesis. According to this analysis, laryngeal metathesis is not true metathesis, in the sense that the order of the vowel and [s.g.] is not simply switched, rather the apparent reversal of order results from deletion and epenthesis.[3] In present terms, true metathesis would involve a violation of Ordering, reversing an ordering relationship. Such violations must be possible to account for metathesis in consonant clusters, for example, where epenthesis could hardly be implicated. Thus it would be possible to analyze Cherokee laryngeal metathesis in this way. That is, *[s.g., son] could be ranked above Ordering, so Ordering could be violated to avoid a breathy sonorant.

There are two reasons to prefer the analysis in terms of deletion and epenthesis. Firstly, metathesis is not generally possible in Cherokee. Although the optimal position for [s.g.] is the release of a stop, [h] does not metathesize with a following stop to associate to this position:

(51) hT –x→ Th :

hìhdlíya	'you're sharpening it'
sàhkòónge	'blue'

Given the current formulation of Ordering, permitting metathesis of [s.g.] with a vowel would also permit metathesis with a consonant, because Ordering constrains reversal of ordering relationships without regard to the type of segments involved. It would be possible to replace Ordering with a set of constraints such as 'Preserve CV Ordering' and 'Preserve CC ordering' with the latter being ranked higher than the former in Cherokee, permitting CV metathesis but not CC metathesis. However this sacrifices the simplicity of the Ordering constraint adopted here.

The more important reason for preferring the deletion/epenthesis analysis of laryngeal metathesis is that it allows a unified analysis of parallels between metathesis and deletion. Both

[3] A comparable analysis of metathesis in Maltese Arabic is proposed in Hume (1992).

metathesis and deletion apply only with short vowels (6.3.1). If both processes involve deletion, this fact can be accounted for in terms of a single constraint against deleting long vowels, as proposed below. If metathesis is a distinct operation, then separate constraints will have to be invoked to block the two processes under the same conditions.

6.1.4. Deriving the properties of metathesis. To formalize the proposed analysis of metathesis we need an additional constraint, Contiguity (X, above), which forbids insertion of segments that were not present in the input. This constraint must be ranked below *[s.g., son] to allow metathesis to occur, as illustrated in (52). In the optimal output, [s.g.] is delinked from a sonorant, and surfaces on the release of a stop at the cost of violating lower ranked constraints by deleting and epenthesizing vowels.

(52) TVhN → ThVN

/tan̲/	*[s.g., son]	*h	Parse V	Segment	Contiguity
tan̲	*!				
t<a>n̲	*!		*		
> t<a>h̲an̲			*	*	*

Metathesis applies only with a preceding plosive[4]

Obviously, metathesis does not apply where the preceding consonant is a sonorant (53) because it would result in an breathy sonorant, which is precisely the segment that metathesis applies to eliminate.

(53) NVhN *d-úùnà-hnúùwa* 'they wear shirts'
dis-3p>3p-wear.shirt;prs

Metathesis also does not apply in the absence of any preceding consonant (54). Metathesis in this case would violate several constraints to create an /h/, which is as undesirable as a breathy sonorant (55).

(54) *àhóol* –x→ **hool* 'his mouth'
àhyvhjéeni –x→ **hayvhjeeni* 'his neck' (Feeling and Pulte 1975: 29)
àhnàwo –x→ **hanawo* 'shirt'

(55)

/an̲/	*[s.g., son]	*h	Parse V	Segment	Contiguity
> an̲	*				
<a>h̲an̲		*	*!	*	*

[4]Cook (1979) does not make this observation. His rule of laryngeal metathesis predicts that metathesis should apply with a preceding sonorant. While it must be borne in mind that Cook's description is based on the North Carolina dialect of Cherokee, while the present study is based on a speaker of Oklahoma Cherokee, there is evidence that /h/ does not metathesize onto sonorants in Cook's data either. He presents two forms that are regular according to the current analysis as exceptions to his rule (p.11):

aanahneejoo'vska 'they are playing a sport'
ganohliitooha 'he is hunting'

According to the present analysis metathesis should not apply since the potential target in each case is a sonorant /n/. The only example Cook supplies in support of metathesis onto sonorants is a complex derivation of an object-specific verb, *gahlasga* 'he is putting a round object in a container' (p.10). As Blankenship (this volume) demonstrates, the formation of such stems is unproductive and highly idiosyncratic, so this example is not compelling motivation for admitting metathesis onto sonorants.

Metathesis only applies to breathy sonorants

There are two other configurations in which metathesis might apply: /TVhV/ and /TVhT/ (the case of [s.g.] on a fricative is discussed in 6.1.7). In the case of /TVhV/, discussed in 4.1.1. above, the result of deletion is a well-formed configuration, [ThV], in which [s.g.] is associated to the release of a stop, so there is no motivation to violate further constraints to epenthesize a vowel as in metathesis. In fact the result of epenthesis, [ThV_1V_2], would be ill-formed because vowel sequences are not permitted in Cherokee and are resolved by deletion of V_1.

Deletion of the vowel in a /TVhT/ sequence also produces a well-formed output: [ThT]. In any case, deletion in this environment is also motivated by the constraints responsible for breathy vowel deletion (6.2, below).

Metathesis applies only to breathy sonorants because it is in this case that the output of deletion is a configuration in which epenthesis is motivated, i.e. an aspirated stop-sonorant sequence.

Metathesis operates leftwards

Note that it is not stipulated anywhere that metathesis should operate leftwards. This is related to the observation that /h/ does not metathesize with a following stop (56).

(56) hT –x→ Th :

hìhdlíya	'you're sharpening it'
sàhkòónge	'blue'

This shows that Ordering, the constraint against reversing precedence relations, must be ranked above *h, so metathesizing in this context is a greater violation than allowing /h/ to surface. In fact precedence relations are never violated in Cherokee, so Ordering is an undominated constraint.

This ranking also yields the result that shifting [s.g.] to the right cannot result in an improvement (57). For an input containing a breathy sonorant, the only output preferrable to leaving [s.g.] in the same position is one in which [s.g.] is associated to the release of a stop. This can only be achieved by moving [s.g.] rightwards if that movement is across a stop and this would require reversing the precedence relation between [s.g.] and the following stop. That is, given that metathesis cannot apply across an adjacent stop, it clearly cannot apply across a vowel and a stop.

(57)

/n̤ati/	Ordering	*[s.g., son]	*h	Parse V	Parse Association	Contiguity
> n̤ati		*				
nah<a>ti			*	*!	*	*
nathi	*!				*	

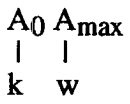
6.1.5. The behavior of labialized velars. It is interesting to note that [s.g.] does not metathesize onto a labialized velar stop (58).

(58) *ààgwà-hnúúwa* –x→ **ààkwànúúwa* 'I'm wearing a shirt'
1sB-wear.shirt;prs

dòódágwòhnv –x→ **dòódákwònv* 'Monday'

This is expected given the phonological representations assumed here according to which a labialized stop consists of two positions; a stop closure and a release which is identical to the sonorant [w] (59). Thus metathesis onto a labialized stop is blocked for exactly the same reason that [s.g.] does not metathesize onto [w]: it would produce a dispreferred breathy sonorant.

(59)



This analysis implies that aspirated labial velars are dispreferred because they involve the marked feature combination [s.g., +sonorant]. Thus we might expect that the vowel epenthesis that applies in metathesis would apply erroneously to break up this sequence.

(60) kw → *khiw

The crucial observation in explaining why this does not occur is that we have not analyzed metathesis as involving epenthesis of a vowel per se, rather it involves insertion of a vowel position. The features associated to that position are present in the underlying representation. Thus we can prevent epenthesis breaking up labialized velars by giving a high ranking to *Insert Feature, a constraint against inserting features (61). So while inserting a vowel segment in violation of contiguity is less violation than creating a breathy sonorant, inserting features on that vowel is a greater violation.

(61) *Insert F >> *[s.g., son], *h >> Parse V >> Contiguity

/kw̤a/	*Insert F	*[s.g., son]	Parse V	Segment	Contiguity
> kw̤a		*			
khi̤wa	*!				*

6.1.6. The behaviour of /l/. The laterals exhibit apparently exceptional behaviour with regard to metathesis, in that [s.g.] does not metathesize off /hl/, with one apparent exception:

(62) a. *gà-hlìha* –x→ **kàlìha* 'he is sleeping'
3sA-sleep;prs

b. *gàhlgwòógi* –x→ **kàlgwòógi* 'seven'

c. *gà-hlv́v́'ìha* –x→ ˇ*kàlv́v́'ìha* 'he's tying him up'
3sA-tie.up;prs

exception:

d. *dee-ga-lihgwadeega* → *dèèkálìhgwàdéégа* 'he's turning him over'
dis-3sA-turn.over;prs

Thus *hl* is not behaving like a sonorant, in that it seems to be a satisfactory docking site for [s.g.], and thus does not trigger metathesis. This is unsurprising if we take into account the fact that *hl* is phonetically a lateral fricative [ɬ], not a breathy approximant, and thus does not

violate *[s.g., son].

Note that the lateral fricative is in a sense the [s.g.] counterpart of the lateral approximant, in that an underlying sequence of /h/ adjacent to /l/ does surface as [ɬ]. For example, in (63) deletion of the vowel between /h/ and /l/ results in [ɬ] (orthographically *hl*):

(63) *aa-lihtawo* → *àahltàwo* 'he's combing his hair'
3sA-comb.hair;prs

Presumably the contrast between a breathy lateral and a lateral fricative would be too slight to be reliably perceived. Certainly Maddieson's (1984) survey identified no languages that contrasted voiceless lateral approximants and fricatives. This potential distinction is thus neutralized in favour of the lateral fricative in Cherokee, perhaps because of the greater salience of voiceless fricatives compared to voiceless or breathy approximants (cf. Maddieson 1980).

Although the fact that *hl* does not trigger metathesis is in fact unexceptional, given its phonetic nature, we now have to explain why [s.g.] does not metathesize onto /l/, if it is an acceptable docking site. We can account for this fact by ranking Parse [sonorant], a constraint against changing the value of [sonorant], higher than *[s.g., son]. Changing a lateral approximant into a fricative, i.e. changing it from [+sonorant] to [-sonorant], is then a greater violation than creating a breathy sonorant :[5]

/lan̤/	Parse [son]	*[s.g., son]	*h	Parse V	Contiguity
> lan̤		*			
l<a>han̤	*!			*	*

6.2. Breathy vowel deletion. We now turn to the analysis of breathy vowel deletion. This process is triggered by /h/ followed by a stop, or by /s/ (64-68). Note that

NVhT → NhT (64) *aa-lihkooddi* → *àahlkòòddi* 'he's shattering it'
3sA-shatter;prs

(65) *aani-htoosadii'a* → *àanhtóósàdi̤i̤'a* 'they're hanging it (long) up'
3pA-hang.up.long.object;prs

TVs → Ts (66) *aagi-sgaasdaaneelv* → *àagsgáásdáànèèlv* 'he scared me'
1sB-scare;pst

NVs → Ns (67) *aa-danasiini* → *àadànsi̤i̤ni* 'he's crawling'
3sA-crawl;prs

(68) *aa-lisgi* → *àalsgi* 'he is dancing'
3sA-dance;prs

I suggest that in both cases, deletion is conditioned by [s.g.]. The coronal fricative [s] is produced with a very spread glottis to allow maximal airflow (Collier, Lisker, Hirose and Ushijima 1979, Yoshioka, Löfqvist and Hirose 1982). Obviously the process cannot be motivated in terms of optimal placement of [s.g.] since /s/ is a satisfactory site for this feature, and because the deletion can result in the creation of breathy sonorants (64-65). Instead it seems that what is involved is simple extension of [s.g.] onto a preceding vowel. Any resulting breathy

[5]The lateral fricative can also condition vowel deletion, however this deletion is dsitinct from the processes discussed here. It is optional and only applies to the vowel [i].

vowels are deleted.[6] Spreading of [s.g.] is simply a matter of the preferred timing of the [s.g.] gesture with respect to a preceding vowel, possibly to allow more time to achieve a fully abducted glottis. The motivation for deletion is presumably the elimination of a marked sound type, breathy vowels. We shall see further evidence that breathy vowel deletion involves spreading of [s.g.] when we consider the circumstances under which this process is blocked (below).

If breathy vowel deletion is conditioned by [s.g.], the question remains as to why [s.g.] only spreads from /s/ and /h/ preceding a stop, but not from breathy sonorants. I suggest that the reason lies in the fact that these latter sounds are breathy voiced, and hence involve only partial abduction of the vocal folds, allowing vibration to persist. Preceding a stop, /h/ is fully voiceless (although it is breathy intervocalically), and /s/ is always fully voiceless. So these sounds involve greater abduction of the vocal folds than breathy sonorants, and hence might might be more prone to extending the duration of the abduction gesture.[7] The spreading constraint can be formulated as in (69).

(69) Extend [s.g.]: [s.g.] associated to a voiceless segment must be associated to a preceding vowel also.

Deletion results if we rank this constraint above Parse V. There are then two conflicting demands on a vowel preceding voiceless [h] or [s]: it must be breathy to satisfy Extend [s.g.], but if it is breathy it violates *[s.g., son]. Given that we have already motivated ranking *[s.g., son] above Parse V, and that Extend [s.g.] is ranked above Parse V, the best resolution of this conflict is to delete the vowel so neither higher-ranked constraint is violated (70).

(70) *[s.g., son], *h >>Extend [s.g.] >> Parse V

(71)

/nas/	*[s.g., son]	*h	Extend [s.g.]	Parse V
nas			*!	
n̤as	*!			
> n<a>s				*

Breathy vowel deletion is blocked by high tone

Breathy vowel deletion does not apply to a vowel that bears high tone:

(72) *àa-góhv̀vsda* –x→ **àakv̀vsda* 'he burned it'
3s>3s-burn;prs

gà-dèedósga –x→ **gàdèetsga* 'I'm diving'
1sA-dive;prs

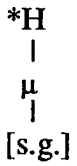
jìi-nv̀vdóhgv́v'i –x→ **jìinv̀vtgv́v'i* 'my tooth'
1sA-tooth;'

This blocking effect can be explained in terms of a constraint against the co-occurrence of [s.g.] and high tone:

[6]Thanks to Donca Steriade for suggesting this approach.

[7]The palatal glide is sometimes voiceless, but given that it can also be realized as breathy voiced, I assume that this sporadic devoicing is due to the relatively narrow oral constriction involved rather than vocal fold abduction. The narrow constriction results in a rise in supraglottal pressure which can prevent vocal cord vibration.

(73)



This constraint is phonetically motivated because spreading the glottis has a lowering effect on fundamental frequency, which would disrupt the realization of the high tone. The constraint is also independently required in the analysis of Cherokee tonal phonology (Wright this volume).

Note that this account of the blocking effect of high tone depends on the assumption that breathy vowel deletion involves the spread of [s.g.] onto the deleted vowel, because it explain the blocking in terms of a constraint on this spreading, rather than on deletion per se.

Breathy vowel deletion does not apply to initial vowels

Word-initial vowels are not subject to breathy vowel deletion before /s/:

(74) *àsgàya* 'man'

ùsga 'head'

The status of deletion of initial vowels before /h/ is unclear because there do not appear to be any words in Cherokee which begin with a sequence of the form /VhT-/.

It is not clear what the best analysis of these facts is. Possibly there is a constraint against deleting word-inital vowels. This analysis seems stipulative, but such a constraint might have a basis in the importance of word onsets to lexical access (Marslen-Wilson and Zwitserlood 1989). Another possible basis for an explanation for this phenomenon is the fact that words which are underlyingly vowel-initial are typically produced with an initial glottal stop. There might be a constraint against adjacent [constricted glottis] and [s.g.] features, since these features involve contrary movements of the vocal folds, and this constraint would thus prevent [s.g.] from spreading onto a vowel preceded by a glottal stop. Some support for this analysis is provided by the following form in which a vowel preceded by a glottal stop is not deleted by a following /s/:

(75) *wìjìnéé'vsga* –x→ **wìjìnéé'sga*

6.3. Shared properties of metathesis and breathy vowel deletion. There are two properties common to both metathesis and breathy vowel deletion: both are blocked by long vowels, and neither applies to a vowel preceded by a [s.g.] consonant. As mentioned above, we expect these processes to exhibit commonalities, because although they differ in their motivations, both involve [s.g.] and both involve vowel deletion, so any constraints relating to [s.g.] or vowel deletion are likely to affect both processes. We shall see that in each case, a single, well-motivated constraint accounts for the shared property of the two processes.

6.3.1. Metathesis and deletion are blocked by long vowels. Metathesis does not apply across a long vowel, and long vowels are never deleted (76-78).

[8]We might expect the final output of deletion to be **wĭjĭnéesga* since pre-consonantal glottal stops surface as glottalization or tonal effects in the dialect of our consultant.

(76) Deletion does not apply to /TVVhV/:

gèègìnïïgòòhvv́'i 'he saw us'
3s>1p-see;pst

g-áádùùhv́sga 'he's baking it'
3s>3s-bake;prs

(77) Metathesis does not apply in /TVVhN/:

àà-gòòhwàhtii'a 'he sees him'
3s>3s-see;prs

g-vvhn̂iha 'he's hitting him'
3s>3s-hit;prs

(78) Breathy vowel deletion does not apply in /VVs/:

ùlàasìhdéeni 'his foot'

tìwóóníisi 'you (sg.) will speak'

Sequences of the form /VVhT/ do not occur in Cherokee, so it is not possible to show that breathy vowel deletion triggered by pre-consonantal /h/ does not apply to long vowels.

The non-application of both processes can be accounted for jointly, since we have analyzed metathesis as crucially involving deletion. That is, metathesis across a long vowel implies deletion of a long vowel (79), and if this deletion is impossible, then so is metathesis.

(79) taa̱n –x→ *t<aa>ha̱n

Thus both phenomena can be acounted for by the natural assumption that it is a greater violation to delete (i.e. fail to Parse) a long vowel than a short vowel. Formally, we posit an undominated constraint:

(80) Parse VV: Don't delete bimoraic vowels.

(81)

/laas/	Parse VV	*[s.g., son]	*h	Extend [s.g.]	Parse V
> laas				*	
la̱a̱s		*!			
l<aa>s	*!				*

6.3.2. Blocking of metathesis and deletion by aspiration. The processes of metathesis and deletion pattern alike in that neither applies in the configuration CVh if C is aspirated, or if C is /s/.

(82) Metathesis does not apply to /ThVhC/:

w-ùuw-ààkàhnvv́'i –x→ **wùuwààkànvv́'i* 'he's placing it'
way-3sB-place;prs

àa-tìhn i –x→ **àatìni* 'he's taking him somewhere'
3s>3s-take.somewhere;prs

(83) Breathy vowel deletion does not apply to /[s.g.]VhT/:

ùu-hì̤isòhdáànèèha 3sB-be.homesick;prs	–x→	**ùuhì̤isdáànèèha*	'he is homesick'
jì̤i-dàànvvtèh dì̤isgo 1s>3s-worry;prs	–x→	**jì̤idàànvvtdì̤isgo*	'I worry him'

(84) Breathy vowel deletion does not apply to /[s.g.]Vs/:

ùu-hwàsga 3sB-buy;prs	–x→	**ùuhwsga*	'he's buying it'
àà-dì̤itvsgvv'i 3sA-drink;nom	–x→	**ààdì̤itsgvv'i*	'his drinking'

(No examples with the sequence /ThVhV/ could be identified.)

Both effects can be analyzed in terms of a single 'OCP'-type constraint forbidding adjacent [s.g.] specifications:

(85) *[s.g.][s.g.]
| |
r r

This constraint is undominated, so a vowel between two [s.g.] segments cannot be deleted because the output would then contain adjacent [s.g.] segments in violation of the constraint (86). Metathesis is blocked in the same way because it also involves deletion of a vowel preceding a [s.g.] segment (87).

(86)

/soht/	*[s.g.][s.g.]	*[s.g., son]	*h	Extend [s.g.]	Parse V
> soht				*	
sö̤ht	*!	*!			
s<o>ht	*!				*

(87)

/khan̤̈/	*[s.g.][s.g.]	*[s.g., son]	Parse V	Parse Assoc.	Contiguity
> khä̤n		*			
kh<a>hä̤n	*!		*	*	*

6.3.3. Deletion cannot feed metathesis. The analysis developed so far correctly predicts that deletion cannot feed metathesis. For example, breathy vowel deletion applies to the form shown in (88), resulting in a configuration (*ganh*) that appears to be an appropriate input for metathesis, but metathesis does not apply.[9]

(88) *gànvhdóhgvv'i* → *gànhdóhgvv'i* –x→ **kàndóhgvv'i*

This fact is easy to understand when we consider the relation between the original input and the final output, which is what the optimality theoretic grammar evaluates. In the input /n/ precedes /h/, but in the unattested final output, /h/ precedes /n/. That is a precedence relation has

[9]Deletion of the [ó] is blocked by its high tone.

been reversed in violation of the undominated constraint Ordering, so this output is not possible. A combination of deletion and metathesis will always violate Ordering in this way.

6.4. Further issues. There are a number of exceptions to the rules proposed here. Some are probably idiosyncratic lexical exceptions, but there are also some apparently systematic exceptions that suggest further embellishments of the analysis.

6.4.1. Deletion before /t/. In the forms in (89), deletion applies before /t/, apparently without any /h/ present.

(89)	*àagì-tàhlàwòòsga* 1sB-get.angry;prs	→	*àaktàhlàwòòsga*	'I'm getting angry'
cf.	*ùu-tàhlàwòòsga* 3sB-get.angry;prs			'he's getting angry'
	àagw-àtv̀v̀dáàsdi 1sB-listen;prs	→	*àakwtv̀v̀dáàsdi*	'I'm listening to it'
cf.	*ùu-tv̀v̀dáàsdi*[10] 3sB-listen;prs			'he's listening to it'

/t/ does not always cause deletion:

(90)	*àagw-àtv́v́nv̀v̀'i* 1sB-hang;pst	'I hung (the picture)'
	àagw-àtàwèédóònv̀v̀'i 1sgB-kiss;pst	'He kissed me'

A possible analysis of these data is to propose that these stems are h-initial underlyingly. The /h/ doesn't surface after a long-vowelled prefix like /uu-/ because it cannot be syllabified: as noted above, Cherokee does not permit sequences of the form [VVhC]. With a short vowelled prefix, like /aagi-/, the /h/ causes vowel deletion.

Another set of exceptions is given in (91):

(91)	*nv̀hgi*	–x→	**nhgi*	'four'
	yàhtèènóohi	–x→	**yhtèènóohi*	'floor'
	wàhga	–x→	**whga*	'cow'

Onset clusters in Cherokee are of the form shown in (92), where T is any stop and C is any consonant:

(92) (T) $\left\{ \begin{matrix} sT \\ C \end{matrix} \right\}$

Thus the forms in (91) could be blocked by syllabification constraints, but substantiating this claim would require a full analysis of Cherokee syllable structure, which is beyond the scope of this paper.

[10]The stem-initial vowel is deleted following the prefix vowel by a general process of deletion in vowel sequences.

6.4.2. Other exceptions. The following are exceptions about which I have little to say at present:

(93)	*j-ùsga* pl-head	–x→	**tsga*	'heads'
	j-ùsdíi'i pl-small	–x→	**tsdíi'i*	'small (pl.)'
	àa-dàhyìha 3sA-deny;prs	–x→	**àatàyìha*	'he is denying it'
	gà-hìi-skááha since?-2sA-scared;prs	–x→	**kìiskááha*	'you are scared of (rattlesnakes)'

Feeling and Pulte (1975) show a number of exceptions to deletion involving the sequence *dohd* (94). According to Pulte, this sequence has two sources: it can be part of the 'unintentional' suffix /dohd(an)/ on verbs, or an instrumental suffix /dohdi/, forming nouns. In many cases the vowel bears a high tone (94b), and thus is not expected to delete, but even when it bears a low tone, deletion does not apply (94a), so perhaps these morphemes are lexical exceptions to deletion.

(94) a.	*dègáhldòhdi*	–x→	**dègáhltdi*	'container'
	ùù-líiyéèdòhdi 3sB-moan;inf	–x→	**ùùlíiyéètdi*	'to moan' (Feeling and Pulte 1975: 173)
b.	*ùù-ksèsdóhdi* 3sB-watch;inf			'to watch him, to be careful' (Feeling and Pulte 1975: 171)
	ùw-ùùhíisdóhdi 3sB-accuse;inf			'to accuse him' (Feeling and Pulte 1975: 125)

7. Conclusions

The laryngeal metathesis and deletion processes in Cherokee are highly complex, being conditioned by a wide range of factors. Furthermore, while they appear to be independent processes in some respects, they share a number of common properties. We have seen that, in spite of their complexity, these processes can be analyzed in terms of a ranked set of simple constraints, most of which have clear phonetic motivation. In particular, many of the properties of metathesis follow from an understanding of the process as involving the optimal placement of the feature [s.g.].

In a purely rule-based approach to phonology, we would not expect processes regulated by separate rules to exhibit shared conditioning factors. Cook (1979) attempts to capture the similarity between the processes by formulating a single rule to account for both, however the resulting rule is extremely complex. This type of commonality between processes is expected if phonology is constraint-based, because all constraints relating to a given feature or configuration will affect all phenomena involving that feature or configuration. Metathesis and breathy vowel deletion both involve the feature [s.g.] and both involve deletion of vowels, and this is the basis of their shared properties.

Finally, we have considered the issue of constraints on faithfulness to linear ordering in

phonology. This issue is raised most directly by metathesis phenomena, but is relevant to a wide range of processes including epenthesis (cf. Kenstowicz 1994). We tentatively adopted three constraints: Parse Association, requiring a feature to remain assocaited to its underlying position, Parse Ordering, a constraint against reversing precedence relations, and Contiguity, which requires that adjacent segments remain adjacent.

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The Cherokee Laryngeal Alternation Rule

Pamela Munro

Cherokee, an Iroquoian language spoken in Oklahoma and North Carolina, has an unusual morphophonological rule that renders many paradigmatic alternations in the verbal system extremely opaque. The rule is unusual in several respects. It is morphologically triggered: no specific phonological environment for its operation can be stated. While the rule operates strictly left-to-right, there may be a considerable distance between the trigger morpheme and the affected element. The effect of the rule is complex: any of a number of segmental or prosodic changes may be said to follow from it. Finally, it interacts in complex ways with other prosodic phenomena of the language, and is generally blocked from occurring at all in the environment of certain prosodic patterns. Even the basic facts of this rule, which I will refer to (following Lindsey n.d.) as Laryngeal Alternation, have been incompletely described in the literature, and no complete analysis has been offered for it. In this paper, I will present a clearer description of how the rule of Laryngeal Alternation works and suggest conclusions that follow from the data.[1] An idea I will consider in conclusion is that the current notion of the underlying phonological contrasts among Cherokee consonants should be revised.

Cherokee verb paradigms are difficult for the language learner to master because of complex agreement morphology and morphophonemics. Consider the paradigmatic relationship between the third-person singular and first-person singular forms of a Cherokee "active" verb in the present tense. There are several morphophonemic alternants of the pronominal agreement affixes for these two types of subjects. Thus, third-person singular subject verbs of this type may show either a *ga-* or an *a-* prefix, as in the (a) examples below, and first-person singular subject verbs of this type may show either a *ji-* or a *g-* prefix:

(1a) gà-wóónìya 'he's speaking'
3sA-speak;prs

(1b) jì-wóónìya 'I'm speaking'
1sA-speak; prs

(2a) à-adv̋v̋nèèlíí'a 'he's acting silly'
3sA-act.silly;prs

(2b) g-àdv̋v̋nèèlíí'a 'I'm acting silly'
1sA-act.silly;prs

[1]I want to thank all the members of the 1993 UCLA Cherokee group, without whose help the data presented could not have been analyzed and understood, especially (of course) Mrs. Virginia Carey, formerly of Tahlequah, Oklahoma, whose dialect is described here. Mrs. Carey's good humor and patience made investigating this topic a pleasure. (Our group included Victoria Anderson, Filippo Beghelli, Barbara Blankenship, Mike Dukes, Edward Flemming, Brian Potter, Nhlanhla Thwala, Kimberly Thomas, Bob Williams, and Richard Wright.) Thanks also go to Geoffrey Lindsey and especially Janine Scancarelli for their help and inspiration, to Donca Steriade for useful ideas, and to Janine Scancarelli for supportive comments on an earlier version of this paper. She has told me that some ideas in this paper are reminiscent of analyses proposed independently (and I am sure earlier) by Geoffrey Lindsey, of which unfortunately I have seen no written version.

I should note that several dialects of Cherokee have been described, and I have only scattered information on the exact realization of the Laryngeal Alternation rule in most of them. Mrs. Carey's dialect agrees quite well with the dialect (or mixture of dialects, according to Scancarelli) presented in Feeling (1975) and described by Pulte and Feeling (1975), and her speech is the major source for work by Scancarelli and Lindsey. Specific facts may well differ between dialects, but Scancarelli (1987: 20-21) suggests that the amount of interdialectal variation is not great.

Cherokee has a complicated pronominal agreement system, with two series of prefixes (A and B), each used for certain intransitive constructions and for certain transitive constructions one of whose arguments is third person, and a separate set of transitive agreement prefixes that mark combinations of non-third-person subjects and objects (see Scancarelli 1987 for a complete analysis of the allomorphy and occurrence of the different prefixes).[2] Each verb has different stems used in different tense/aspect/mode configurations. (1-2) include the present stems of 'speak' and 'act silly', which remain constant throughout their paradigms. However, two rules operate to greatly obscure the relationship between members of many Cherokee paradigms. One of these is a complex of metathesis and associated vowel deletion (cf. Flemming, this volume), which we'll see more examples of shortly. The second is Laryngeal Alternation, the subject of this paper. Here is a simple example of this process:

(3a) àa-gòòhwàhtíí'a 'He sees it'
3sA-see;prs;h

(3b) jìì-gòowàhtíí'a 'I see it'
1sA-see;prs;'

(3a) is closer to an underlying form: the stem contains a *hw* preceded by a low-tone long *òò* vowel. (3b), in contrast, shows the characteristic effects of the Laryngeal Alternation rule. The *h* has been lost before the *w*, and the low-tone *òò* has been replaced by the low falling tone *òo*. These are the two characteristic changes associated with Laryngeal Alternation: the first *h* in a stem is lost, and there may be tonal alternations, typically with the introduction of a low falling tone. This application of the rule is conditioned by the first-person singular A prefix *ji-* or *g-*, which triggers Laryngeal Alternation in all appropriate cases; the corresponding third-person singular A prefix *a-* in (3a), on the other hand, does not trigger the rule's application.

I will not be concerned further here with describing the paradigmatic verb forms in which the Laryngeal Alternation rule operates. King (1975), Cook (1979), and Scancarelli (1987) each provide lists of the specific agreement prefixes that condition the alternation—the first-person singular A prefix in (3b) is the only one that occurs on intransitive verbs, but roughly half of the transitive prefixes also condition it; in some cases, two segmentally identical prefixes may differ in terms of whether they condition Laryngeal Alternation or not. Scancarelli (1987: 101-02) compares the slightly different groups of prefixes that condition the change in different Cherokee dialects, and provides a historical account of the spread of the rule. To facilitate comparison of the forms in this paper, I have restricted most of my examples to present-stem verbs with third-person singular versus first-person singular subjects, just as in (3). A prefixes also are used to mark subjects on predicative adjectives and nouns and possessors on certain possessed nouns. In these cases, the Laryngeal Alternation rule also operates, but I will not exemplify these here.

Cherokee has the following surface consonantal segments, in the orthography I will use for most purposes in this paper.[3] This orthography is just about the same as that used in the popular Cherokee dictionary by Feeling (1975; cf. Pulte and Feeling 1975).

[2] To minimize the complexity of the examples in this paper, I present underlying as well as surface forms in only a few cases. In some cases, then, my segmentations may be somewhat impressionistic. A variety of phonological rules that I will not treat here (but see Scancarelli 1987: ch. 2) affect the form of the pronominal prefixes. Abbreviations and glossing conventions are listed earlier in this volume. I generally follow Scancarelli's conventions (1987) for glossing verbs, with no morphological sign of the present stem segmented.

[3] Thanks to Janine Scancarelli for her advice on orthographic matters. Scancarelli (1992) provides a comprehensive discussion of Cherokee orthographies, including Sequoyah's syllabary.

(4) Cherokee surface consonants

(b)	d	dl	j	g	gw	'
	t	tl	ch	k	kw	
	s					h
m	n					
	hn					
	l					
	hl					
w			y			
hw			hy			

T, tl, ch, k, and *kw* are aspirated and voiceless; *b, d, dl, j, g,* and *gw* are unaspirated and may be weakly voiced in some environments. *Ch* and *j* are alveopalatal affricates; *tl* and *dl* are lateral affricates; *kw* and *gw* are labiovelar or labialized velar stops.[4] The apostrophe (') represents the glottal stop (which occurs as a surface segment only intervocalically in some dialects). *M* and especially *b* (which only appears in loanwords) are rare. *Hn, hl, hw,* and *hy* are generally perceived as voiceless sonorants[5] with voicelessness maintained throughout, but sometimes they seem more like clusters of *h* and the corresponding voiced sonorant. The orthographic representation of these complex segments—standard in all recent sources—thus appears to accept an analysis of these as phonologically derived.

The underlying segments of Cherokee, according to the linguistic analyses presented by King (1975), Cook (1979), and Scancarelli (1987) are in (5).

(5) Cherokee underlying consonants, in traditional linguistic analyses

	t	tl	c	k	kw	?
	s					h
m	n					
	l					
w			y			

In (5), *t, tl, c, k,* and *kw* represent essentially the same sounds written as *d, dl, j, g,* and *gw* in the practical orthography (4). (I ignore *b*. This could be added (as *p*, in this system), but it is

[4] There is some controversy in the literature about whether the simplest forms of the affricates (*j* and *dl*) and the labiovelar stop (*gw*) should be analyzed as units, as argued for by Scancarelli (1987). I will assume a unit analysis of these simplest forms here without further discussion. However, I report below a number of ways in which the affricates pattern very differently from stops. (Cf. also fns. 12, 24, and 27 below.)

[5] I intend the term "voiceless sonorant" only as a convenient label here. Flemming (this volume) shows that surface *hl* patterns as an obstruent with regard to vowel deletion. I return to this topic below.

irrelevant.) In the analysis of (5), it is not only the voiceless sonorants that are seen as clusters of *h* plus an underlying sound. The aspirated stops are considered to be similarly derived: thus aspirated *t* is seen in the standard linguistic analysis as a cluster of underlying phonemic *t* plus *h*, and so on. Thus, when *t* in this system occurs other than immediately before *h*, it has the same phonetic realization as *d* in (4). I will assume this linguistic analysis for the moment, but I will continue to use the orthography in (4). Thus, when I want to refer to the underlying simple stop series given above, I will use the "voiced" symbols *d, dl, j, g*, and *gw*.

Cherokee has a six-vowel system, the familiar five vowels plus a sixth vowel, generally transcribed as a nasalized carat, which is written *v* in all sources. Nasalization is distinctive only for this vowel, although other vowels are nondistinctively nasalized in certainly environments.[6] Vowels may occur short and long;[7] we represent long vowels with doubled vowel symbols. Cherokee has a complex prosodic system (variously described as a tone or pitch-accent system) with seven different tones or pitches; I will follow Wright (this volume) in using the term "tone" hereafter. (6) presents a comparison of how we represent these tones orthographically on syllables containing the vowel *a*, keyed to the Feeling-Pulte system of tone numbers (written as superscripts on vowels), which most recent sources often use for reference, with descriptive labels based on Scancarelli (1987: 29):[8]

(6) Cherokee tone

Level tones (short or long)	low (2)	à, àà
	high (3)	á, áá
Contours (all long)	low fall (1)	àa
	high fall (32)	áà
	low rise (23)	àá
	high rise (4)	áa

The seventh contrastive tone is a high tone (higher than tone 3) used on most final vowels, which is written with no mark.[9] Many sources refer to low level tone 2 vowels as "unaccented". The low falling tone 1 shows "descent into creaky voice" (Lindsey 1985: 124). Lindsey (n.d.) presents a careful analysis of the Cherokee tone phonology; see also Wright (this volume).

[6] Primarily finally, following a nasal consonant, or separated from another nasalized vowel by a glide.

[7] It may be that some vowel length is predictable (cf. Foley 1980 and work by Kimberly Thomas). Certainly, there are more long vowels than short ones. Note that Feeling (1975) and Pulte and Feeling (1975) do not represent vowel length completely consistently (or perhaps there are considerable dialect differences in this regard): all vowels written as underdotted are short, and all vowels in syllables indicated as open are long. But this is not an accurate representation of the phonetic facts for all dialects, since vowels in closed syllables, though generally not underdotted by Pulte and Feeling, may be either short or (rarely, but contrastively) long for Mrs. Carey.

[8] The editors of Feeling (1975: iii) note that this system was analyzed with the help of Eunice Pike. I do not present here the correspondence between our system of tonal representation and those used at various times by Lindsey (1985, n.d.) and Scancarelli (1987, 1992), which are not easily typable.

[9] See Lindsey (1985) for more discussion of the realization of this tone and problems with its treatment in Feeling (1975), and see Wright (this volume) for more information on the system. (Victoria Anderson has also studied related matters.) According to Lindsey (1985), some speakers may produce tone 4 on true short vowels; we have not heard this from Mrs. Carey. Some contour syllables do appear to have vowels whose duration is somewhat shorter than other long vowels, but we have analyzed them as underlyingly long in every case.

Cherokee has a fairly extensive range of medial and initial consonant clusters,[10] but many of these are derived by some form of the vowel deletion rule described by Flemming (this volume).The main surface onset clusters are clusters of *h* or *s* with another sound. *H* may cluster with any other sound except *'* or *m*, both of which occur only medially in the surface phonology of the dialect I am describing. The case of *s* is special: Feeling (1975: x-xi) writes, "whenever a short vowel is followed by an s, a faint h is always present between the vowel and the s"; while we do not always record these *h*'s in Mrs. Carey's speech, they are often audible, particularly after *a*, and they have also been noted by other scholars, as I report below. The other obstruents, or at least *d, g*, and *gw*, work differently from the sonorants *l, n, w*, and *y*. The sonorants may occur in underlying forms in clusters with *h*, but there is no contrast between preaspiration and postaspiration in these forms, though conventionally such clusters are written preconsonantally with the *h* before the sonorant.[11] However, medial stops may occur plain (*d, g, gw*), preaspirated (*hd, hg, hgw*), postaspirated (*dh, gh, gwh*[12]—or, in our orthography, *t, k, kw*), and both pre- and postaspirated (*hdh, hgh, hgwh*—or, in our orthography, *ht, hk, hkw*), as exemplified in (7). Cherokee's morphological complexity makes it hard to find even near minimal pairs, but I have controlled for environment by putting the stop after a low-tone short vowel in all but one case:[13]

(7a) medial plain stops: wà**d**o 'thank you', Jàlègi 'Cherokee', à**g**wv́vsa 'me alone'

(7b) medial preaspirated stops: gàlè**hd**i 'I stand it up', wà**hg**a 'cow', gù**hgw**e 'quail'

(7c) medial postaspirated stops: jìtàága 'chicken', à**k**ìyùùsgéeni 'elbow', àa**kw**ìyv́v́'èé'a 'he's paying'

(7d) medial pre- and postaspirated stops: àagòòhwà**ht**íí'a 'he sees it', hì**hk**òódé'a 'you're shoveling it', sì**hkw**a 'pig'

My recording of such examples follows the range of possibilities presented in Feeling (1975), but is somewhat at odds with the description in such sources as Bender and Harris (1946: 18), who

[10] My description of and thinking on questions of Cherokee syllable structure owe a lot to input by every member of the UCLA Cherokee group.

[11] Conventionally, in the Feeling-Pulte orthography (and, as far as I can tell, standard linguistic analyses), all *h*-sonorant clusters are written as *hS* (where *S* is any Cherokee sonorant) when prevocalic. The same clusters are written as *Sh* when preconsonantal (as a result of the processes described by Flemming this volume), except in the case of *l*, which is written *hl* in all environments (cf. also Feeling 1975: x). These differences in the treatment of *hn, hw*, and *hy* clusters reflect some perceptual differences: observed voicelessness does often seem to be greatest at the beginning of an intervocalic cluster but at the end of a preconsonantal cluster. But there is no contrast, and there seems to be no difference between *l* and the other sonorants in this regard. In this paper, I will follow the standard orthography for all but preconsonantal *hl*, which I will write, following the treatment of the other voiceless sonorants, as *lh*. (But see also fn. 5 above.) The different traditional representations of how *h* seems to be sequenced with a sonorant has influenced analyses of the Cherokee laryngeal metathesis rule (in terms of whether *h* needs to be viewed as metathesizing with a preceding resonant); cf. Flemming (this volume).

[12] *Gwh* (or *kwh*) represents an aspirated unit labiovelar stop. Scancarelli (1987: 47-48 and personal communication; cf. also fns. 24 and 27 below) cites arguments from Lindsey that there is a contrast between a unit *gw* (*kw*, in her orthography) and a cluster of *k* plus *w*, as well as similar unit-cluster contrasts between *dl* (*tl*, in her orthography) and *d* plus *l*. I regret that I do not yet understand these arguments, and will assume for now that there are no such contrasts. However, all the affricates (*j, dl*, and aspirated *ch, tl*) have far more restricted distributionthan than the labiovelar stops, as the discussion in the text and the following footnote should make clear.

[13] I have not yet elicted specifically for words illustrating these contrasts. I'm reasonably confident that I'll be able to present better examples in a later version of this paper. It should be noted, thought, that there are a number of important distributional observations which may later prove to be important, such as the fact that in most (though not all) cases where pre- and postaspirated stops like those in (7d) occur in my data, the immediately preceding sound is what Scancarelli (1992) would call [+h], as discussed in the text following (38) below.

state "it is possible to consider each voiceless consonant as being phonemically h plus the homorganic voiced counterpart, since h consonant does not otherwise occur", and, as we will see below, in Scancarelli (1987).

Thus, Cherokee presents a contrast in how aspiration may combine with stops and non-stops (the classes either of *s* and sonorants or of *n* and continuants) that provides nice support for recent proposals about consonant structure by Steriade (1992b). She argues that "plosives (stops and affricates) have representations in which their closure and release appear as distinct positions, capable of independently anchoring distinctive features...plosives have more clustering possibilities than continuants, because plosives are bipositional" (2). Cherokee stops compared to non-plosives (in Steriade's sense) seem to clearly validate this claim. The case of the affricates, however, is not yet settled. I can document a three-way contrast, between plain (*j, dl*), preaspirated (*hj, hdl*), and postaspirated (*jh, dlh*—or, in our orthography, *ch, tl*), exemplified in (8).

(8a) medial plain affricates: à**j**óolàni 'window', hà**dl**v 'where'

(8b) medial preaspirated affricates: àhyv̀**hj**éeni 'neck', hv̀**hdl**a! 'sharpen it!'

(8c) medial postaspirated affricates: à**ch**úuja 'boy', à**atl**i 'he's running'

But I have found no instances of pre- and postaspirated affricates (*hjh, hdlh*—or what would be represented in our orthography as *hch, htl*). At this point I cannot say for sure whether this gap is motivated, or merely accidental due to the general rarity of aspirated *ch* and *tl*.[14] In any case, though, the Cherokee affricates show more combinatorial possibilities than do non-plosives.

Conservatively speaking, it may be that there are no coda consonants at all in Cherokee underlying forms. The main candidate for a coda consonant is *h*—Feeling (1975) regularly writes *h* and *h*-sonorant clusters as codas, when they precede a following non-sonorant consonant, for example.[15] And while *h*-sonorant clusters may occur initially (some at least of them derived by vowel deletion), *h*-stop clusters never do. Further, it is likely that only short vowels may occur before *h*-stop clusters (cf. Scancarelli 1987: 27). But whatever the proper analysis of possible coda *h*, I will assume that, at some level, no other consonants occur underlyingly in Cherokee codas.[16]

Let us return now to the Laryngeal Alternation rule. Here is a second example:

(9a) g-ùùhv́sga 'he is putting it in water'
3sA-put.in.water;prs;h

(9b) g-ù'v́sga 'I am putting it in water'
1sA-put.in.water;prs;'

The two examples in (9) use similar allomorphs of the agreement prefixes, but these prefixes are differentiated, once more, by their morphological effect on the following verb stem. Once again, the *h* in the stem of 'put in water' (9b), like that in the stem of 'see' (3b), is lost. But in (9b) the intervocalic *h* of (9a) is not simply deleted, but replaced by glottal stop. Alternations like this led Scancarelli (1987) and Lindsey (n.d.) to refer to the (a) forms of such verbs as "h-grades" and the

[14] There are other such gaps. I know of no instances of *sj, sch, sdl*, or *stl* clusters in Mrs. Carey's speech. Feeling (1975) transcribes at least one stem, *dasdlusga* 'he's splitting it' (I omit vowel underdots and tone numbers), with an *sdl* cluster. Mrs. Carey pronounces this word with *sl*, itself an unusual cluster.

[15] This is clear, apparently, from the fact that superscripted tone numbers follow syllables, as implied by Feeling (1975: ix-x). However, because the facts of vowel length do not systematically line up with what is claimed in this explanation (cf. fn. 7), I assume this is (at least in part) just another conventionalization.

[16] As hinted here, initial clusters generally agree with what are assumed here to be possible medial onsets.

(b) forms, regardless of whether they contain a surface glottal stop, as "?- grades" or, as I will call them, glottal grades. This terminology is reflected by my use of ";h" and ";'" in glosses for the (a) and (b) forms in paradigms cited here.

On the basis of the transparent *h/'* alternation in verbs like (9), King (1975) proposed that the process we are concerned with should be generally seen as a morphologically conditioned replacement of the first *h* in the stem of a verb with '; this same rule statement is retained by later sources. Thus we would expect *-goo'w-* in the glottal grade of 'see' (3b). Lindsey (1985, n.d.) accounts for the cases where the inserted glottal stop is preconsonantal, proposing that preconsonantal glottal stop is realized as the low falling 1 tone on the preceding vowel, as in (3b). Cook (1979: 6), who reports that "in some [North Carolina?] dialects /?/ is realized post-vocalically as a full glottal closure [?], while in others it is realized as glottalization of and fall in pitch of the preceding vowel"; some overt preconsonantal glottal stops in the glottal grade are written occasionally in Feeling (1975).[17] Lindsey's proposal explains the structure of (3b). We do not see a low falling 1 contour in (9b), however, since the glottal stop is not preconsonantal and because, as Scancarelli observes (1987: 56), low-tone ("unaccented") vowels are always short before intervocalic glottal stop. As many examples in this paper demonstrate, the low falling 1 tone develops not only as a result of Laryngeal Alternation; in addition, it appears on many pronominal prefixes as a result of a regular morphological process of Tonic Glottal Insertion (Lindsey 1985: 136; Scancarelli 1987: 64-65).

We have now accounted for many of the consonantal and tonal alternations produced by Laryngeal Alternation. The same process relates the examples in (10)-(12), which show a similar loss of *h* and accompanying tonal change in the environment of *y, n* , and *l* respectively:

(10a) à-adààhyáàsdìì'a 'he is stretching'
3sA-stretch;prs;h

(10b) g-àdàayáàsdìì'a 'I am stretching'
1sA-stretch;prs;'

(11a) g-vvhníha 'he is hitting it'
3sA-hit;prs;h

(11b) jìiy-vvníha 'I am hitting him'[18]
1sA>3a-hit;prs;'

(12a) g-òòhlv́sga 'he is getting full'
3sA-get.full;prs;h

(12b) g-òolv́sga 'I am getting full'
1sA-get.full;prs;'

In each case, the preconsonantal *h* of the stem (the form we see in the third-person subject (a) form) is lost in the first-person subject (b) form, and the tone change is as predicted, with the development of tone 1 in the first-person subject glottal grade. (The situation with other *h*'s can be more complicated. We return to this matter below.)

[17] Feeling (1975) consistently treats such preconsonantal glottal stops differently from prestop *h*'s, generally not treating them as syllable-final (cf. fn. 15). I don't know the significance of this is for Feeling's analaysis, however.

A good survey of dialectal variation involving glottal stop is given by Lindsey (1985: 137-38).

[18] The prefix *jiiy-* on this verb is a transitive prefix. In some examples Mrs. Carey simplifies the expected form of this prefix to resemble the intransitive prefix *ji(i)-* seen in previous examples; I give such shortened prefixes an intransitive gloss. Some tonal irregularities may develop as a result of this morphological simplification.

Similar changes may occur in combination with metathesis of *h* (Flemming this volume):

(13a) kànóóyéè'a 'she's fanning him'
g-ahnooyee'a
3sA-fan;prs;h

(13b) jìi-nóóyéè'a 'I'm fanning him'
1sA-fan;prs;'

Here, the *h* of the underlying *hn* cluster metathesizes over short unaccented *a* to produce an aspirated initial *k* (13a). This process does not occur in (13b), since Laryngeal Alternation has removed the underlying *h* in the verb stem; instead, the inserted glottal stop causes the development of low falling tone 1. In addition to demonstrating a new type of Laryngeal Alternation pattern, (13) shows that some Cherokee aspirated *k*'s are indeed derived from *g* (the same pronominal prefix seen in (12a), for example) plus *h*.

Other processes may obscure the expected tonal alternations. For instance, as Lindsey (n.d.) observes, when a distributive prefix (whether meaningfully indicating a plural object or, as in (14), lexically required) precedes a verb in the glottal grade, following tones are raised.

(14a) dèèkàyv̀v́gí'a 'he's tickling her'
dee-g-ahyvvgi'a
dis-3sA-tickle;prs;h

(14b) dèè-jîi-yv̀v́gí'a 'I'm tickling him'
dis-1sA-tickle;prs;'

The aspirated *k* of (14a) again is derived by metathesis. (14b) is structurally parallel to (13b), but the presence of the distributive prefix causes the expected low falling 1 tone to surface as a high falling 32.[19]

We have not yet observed what happens when the first *h* in a stem is clustered with an obstruent rather than a sonorant. These cases are much trickier to describe and analyze, and are not usually given as examples in discussions of the Laryngeal Alternation process. Although I question parts of Scancarelli's analysis (1987, 1992) below, it should be remembered that she is the only person to attempt a full description of the data.

Let's first consider what happens in stems containing *s*. Scancarelli (1987: 26-27) suggests that in underlying forms all Cherokee *s*'s are preceded by *h*, but that these *h*'s do not surface after long vowels. If underlying Cherokee *s* is always preceded by *h*, we would expect Laryngeal Alternation to occur in verb stems containing *s*. The tonal alternations in paradigms like (15) suggest that this is true: we assume an underlying stem *loohsga* in (15a); in the Laryngeal Alternation form (15b), the *h* is replaced by ', leading to the development of the characteristic low falling 1 tone.

[19] There are some additional complexities. First, other prefixes, may have a similar effect. Second, and most mysteriously, the raising process often appears to occur only in the glottal grade form. Note that it doesn't affect the second-syllable 2 tone in (14a). Lindsey makes other important points about tonal alternations that are confirmed in my data but which I will not discuss in the text, such as the fact that the Laryngeal Alternation form of a 23 tone is high level 3, as exemplified, for example, in *àadlàgòósga* 'he's scratching' / *gàdlàgóósga* 'I'm scratching' (see the text for a discussion of Laryngeal Alternation before s).

(15a) gàlòòsga 'he is passing it'
ga-loohsga
3sA-pass;prs;h

(15b) jì-lòosga 'I am passing it'
1sA-pass;prs;'

In (15), the underlying hs is preceded by a long vowel; when the preceding vowel is short, as in (16)-(18), vowel deletion (Flemming this volume) occurs in the third-person singular subject form, while the first person singular form develops the same low falling 1 tone as in (15b):

(16a) àadànsìíni 'he is crawling'
a-adanahsiini
3sA-crawl;prs;h

(16b) g-àdànàasìíni 'I am crawling'
1sA-crawl;prs;'

(17a) àalsgi 'he is dancing'
a-alihsgi
3sA-dance;prs;h

(17b) g-àlìisgi 'I am dancing'
1sA-dance;prs;'

The *n* and *l* in verbs like (16a) and (17a) devoice before *(h)s*, so they are comparable to the *hn* and *hl* in examples we've seen earlier. This makes pairs like (16) and (17) initially look similar to cases like (11) and (12) in which Laryngeal Alternation results in paradigmatic alternation between an underlying *h*-sonorant cluster and the corresponding plain sonorant. However, as the underlying forms here show, the *h* involved in Laryngeal Alternation in these forms is not underlyingly adjacent to the sonorant. The location of the derived low falling 1 tone is crucial— in (16b) and (17b), it appears in the syllable before *s*, while in examples like (11) and (12) it appears in the syllable before the sonorant. (Example (16) demonstrates that the locus of the Laryngeal Alternation rule may be separated by two underlying syllables from the prefix that triggers the rule. Such cases are common, and in theory the distance could certainly be greater.)

(18) and (19) show comparable cases where an obstruent (*g* or *j*) underlyingly appears in the syllable before *(h)s*. Vowel deletion produces a *Chs* sequence, which is realized as a voiceless and possibly lightly aspirated *C* before the *s*:[20]

(18a) àaksóósga 'he is going downhill'
a-gahsoosga
3sA-go.downhill;prs;h

(18b) jì-gàasóósga 'I am going downhill'
1sA-go.downhill;prs;h

[20] There is some dispute about this. The UCLA Cherokee group elected to write some *Cs* clusters resulting from this deletion as unaspirated (*d, g*, etc.), departing from the standard Feeling (1975) orthographic tradition. I retain the traditional orthography here (using *t, k*, etc.). Crucially, there is no contrast in stop aspiration in this position.

(19a) àayèètsdíi'i 'he is laughing at him'
a-yeejahsdii'i
3sA-laugh.at;prs;h

(19b) jì-yèèjààsdíi'i 'I am laughing at him'
1sA-laugh.at;prs;'

(19) is only of only a few available Laryngeal Alternation examples involving affricates. Underlyingly, the stem of 'laugh at' includes the sequence *-jahs-*. Vowel deletion produces *-jhs-*, which we would expect to surface as *-chs-*; however, the affricate is realized preconsonantally as *ts* (Scancarelli 1987: 25). The expected *ts-s-d* cluster in (19a) is simplified to *tsd*.

If an underlying stem contains a cluster of *h* and a stop or affricate, several different forms of Laryngeal Alternation can result.

When the underlying form of the verb includes an *hC* cluster, where *C* is a stop or affricate, aspirated or unaspirated (in the available examples, *t* (i.e., *dh*), *d*, *g*, or *dl*), the third-person (a) subject form shows deletion of the vowel before the *h*, and in the first-person (b) forms, Laryngeal Alternation replaces the *h*, there is no vowel deletion, and the expected tonal alternation occurs. This happens both when the original vowel-*h*-consonant sequence was preceded by an obstruent, such as the third-person prefix *ga-* in (20a)-(22a)—

(20a) któósìì'a 'he is taking it down'
g-ahtoosii'a—i.e., g-ahdhoosii'a
3sA-take.down;prs;h

(20b) gà-atóósìì'a 'I am taking it down'
1sA-take.down;prs;'

(21a) kdí'a 'he is using it'
g-vhdi'a
3sA-use;prs;h

(21b) gv̀-vdí'a 'I am using it'
1sA-use;prs;'

(22a) kdlíya 'he is sharpening it'
g-vhdliya
3sA-sharpen;prs;h

(22b) gv̀-vdlíya 'I am sharpening it'
1sA-sharpen;prs;'

—or by a sonorant consonant of the stem, as in (23a)-24a):

(23a) gòòlhgi 'he knows him'
g-oolihgi
3sA-know;prs;h

(23b) jìiy-òólìigi 'I know him'[21]
1sA-know;prs;'

[21] I have no explanation at present for the tonal alternation on the *oo* stem vowels here.

(24a) àadàànhte 'he's thinking'
a-adaanvhte
3sA-think;prs;h

(24b) g-àdàànv̀vte 'I'm thinking'
1sA-think;prs;'

If the first *h* in the underlying stem appears immediately to the right of a stop, however, results appear to vary lexically.

We would expect that if an aspirated stop was analyzeable as a stop-*h* sequence (as we have seen in the aspirated stops derived by metathesis, as in (13a) and (14a)) that removal of the *h* during Laryngeal Alternation would produce an unaspirated stop in the first person form, and this happens in about half the cases I have examined, as in (25)-(26) below (and also (27)-(28)). On the basis of what we have seen so far, however, we can have no expectation about what should happen tonally in such cases. Glottal stop cannot simply replace the postconsonantal *h* in a verb like (25a) and (26a), since Cherokee ' does not occur postconsonantally. A new low falling tone 1 may develop before the affected stop, as in (25). (In cases like (26) the development of first-person singular tone 1 appears vacuous.)

(25a) à-adèètósga 'he's diving'
3sA-dive;prs;h

(25b) g-àdèedósga 'I'm diving'
1sA-dive;prs;'

(26a) àa-kwìyv́v́'èé'a 'he's paying'
3sA-pay;prs;h

(26b) jìi-gwìyv́v́'èé'a 'I'm paying'
1sA-pay;prs;'

Just about as often, however, the vowel before the unaspirated stop in the first-person singular is short and unaccented, and there is no tone 1:

(27a) à-atv̀sga 'he's growing'
3sA-grow;prs;h

(27b) g-àdv̀sga 'I'm growing'
1sA-grow;prs;'

(28a) àa-kìsga 'he's swallowing it'
3sA-swallow;prs;h

(28b) jì-gìsga 'I'm swallowing it'
1sA-swallow;prs;'

In other cases, however, there is no change in the aspirated stop, but the tonal alternation still suggests that some form of Laryngeal Alternation has applied (sometimes vacuously):

(29a) g-ùùtéé'a 'he is picking it up'
3sA-pick.up;prs;h

(29b) g-ùutéé'a 'I am picking it up'
1sA-pick.up;prs;'

(30a) gàà-kwèènv́v́sga 'he is wrapping it'
3sA-wrap;prs;h

(30b) jìi-kwèènnv́v́sga 'I am wrapping it'
1sA-wrap;prs;'

(31a) àa-kòódé'a 'he is shoveling it'
3sA-shovel;prs;h

(31b) jìi-kòódé'a 'I am shoveling it'
1sA-shovel;prs;'

Thus, in (29-31) the only sign of Laryngeal Alternation is in the tone, and sometimes the tone "change" in the first-person singular forms appears vacuous in comparison with the third-person forms. When I began studying the Laryngeal Alternation rule, I originally interpreted these cases as rule failures, since the rule appears to have no effect in such forms. These patterns were matched by other cases like (32), in which, again, there is no visible alternation:

(32) g-úúhlv̀sga 'he's putting a lid on it', 'I'm putting a lid on it'
3sA/1sA-put.lid.on;prs

In such examples, as Lindsey (n.d.: 5) has observed, the presence of a preceding high 3 tone blocks the application of Laryngeal Alternation.[22] Once principled restrictions like this one are realized, there are only a handful of problem cases among the hundreds of verb paradigms in Feeling (1975). Laryngeal Alternation is thus a very regular (though complex and still not well understood) rule.[23]

Aspirated stops can thus be involved in three types of Laryngeal Alternation rule alternations. First, like unaspirated stops and affricates (21-22), they can be preceded by *h* in the h-grade and appear intervocalic after a 1 tone in the glottal grade (20, 24). Next, they can become unaspirated in the glottal grade (again often with development of a 1 tone) (25-28). Finally, they can appear unchanged in both forms, with the only difference being the 1 tone in the glottal grade (29-31).

One approach is suggested by Scancarelli (1987).[24] She writes, "/obstruent + h/ clusters

[22] I have surveyed the paradigms in Feeling (1975) carefully, along with my own data, and found this to be the case: any preceding short or long high level 3 in the word blocks Laryngeal Alternation. A preceding high falling 32 tone (though not a preceding high rising 23) in the surface form has the same effect.

[23] I have not yet completed my investigation, but I believe there are only three cases in Feeling (1975) that appear to be exceptions to Laryngeal Alternation; none of these appear to occur in Mrs. Carey's speech. A more pervasive question concerns what appear to be overapplications of Laryngeal Alternation: cases where a preceding high level 3 tone does not block the rule. Perhaps such surface 3 tones are derived.

[24] Scancarelli does not raise these points specifically to explain puzzling Laryngeal Alternation cases like those discussed in the text, but her discussion (especially in her 1992 paper) suggests that this is the analysis she has in mind. One specific contrast she considers (1987: 47-48) is that between 'pay' (26) and 'wrap' (30). Citing a suggestion by Lindsey (see also fn. 12), she argues that the difference between 'pay' and 'wrap' is that 'pay' contains an underlying *g-w* cluster (*k-w*, for Scancarelli, clustered in this verb with *h*), while 'wrap' contains an underlying unit *gw* (*kw*, for Scancarelli, again clustered with *h*). I find this account of the 'pay'-'wrap' contrast unsatisfying, since the *kw*'s in these verbs, though they certainly work differently, behave analogously to differently behaving *k*'s and *t*'s, as shown in the text. Thus, following the line of argument developed below, I would agree that 'pay' indeed

may be analyzed as always preceded by an /h/. This /h/...alternates with /?/ in the h-grade ~ ?-grade alternation....An /h/ which precedes an obstruent is dropped by a low-level rule if it in turn is preceded by a long vowel" (1987: 26-27). By this analysis, we would assume that all three types of aspirated stop paradigms are underlyingly e.g. *hdh*. The pre-stop *h*'s surface only in forms of the paradigms illustrated in (20) and (24) because only in those forms are they preceded by short vowels. Cases like (29-31) have long vowels before the unchanging aspirated stops; these long vowels block the appearance of the prestop *h*'s in the h-grade. But there seem to be problems with this account. (25-28) also show long vowels before aspirated stops in the h-grade. We would have to assume that these stops also were preceded by underlying *h*. But in these glottal grades, it is the *h* after the stop that is lost, and there are frequent tonal anomalies as well.[25] Another problem with this proposal is that it is simply not true that all surface aspirated stops are preceded by *h* when they follow a short vowel. (7c) and (8c) above include words containing aspirated stops and affricates preceded by short vowels; there are a number of others with *t, k,* and *ch* in this environment (though I am currently lacking any such examples of *kw* or *tl*). So this proposal will need amendment if it is to handle all the data.

An alternative is to assume that—contrary to the linguistic analysis that has been assumed since the work of King (1975) at least—Cherokee has a contrast between two types of aspirated stops: aspirated stops derived by coalescence of a sequence of stop plus *h*, and underlying aspirated stops. Under this analysis, when any stop is preceded by *h* in the underlying form of a verb, that *h* will simply be replaced by *'* in the glottal grade. When the Laryngeal Alternation trigger is an aspirated stop or the *h* of a Ch cluster, *'* will be inserted before the whole cluster, and *h*, if there is one, will be lost. This suggests that Laryngeal Alternation is not a simple replacement of one sound by another, but rather a two-step process by which, first, *'* is inserted to the left of any consonant or consonant cluster that includes *h* or an aspirated element, and next, the first *h* in that sequence, if there is one, is deleted, as outlined in (33):

(33) Assume an underlying contrast between unit unaspirated *d, g* and aspirated *t, k*, along with derived (cluster) *dh, gh* (with *t/dh* and *k/gh* phonetically neutralized). Laryngeal Alternation first inserts *'* before the first single consonant or consonant cluster that includes *h* or the feature [+aspirated]. Then Laryngeal Alternation deletes the first *h*, if there is one, of the resulting *'*-initial sequence.

Thus Laryngeal Alternation operates differently on the following strings:

/...dh.../ > ...'dh...>...'d...

/...t.../ > ...'t....

Although this solution appears to account for the facts, it violates naive notions of underlying economy and seems a bit add hoc. I am hopeful that additional evidence from the paradigms above will help further this investigation. In particular, I plan to survey second-person singular forms of these verbs, which often seem to be closer to underlying stem forms. For instance, we have assumed that the underlying form of the present stem of 'use' (21) includes an *hd* sequence, even though no *h* appears in either the third- or first-person subject forms. The second-person form, however, does include this stem *h*:

(34) h-ѵ̀hdí'a 'you're using it'
2sA-use;prs;h

Similarly, we have assumed following (33) that the underlying form of 'swallow' (28) must include a derived aspirated stop not preceded by *h* (i.e., *gh* or, in our system, *k*), and the second-person subject form confirms this:

contains a cluster, but I would argue it is a two-member cluster, of unit *gw* plus *h*. As far as I can tell, *gw* and *kw* behave like all the other unaspriated and aspirated stops.

[25] Scancarelli (1992: 138) appears to acknowledge that cases like these constitute a problem.

(35) h-ìkìsga 'you're swallowing it'
2sA-swallow;prs;h

More such evidence will hopefully help either to validate or to disprove the suggestions advanced here. The final analysis may invoke additional contrasts, perhaps among medial derived and underlying aspirated stops preceded and not preceded by *h*.

Finally, there is one more possible obstruent to consider, *hl*, which displays two types of exceptional behavior. Although I included this sound in the class of "voiceless sonorants", it is phonetically a voiceless lateral fricative and thus an obstruent, in contrast to *hn, hw*, and *hy*, which may be described as breathy sonorants (Flemming, this volume). Unlike the other members of the *h*-sonorant class, *hl* participates in paradigmatic alternations in which its *h* is not lost in the glottal grade:

(36a) g-òòhlv̀v̀sga 'he's making it'
3sA-make;prs;h

(36b) g-òohlv̀v̀sga 'I'm making it'
1sA-make;prs;'

The pair in (36) is extremely similar to that in (12). But in (12), the characteristic tonal change is accompanied by a change of h-grade *hl* to glottal grade *l*, which we have analyzed as usual as showing the loss of *h*. Why, then, do we not see a change of *hl* to *l* in (36b)? In fact, (36) looks like (29-31), other cases in which, I have suggested, underlyingly aspirated obstruents identify a locus for Laryngeal Alternation, but do not lose an *h*, because they have no *h* to lose. One analysis of cases like (36), along the lines of (33), might be that the *hl* in such cases is an underlying *hl*. Flemming considered that an underlying *hl* might explain the failure of *h* to metathesize in cases like (37a) (in contrast to apparently similar forms like (13a) and (14a) above). However, as he observed, the glottal grade form in (37b) shows that the *hl* in 'sleep', like that in 'get full', but unlike that in 'make', is decomposable into *h* plus *l*.

(37a) gà-hlíha 'he is sleeping' (*kàlíha, *klíha)
3sA-sleep;prs;h

(37b) jì-líha 'I am sleeping'
1sA-sleep;prs;'

Another surprising thing about *hl* is that sometimes this sound appears to reflect a lateral affricate. Consider alternations like

(38a) à-ahlìilóó'a 'he's measuring it'
3sA-measure;prs;h

(38b) g-àdlìilóó'a 'I'm measuring it'
1sA-measure;prs;'

Since (38b) is a glottal grade form containing *dl*, we would expect that (38a) would contain either *hdl* or *tl*: either of these h-grade forms should yield *dl* in the first-person glottal grade. But instead (38a) includes *hl*. Feeling (1975: xviii) reports that many Oklahoma Cherokees are "converting tl to hl in many words",[26] suggesting that we should assume that conservative pronunciations of (38a)

[26] Mrs. Carey alternates *hl* and *tl* in the negative particle *hla /tla*, for instance. Scancarelli (1987: 47-48) reports that some Oklahoma Cherokee speakers pronounce the word 'he is having a nightmare', which Feeling (1975) writes

would include *tl* rather than *hdl*. Thus, (38) reflects an original alternation much like those in (25)-(28).

This suggests another, potentially more plausible account of the non-alternating *hl*'s in verbs like (36). I noted above that we might account for such cases by assuming that Cherokee has an underlying *hl* in addition to the *hl* derived from clusters of *h* and *l*. However, there is a second possibility: that a verb like (36) contains not underived *hl*, but rather a *tl* changed to *hl* by the same process seen in (38). Then the similarity between (36) and cases like (29)-(31) is even closer, since (36), like them, may be analyzed not just as an obstruent, but as an original "plosive".[27]

Now let's return to the interaction of *h* and stops versus *h* and *s*. Scancarelli (1992: 139) (following suggestions by Lindsey)[28] proposes that laryngeal features [±h] and [±?] may be associated with Cherokee consonants:

> Both the aspiration and glottalization features may be associated with the same consonant...../h/ typically affects sounds before and after the consonant with which it is primarily associated whereas /?/ affects only sounds before the consonant with which it is primarily associated.

This description recognizes an important distinction between aspiration and glottalization (or *h* and ') in Cherokee: aspiration (*h*) may either precede or follow another consonant, but glottalization (') may only precede a consonant.[29] It is true that glottalization interacts in the same way with every class of Cherokee consonants. However, different classes of consonants interact with *h* in different ways. While stops and possibly also affricates may be either preceded or followed by *h*, or both, sonorants and *s* are different. Sonorants coalesce with *h*; while there seem to be perceptual differences in different environments as to whether the voicelessness of the *h* comes before or after any voiced part of the sonorant, there are no contrasts: in any given environment, a sonorant may combine with *h* in only one way. There is some analytical confusion about *s*. Many *s*'s appear to be preceded by *h*; other *s*'s show the characteristic tonal affects associated with preconsonantal glottal stop. Are these mutually exclusive, or can it be true, as Scancarelli suggests (1992: 150 and personal communication), that "/s/ may be regarded as always being [+h]; it is sometimes also [+?]" when it undergoes Laryngeal Alternation? Such sources as Bender and Harris (1946: 18), Reyburn (1953: 175), and Foley (1980: 107) agree on transcribing *h* before *s* in h-grades but not in glottal grades. However, these sources are not trustworthy on other matters, especially

as *ahligi'a* (tone and underdots suppressed), with an aspirated *tl*. Mrs. Carey, as Scancarelli confirms, has reanalyzed the *hl* (from older *tl*) in this word as an *h-l* cluster, as shown by her forms *àahlìgíí'a* 'he's having a nightmare' / *gàlìgíí'a* 'I'm having a nightmare'. Cf. also Scancarelli (1992: 143).

[27] Scancarelli (1987: 48) provides more support for this idea, suggesting that some Oklahoma Cherokee speakers pronounce verbs like 'place (something) on (something)', in which both Feeling (1975) and Mrs. Carey have non-alternating *hl*, as in (37), with aspirated *tl*. (Mrs. Carey's forms are *àahlàhv́sga* 'he's putting it on it' / *jùlhàhv́sga* 'I'm putting it on it'.)

Scancarelli proposes (again citing Lindsey; cf. fn. 12) that the contrast between 'have a nightmare' (fn. 26) and verbs like 'place (something) on (something)' is between a cluster *d-l* (Scancarelli's *t-l*, itself clustered with *h*) in 'have a nightmare' and a unit *dl* (Scancarelli's *tl*, plus *h*). It's clear that the facts regarding all the the affricates are complicated. The alternative pronunciations of 'split' reported in fn. 14 above may be relevant for the question of whether there are unit versus cluster *dl*'s.

[28] Scancarelli cites a talk given by Lindsey in 1987, an earlier version of Lindsey (n.d.). Unfortunately, many of the most provocative claims in the talk (which I heard myself, but do not remember accurately!) do not appear in the written version.

[29] Cook (1979: 6) appears to disagree with this statement: "Post-consonantally /?/ is always [?]." However, he gives no examples, and goes on to say, "Words written with an initial vowel have a /?/ automatically before the vowel in several contexts. Since the occurrences of this /?/ are predictable from phonetic context it is not written". Thus, perhaps he is not claiming that word-internal postconsonantal ' exists.

involving suprasegmentals, so we should not rely on them too far. Possibly further instrumental studies will prove valuable here.[30]

As noted earlier, the popular orthography for Cherokee (as in Feeling 1975, or essentially that used in this paper) is very different from the standard linguistic orthography. The linguistic analyses that the linguistic orthography reflects are supported by unaspirated-aspirated alternations resulting from Laryngeal Alternation and, much more extensively, metathesis. But in fact most Cherokee stops in most words do not participate in such alternations, which arise only in certain specific environments. Cherokee may exhibit a process of gradual lexicalization of originally more productive contrasts in aspiration, by which only a few aspirated stops in the lexicon (crucially, those that occur as the first aspirated element in stems that take A prefixes) must be specified as as clusters or units, while most other aspirated stops are unspecified for this history. Scancarelli's survey of the different representations of aspiration in different ways of writing aspiration in Cherokee (1992) confirms that this is an ongoing concern for speakers.

More evidence must be considered before reaching final conclusions about the consonantal alternations we have observed in the Cherokee h- and glottal grades. Steriade's claims concerning the structure of different types of consonants provide a motivated account of why stops (and to some degree affricates) behave differently from sonorants and *s*. At present, the evidence suggests that we should reevaluate the standard linguistic analysis of Cherokee underlying segments, since adding an aspirated stop series at some underlying level may facilitate the description of the very productive process of Laryngeal Alternation.

[30] Thomas's findings (cf. fn. 7) may confirm the reports in the text; I am not sure if her recordings are specifically grade forms, however.

Classificatory Verbs in Cherokee[1]

Barbara Blankenship

Cherokee is among the American Indian languages that have classificatory verbs, a system where the choice of verb is determined by the shape or some other quality of the item that serves as subject (of an intransitive verb) or object (of a transitive verb). There are at least 40 Cherokee verbs that have classificatory variants (King 1978).

The classes of verb referents

The classes of verb referents distinguished in Cherokee are animate (N), liquid (Q), flexible (F), long (L), and compact (C) (Haas 1948). Thus, for example, there are five separate stems for the verb 'give', depending on what is being given.

(1) 'She is giving him a cat.'	Wèésa cat	gà-káà-nèè'a. 3s>3s-N-give;prs	N
(2) 'She is giving him water.'	Àma water	gà-nèèh-néé'a. 3s>3s-Q-give;prs	Q
(3) 'She is giving him a shirt.'	Àhnàwo shirt	gà-nvv́-nèè'a. 3s>3s-F-give;prs	F
(4) 'She is giving him a stick.'	Gànsda stick	àa-d-éé'a. 3s>3s-L-give;prs	L
(5) 'She is giving him a peach.'	Kwàna peach	àa-h-nèè'a. 3s>3s-C-give;prs	C

Abstract nouns or physical items that do not readily fit into one of the five classes take the C verb.

(6) 'She's gonna give him a job.'	Jvlv́vsdàti job	d-à-h-nééli. fut-3s>3s-C-give;bene;ft2

The C form is also used in questions where the identity of the object is not yet known.

(7) 'What is he holding?'	Gàdò úusdi what is.it	àa-hy-é'a? 3s>3s-C-hold;prs	

Previous research

Haas (1948) has the earliest modern linguistic reference to Cherokee classificatory verbs. Since the article focuses on Muskogee, the Cherokee examples are given without analysis, except for a description of the five categories of physical objects that the verbs refer to.

Reyburn's (1954) study of Cherokee verb morphology has a section on classificatory verbs, including a generous selection of forms for four of the five categories. The analysis establishes that verb stems often include overt classificatory morphemes but that there are also

[1]I am grateful to Pamela Munro for extended guidance in this research and to Janine Scancarelli for comments and suggestions on the paper. Special thanks to our Cherokee consultant Virginia Carey for her patience and good humor during the grueling work of providing data.

zero-morphemes and suppletive forms.

Davidson et al (1963) analyze classificatory verbs in a number of Athapaskan languages. They note four kinds of verbs that characterictically take classificatory constructions: stative verbs, intransitive verbs of nonvolitional motion, transitive verbs denoting handling or moving, and transitive verbs denoting throwing or dropping. As we shall see, the same kinds of verbs are likely to take classificatory constructions in Cherokee. Athapaskan classificatory verbs distinguish from 4 (Chipewyan) to 12 (Navajo) categories of physical objects. Basso (1968) describes 13 categories for Western Apache.

King (1978) gives five category-stems for each of 40 Cherokee classificatory verbs. Several possible classificatory morphemes are identified, but there is no attempt to group them systematically. On the basis of deficient verb sets (to be described below), King theorizes that the categories originally distinguished items on two axes: rigid/flexible and solid/liquid.

The section on classificatory verbs in Cook's (1979) grammar of North Carolina Cherokee is based on Reyburn's (1954) conclusions, but carries the phonological analysis further. His discussion of four of the category-stems for each of 16 verbs traces the surface morphemes back through phonological rules to determine their underlying forms. There is no attempt to relate the forms systematically to each other. Instead, they are used to display the phonological mechanisms of verb construction.

Since there has been no published study analyzing the Cherokee classificatory morphemes in terms of an overall semantic system as Davidson et al (1963) have done for Athapaskan languages, this paper will begin to develop such a system, and discuss its relation to Mithun's (1984) theory of noun incorporation processes.

Stem structure

Each verb stem in examples (1-5) comprises a class morpheme (*-káà-, -nèèh-, -nvv́-*, etc.) and a verb root (*-nèè-*).[2] (The root in (4) is reduced to *-ee*. In Appendix A, groups 1a, 1b, and 4 present other examples where the root for the L class verbs is different from the root for the other classes of the same verb. Why this is so is a topic for further study.)

The usual position of the class morpheme is after the prefixes and immediately before the verb root, as illustrated in (1) through (5). There are exceptions where the class morpheme follows the root, as in (8) through (10).

(8) 'She is hiding C.' G-vvsgà-hlvv́s-ga.
3s>3s-hide-C-prs

(9) 'She is hiding L.' G-vvsgà-l(á)dí-'a.
3s>3s-hide-L-prs

(10) 'She is hiding F.' G-vvsgá-lv́vs-ga.
3s>3s-hide-F-prs

[2]Throughout the paper, "root" refers to the verb root without a class morpheme, and "stem" refers to the combination of root and class morpheme.

Semantic range of classes

Since other Native American languages exhibit verb class distinctions for as many as 13 classes, further classes were sought in Cherokee as well. Following the method described in Basso (1986), verbs were elicited in the frame 'She is holding X', with about 100 different nouns in the position of X. The semantic possibilities, adapted from the Davidson et al (1963) description of Navajo, included small grains (sand, sugar), a soft plastic mass (mud, dough), a fluffy mass (wool), ropelike objects, fabric, parallel long items (wood in a woodpile), bulky items (crate, barrel), animals too large to carry, and an aggregate of small items (a handful of coins).

None of these items elicited separate classifiers in Cherokee, nor were other classes discovered accidentally in the course of the elicitations. Thus we can be reasonably certain that there are only five classes.

It is interesting to observe the semantic ranges of the Cherokee classes in detail. The animate (N) class includes all animals and plants, but not their parts. Thus a tree is N, but its fruit could be C, L, or F depending on its shape and rigidity. Animals are N, but their meat is usually C, (hotdogs are L).

The animate class need not be rigidly adhered to, however. Depending on which quality the speaker wishes to emphasize, a cat can be N or F, a tree can be N or L. When the verb does not have an N stem (see discussion of deficient verb sets below), all animals are classified as F, even those that seem rigid, such as bugs and turtles.

For materials that can assume the shape of their container, the quality of the container often determines the class. Sugar in a bowl is C, but sugar in a bag is F. Honey in a comb is L, but honey in a jar is C. Liquids are also classed by the shape of the container when the verb does not offer a Q stem.

Regardless of their shape, furniture and other items made of wood belong to the L class, presumably because lumber is long. Tools are classed not by overall shape, but by the shape of their most salient part. Thus a hammer is L because the head is long, while an axe is C because the head is compact.

Deficient verb sets

Some classificatory verbs do not have different stems for all five classes. Classes can be missing for semantic reasons. For example, 'fall over' has no form for C, Q, or F, since none of those kinds of items could stand upright. In other cases, although the meaning is plausible, there is still no distinct stem for one or more of the classes. In such a case, a form is borrowed from another class. Table 1 summarizes the possibilities encountered.

Kind of verb	Stem used for a	C	L	Q	F	N	noun
Non-deficient verb		C	L	Q	F	N	
No N stem		C	L	Q	F	F	
No Q stem		C	L	C/L	F	N	
No N or Q stem		C	L	C/L	F	F	
F differentiation only (no L, Q, or N)		C	C	C	F	F	
N differentiation only (no L, Q, or F)		C	C	C	C	N	
L differentiation only (no Q, F, or N)		C	L	C	C	C	

Table 1. Summary of stem selection in classificatory verbs

When there is no N form, N nouns take the F verb, i.e., a verb containing what is usually the F morpheme for that kind of verb. Thus, for example, 'he is finding N' and 'he is finding F' both are expressed with *gànvvhwtí'a*. We know that the morpheme *-nv-* in this verb usually refers to F objects, as illustrated by the pair *ùunv'a* 'he has F' and *ùuwàákáha* 'he has N' (*-ka-* is the N morpheme.) Other such examples may be found in Appendix A.

When there is no Q form, Q nouns take the L or C verb, depending on the shape of the container in which the liquid resides. There is always a C form (unless it is semantically impossible, as in 'fall over'), which acts as the default verb in the absence of other forms.

Which kinds of verbs are classificatory

The majority of classificatory verbs have to do with handling physical objects: 'have', 'hold', 'handle', 'break', 'drop', 'give'/'get', 'carry'/'leave behind', 'hang up'/'take down', 'hide'/'find', 'pick up'/'set down', 'put into water'/'take out of water', 'put into fire'/'take out of fire', 'put into a container'/'take out of a container'. Some less concrete ways of handling objects, such as 'send', 'eat', and 'wash', are also classificatory. There are a few intransitive verbs as well, usually related semantically and morphologically to a transitive verb in the set:

'fall'	(related to 'drop')
'hang' (intrans)	(related to 'hang up' (trans))
'lie'	(related to 'have')

Some transitive verbs that seem equally concrete are not classificatory. The family does not include 'catch', 'touch', 'move', 'lift', or 'cut'.

The class morphemes

The classes are not indicated by a unique set of morphemes. There appear to be at least five sets that occur with some frequency, plus various suppletive forms. Table 2 summarizes the most common morphemes. (Sample words for each set are in Appendix A.)

Set	Class C	L	Q	F	N	Semantic area
la	h	di	neeh	nv(v)	ka(a)	(default)
lb	h	yv(v)	neeh	nv(v)	ka(a)	(default)
2	hy	n	nhj	hn	tihn	in the hand
3	hl	l(a)di(s)	dliis	lvv		containing
4	t	too(s)		d		hanging
5	ooh			d	1	falling

Table 2. Classificatory morphemes.

The choice of set is determined by the meaning of the verb. Sets la and 1b are by far the most frequent, and appear to the be default sets for verbs whose meaning does not place them in one of the specialized categories that follow; 1a and 1b differ only in the morpheme for L objects. Set 2 is used in verbs that relate to objects in the hand: 'hold', 'handle', 'take somewhere by hand'. Set 3 appears in verbs relating to containers: 'contain', 'put into a container', 'take out of a container', 'hide', as well as the nouns for containers. Set 4 occurs with verbs having to do with hanging: 'hang' (intransitive), 'hang up', 'take down'. Set 5 is found only in 'fall' and 'drop'. It is of interest that Davidson et al (1963) found sets semantically similar to 2 and 5 in Athapaskan

languages.

For the most part, the class morphemes do not appear related to modern Cherokee nouns or adjectives. The morpheme *-neh-* is cognate with the northern Iroquoian noun stem **-hnek-* 'liquid' (Cook 1978:42, Mithun 1984: 884). The morpheme *-yvh-* may be related to the Cherokee noun *yvwi* 'person'. 'Person' is associated with the L class in some languages (in the Yuman family for example), and may have been L in Cherokee at an earlier phase. According to Mithun (1984: 865), a study of incorporation not limited to American languages, it is common for a noun with a narrow meaning to be incorporated into a verb as the classifier for a broad class of meanings. Her example is the Caddo noun root *-'iǐ'ah-* 'eye', which when incorporated stands for any small, round object.

(11a)	'She is stringing beads.'	Kassi' hah-'iǐ'a-sswii'-sa. bead prg-eye-string-prg
(11b)	'Plums are growing.'	Ka'as hah-'iǐ'ah-'i'-sa. plum prg-eye-grow-prg

By the same process, 'person' could come to stand for long objects in Cherokee.

Mithun (1984:865) theorizes that since the C morpheme in Cherokee usually has the shortest form, it probably evolved from a plain verb root with no incorporation. This theory also accords with the fact that even defective sets always have a C form. If the C form is derived from the naked verb root, then of course there would be no modern Cherokee noun related to the C forms.

Productivity of the class morphemes

Table 3 gives examples where morphemes that commonly appear in classificatory verb sets occur in nouns and non-classificatory verbs. (The first two items are from Feeling 1975: 59,81, the remainder from King 1978:41). Such items are an indication that the morphemes were once used productively in contexts other than the verb classification system.

Morpheme	Class	Lexical item	
-tihn-	N	àa*tíhn*i	'he is leading him/it'
		dìdà*tìhn*ìdóohi	'leader'
-ka-	N	da*ka*hvhskvvgi	'she was giving birth'
		da*ka*hnala	'I own livestock'
		dadas*ka*hneesi	'he will return the animals'

Table 3. Other uses of the classificatory morphemes.

The morphemes do not appear to be productive in modern Cherokee, however. There is no evidence that they are used in forming new words. Furthermore, our Cherokee consultant said she does not recognize them. When presented with the words in (1) through (5), she said she was unable to tell, for example, which part of the word *gànèèhnéé'a* (2) indicated that the object was liquid. She says Cherokee speakers know which whole verb to use; they don't analyze the verb into its constituent parts.

Sentences with more than one class

Like verbs, nouns referring to containers are differentiated by the class of the objects contained. The element *-dòhdi* in these examples is the same as the instrumental verb suffix (Pulte

1975:284). Thus these nouns are probably derived from verbs.

(12) 'container for C' gáhldòhdi

(13) 'container for L' gáldìsdòhdi

(14) 'container for Q' ádlìisdòhdi

(15) 'container for F/N' gàlv̀v́dòhdi

The verb 'contain' distinguishes the classes of both the container and the thing contained. A flexible container like a sack (F) requires a different set of verbs from those of a rigid container like a box (L) or basket (C). These forms are shown in examples (16) and (17). It will be seen that the set for C or L containers is closely related to the noun forms in (12-15). The set for F containers may have originated as a non-classificatory verb *gáánhda*, which borrowed the L, Q, and F forms from the set shown in (16).

	C	L	Q	F	N	
(16)	'C or L contains'	gàhldi	gàldîsdi	àadlîsdi	gàlv́v́di	gàlv́v́
(17)	'F contains'	gáánhda	gàldîsdi	àadlîsdi	gàlv́v́di	gáánhda

English constructions like 'a bag of sticks' are expressed in Cherokee by 'a bag containing sticks', leading to complex verb selection requirements. Examples (18) through (21) illustrate some of the possible combinations. In each of the examples, the participial verb 'containing' is selected to agree with the shape of the container (C/L or F, as in 16-17), and incorporates a morpheme indicating the shape of the object contained. The main verb 'hold' incorporates a morpheme indicating the shape of the container being held. (See Cook 1979:130 for a description of participial forms ending in -v́v'i.)

(18) Wèésa déégàhldi dèe-gáánhdv́v'i gà-hn-é'a.
cat bag dis-F.containing.A 3s>3s-F-hold;prs
'She is holding a bag of cats.'

(19) Wèésa tàlùúja dèe-gàlv́v'i àa-hy-é'a.
cat basket dis-C.containing.A 3s>3s-C-hold;prs
'She is holding a basket of cats.'

(20) Nv̀vya tàlùúja dèe-gàhldv́v'i àa-hy-é'a.
rock basket dis-C.containing.C 3s3>s-C-hold;prs
'She is holding a basket of rocks.'

(21) Dìhnáwo kànèesá'i dèe-gàlv́v́dv́v'i gà-n-é'a.
clothes box dis-L.containing.F 3s>3s-L-hold;prs
'She is holding a box of clothes.'

Incorporation

The presence of class markers in the classificatory verbs hints that the incorporation of nouns into verbs may once have been a characteristic of Cherokee, as it is today in northern Iroquoian languages. (It should be noted, however, that Cherokee is the only Iroquian language that has classificatory verbs (King 1978).) Mithun (1984) delineates four types of incorporation. Each type develops from and co-exists with the previous type. That is, if a language has productive Type III incorporation, it must necessarily have Types I and II as well, although they may or may not be productive. We will outline the hierarchy of types, and then see where Cherokee fits into the system.

Type I. A verb stem and a noun stem are combined to form an intransitive predicate. The noun loses its individual semantic salience; instead of referring to a specific entity, it simply narrows the scope of the verb. An example is:

(22) I am coconut-grinding.[3]

The incorporated noun also loses its syntactic role in the sentence; it cannot be marked for definiteness, number, or case, nor modified by demonstratives or adjectives. Particles that normally cliticize to the verb will cliticize to the noun-verb combination. The process of incorporation lowers the valence of the verb by deriving an intransitive predicate from a transitive one.

Type II. This process is identical to Type I, with the addition that an oblique argument advances into the case position vacated by the incorporated noun. Thus when 'face' in (23) is incorporated, 'his' becomes the direct object, (24).

(23) I washed his face.
(24) I face-washed him.

Type III. Incorporation is used to manipulate the discourse structure. New noun items are presented in full case positions, but old items are put into the background by incorporation. 'Meat' is a new item in (25), but old in (26).

(25) You never eat meat.
(26) I meat-eat all the time.

Type IV. A fairly general noun stem is incorporated to narrow the scope of a verb, but a different, more specific external noun phrase identifies the argument of the verb. Once the argument has been identified, it need not be mentioned further, since the presence of the incorporated noun in subsequent verbs makes the referent clear. This can lead to a classificatory system. Nominals are classified according to the noun that is incorporated into the verbs directed at them.

(27) He said "You should granular-make me some parched corn." After I granular-made him (some), he granular-put (it) on his back and left.

Example 28 illustrates a Type IV paragraph in Cherokee. Thus we know that Cherokee achieved

[3]Although English examples do not allow a complete illustration of the syntax of incorporation, they clarify the semantics for English-speaking readers. Thus the examples in this discussion will all be English paraphrases of American Indian and Micronesian examples given in Mithun's article. Page references are as follows. Example (22): Mithun, page 849; (23-24): 857; (25-26): 860; (27): 865.

productive Type IV incorporation at some point in its history, and, according to Mithun's theory, must also have had Types I through III. It does not, however, give evidence whether incorporation is currently productive, a question to be addressed later in this discussion.

(28) Jààni ùùji ùùhnàwo ùunvvnèèlvv'i. Ùùyààsdi wùudvvnvv'i.
John mother shirt 3s>3s;F;gave his;room 3s>3s;F;hung

Sùnáálée nùuhlsdána ùudlókjvv'i. Ùùdó ùuwààsgàlvvnvv'i.
morning happen 3s>3s;F;not.found his;sister 3s>3s;F;hid

'John's mother gave him a shirt. He hung it up in his room. The next day he couldn't find it. His sister had hidden it.'

Mithun further states that productive use of incorporation may reach any stage (Type I-IV) and then decay, leaving lexical fossils of the incorporation process. The Cherokee classificatory verbs appear to be fossils of Type IV incorporation. The use of incorporated NV combinations is lexicalized for certain verbs, but is never extended innovatively to other verbs. This point will be discussed further below.

Development of the classificatory morphemes

The current distribution of classificatory morphemes is indicative of the status of the incorporation process in its last productive phase for the classes in Cherokee. Morphemes of sets la and lb in Table 2 had progressed to the final stage of Type IV. Their use as the default set for a wide semantic range of verbs suggests that, like the morpheme 'eye' in example (11), they had probably lost their original meanings denoting a specific object in the physical world, and had come to represent classes of objects. The five classes were well established as they related to this set of morphemes, since there is a separate morpheme for each class.

Morphemes of sets 2 through 5 were not yet full Type IV classificatory morphemes. Their application to a limited semantic range of verbs (e.g., 'containing', 'hanging') suggests that they had retained their original meanings denoting a specific item in the physical world, and thus their incorporation was limited to the small group of verbs that express possible actions upon that item.

Is there incorporation in modern Cherokee?

If Cherokee once had productive Type IV incorporation, then according to Mithun's model it must also have had Types I-III. Are any of these still productive, or has the decay been complete? The Cherokee verbs that refer to putting on and changing clothes offer excellent examples of incorporation. (Appendix B presents a list of these verbs.)

Example (30) illustrates Type I incorporation, where the direct object 'shirt' has been incorporated into the verb, turning it into an intransitive predicate. Example (31) shows Type II incorporation, where the oblique argument 'baby' has advanced to the direct object position vacated by 'shirt', triggering a transitive agreement prefix on the verb.

(29) 'shirt' àhnàwo

(30) 'I am putting on a shirt.' Gà-nìiwóo'a.
lsA-shirt.put.on;prs

(31) ' I am putting a shirt on the baby.' Ùùsdi jìi-nìiwóo'a
baby 1s>3s-shirt.put.on;prs

When the incorporated element is modified by an adjective, the incorporated noun can optionally be stated as a separate argument. In (32) the noun *diktinutdi* is omitted, in (33) it is present. (The examples are from Feeling 1975: 87 and 71; no tones were provided.)

(32) Agalisgvm y-edo julsihgi d-u-ktịnvto'i.
sunshine cnd-3sA;walk.around dark dis-3sB-glasses.wear;prs

'When she's out in the sun, she wears dark glasses.'

(33) Igada aagalisgv y-anedoha julsịhgi diktịnvtdi
some sunshine cnd-3pA;walk.around dark glasses

d-ana-ktinvtvsgo'i.
dis-3p>3p-glasses.put.on;prs

'When some people are in the sun, they put on dark glasses.'

But it is not clear whether these examples are lexical forms or show productive use of incorporation. Attempts to elicit incorporation of a less standard item of clothing yielded:

(34) 'I am putting on a watch.' Wàáji nìgv́v nhdì'a.
watch 1sA;put.on;prs

(35) 'I am putting a watch on the boy.' Àachúuja wàáji nìjìyv́v́nhdàánèè'a.
boy watch 3s>3s;put.on;prs

There is no verb incorporating 'watch' in (34) and (35). *Nìgv́v́nhdì'a* may function as a general verb for articles of clothing that don't have incorporated verb forms in the lexicon. Like the clothing verbs, *nìgv́v́nhdì'a* has related forms for 'have on, wear' (*nu[1]wanh[3]di*) and 'take off' (*nị[2]gvnh[3]de[3]'a*), (examples from Feeling1975: 148 and 147, transcription unmodified). Note also that if *nigvvnhd-* is assumed to be an incorporated morpheme, the remaining markers for 'put on' (-i') and 'take off' (-e') are the same as those for the clothing verbs, (see appendix B). Unlike the clothing verbs, however, it is used for non-clothing items ('put a decal on the car', 'put a lock on the door', 'put blinds on the window'). Our consultant says the verb *nìgv́v́nhdì'a* is not used for clothing at all. 'Watch' is not viewed as an article of clothing in (34-35). But it is impossible to determine whether this point of view is due to the fact that there is no lexical verb form for 'put on a watch'.

An even less common article of apparel yielded:

(36) 'I am putting on swim fins.' Ààdla d-àaláàsùhlv́v́sga.
rubber dis-1sA;shoe.put.on;prs

(37) 'I am putting swim fins on the boy.' Àachúuja ààdla dèè-jìláàsùhlv́v́sga.
boy rubber dis-1s>3s;shoe.put.on;prs

Our consultant says that (36) and (37) would also do for 'put on galoshes', or any other footgear made of rubber. Thus the verb 'put on shoes' is being extended to other kinds of footwear by use of an adjective to specify the object. This construction is analogous to the 'dark glasses' example in (32-33). There is no way to incorporate 'galoshes' or 'swim fins' into a verb.[4]

[4]Our consultant says that (37) does not allow a Type II form with 'boy' in object position. It has not been determined whether this is an idiosyncracy of the particular verb, or whether it always applies to incorporated verbs with adjectival modifiers.

Thus the evidence is fairly certain that incorporation is nonproductive with items of clothing. When it was productive, it was of Type IV, where a fairly general noun stem ('shoe') was incorporated to narrow the scope of the verb, while a more specific lexical item ('rubber') identified the argument of the verb. This evidence supports Mithun's (1984:883-884) conclusion about Cherokee incorporation.

Summary

This paper has confirmed that Cherokee classificatory verbs distinguish five classes of objects in the physical world and established that there are at least six sets of morphemes used to mark the differentiation. The incorporation process that derived the class morphemes is no longer productive, nor is incorporation productive in verbs applying to articles of clothing. (Verbs applying to body parts, not attended to in this study, may offer further insights on the question of productivity.) Despite its lexicalized status, the classificatory system can be remarkably complex in actual use.

Appendix A

A selection of classificatory verbs in third person singular, present tense

These verbs were selected because they displayed the most complete sets and the fewest irregularities. They are organized by morpheme sets, as set forth in Table 2.

Words in parentheses are borrowed from elsewhere in the paradigm to fill a gap. This phenomenon is discussed in the section on deficient verb sets.

Those marked with * have the class morpheme after the root; the rest are in the more standard order with the class morpheme before the root.

Gloss	Root	C	L	Q	F	N
1a		-h-	-di-	neeh	nv(v)	ka(a)
leave behind	-ìiyá-	àahìiyá	àadîsìiyá[5]	gànèèhìiyá	gánìiyá	gààkàhìiyá
give	-nèè-	àahnèè'a	àadéé'a[5]	gànèèhnéé'a	gànv́v́nèè'a	gàakáanèè'a
1b		-h-	-yv(v)-	neeh	nv(v)	ka(a)
find	-hwàhtí-	àahwàhtí'a	àayv̀v̀hwtí'a	gànèèhwàhtí'a	gànv́v̀hwtí'a	(gànv́v̀hwtí'a)
*have	v̀(waa)	ùúha	ùuwàáya	ùunèé'a	ùunv́'a	ùuwàákáha
*lie	v̀	àaha	jìiya[5]	gànéé'a	gáànv	gànhga[6]
2		-hy-	-n-	-nhj-	-hn-	-tihn-
hold	-é'-	àahyé'-a	gàné'-a	gànhjé'-a	gàhné'-a	gààtìhné'-a[7]
handle	-ìídó'-	àahìídó'a	gànìídó'a	gàanhjìídó'a	gàhnìídó'a	(gàhnìídó'a)
3		-hl-	-l(a)di(i)(s)-	-dliis-	-lvv-	
*hide (trans)	-v̀v̀sga-	gv̀v̀sgàhlv̀v́sga	gv̀v̀sgàlàdí'a	(gv̀v̀sgàhlv̀v́sga)	gv̀v̀sgàlv́v̀sga	(gv̀v̀sgàlv́v̀sga)
container for[8]	-dòhdi	gàhldòhdi	gàlàdìsdòhdi	ádlìisdòhdi	gàlv̀v́dòhdi	---
C or L contains	-d-	gàhldi	gàldîsdi	àadlîisdi	gàlv́v́di	(gàlv́v́di)
put into container	-dí'-	gààhldí'a	gàlàdîsdí'a	àadlîisdí'a	gàlv́v́dí'a	(gàlv́v́dí'a)

[5]The morpheme -di- causes unexplained irregularities in the surrounding morphemes. *Jìiya* contains elements of both class 1a and 1b morphemes; *któósàdí'a* contains elements of both 1a and 4.
[6]Suppletive form.
[7]This form has a different meaning: 'lead N by the hand'. For the meaning 'hold N' there is no form available; thus that meaning is expressed by the use of the verb 'hold F'.
[8]Although this is a noun set, it is included here because of its obvious relation to the classificatory verbs.

4		-t-	-too(s)-		-d-	
hang (intrans)	-v́-	gàtv	ktòò'a[6]	---	gàdv	(gàdv)
hang up (trans)	-v́v́s-	gàtv́v́ga	któósàdí'a[5]	---	gàdv́v́sga	(gàdv́v́sga)
take down	-éé'-	àahléé'a	atoosii'a	(àahléé'a)	gàdéé'a	---
5		-ooh-			-d-	-l-
fall	-oos-	gòohòòsga	(gòohòòsga)	(gòohòòsga)	gàdóósga	gàlóósga
drop on purpose	-óónhd-	gòohónhda	(gòohónhda)	---	gàdóónhda	gàlóónhda

Appendix B

Verbs having to do with clothes, third person singular present tense

(Examples from Feeling, 1975)

Note the similarity between the stems for 'put on an item' and 'hang up' (appendix A, set 4); and for 'take off an item' and 'take down' (appendix A, set 4). These forms appear to incorporate the noun signifying the article of clothing into the verbs 'hang up' and 'take down'. For each article of clothing, the stem for 'wear an item' is related to the remote past stem of 'put on an item'.

Gloss	Item	'put on item'	'wear item'	'change item'	'take off item'
Verb stems:		-(h)i'- or -vs-	0	-'iyv'- or -sih-	-e'- or -gi'-
cap	al^{2}sdu^{2}lo	al^{1}sdu^{23}lị^{3}'a	ul^{1}sdu^{3}la		al^{1}sdu^{23}lẹ^{3}'a
glasses	di^{2}ktị^{2}nv^{4}tdi	da^{1}ktị^{2}nv^{2}tv^{3}sga	du^{1}ktị^{2}nv^{2}ta		da^{1}ktị^{2}nv^{2}de^{3}'a
gloves	di^{2}lị^{2}ye^{1}su^{2}lo	da^{1}lị^{2}ye^{32}su^{2}lị^{3}'a	du^{1}lị^{2}ye^{32}su^{2}la		da^{1}lị^{2}ye^{32}su^{2}le^{3}'a
hat	al^{2}sgwe^{1}tụ^{2}wo	al^{1}sgwe^{3}tụ^{2}hv^{3}sga	ul^{1}sgwe^{3}tuh^{2}ga		al^{2}sgwe^{3}tuh^{2}gi^{3}'a
pants	a^{1}su^{2}lo	a^{3}su^{2}lị^{3}'a	u^{3}su^{2}la	a^{3}sul^{2}ạ^{3}'i^{2}yv^{3}'a	a^{3}su^{2}le^{3}'a
ring	ạ^{2}lị^{2}ye^{1}su^{23}sto	a^{1}lị^{2}ye^{32}su^{2}stv^{3}sga	u^{1}lị^{2}ye^{32}su^{2}stga		a^{1}lị^{2}ye^{32}su^{2}stgi^{3}'a
shirt	ạ^{2}hnạ^{2}wo	a^{1}hnạ^{2}wo^{3}'a	u^{1}hnu^{32}wa	a^{1}hnạ^{2}wạ^{32}'i^{2}yv^{3}'a	a^{1}hnạ^{2}we^{3}'a
shoes	di^{2}la^{1}su^{23}lo	da^{1}la^{32}su^{2}hlv^{3}sga	du^{1}la^{32}su^{2}hla	da^{1}la^{32}su^{2}lạ^{3}'i^{2}yv^{3}'a	da^{1}la^{32}su^{2}le^{3}'a
socks	di^{2}li^{23}yo	da^{1}li^{23}yo^{3}hị^{2}ha	du^{1}li^{23}yo^{3}ha	da^{1}li^{23}yo^{3}sị^{2}ha	da^{1}li^{23}yo^{3}gị^{2}'a

Animacy and Agreement in Cherokee[1]

Michael Dukes

0. Introduction

Agreement in natural language has usually been treated as a purely syntactic phenomenon in generative grammar. Within R[elational] G[rammar] and Transformational Grammar (including G[overnment] B[inding] theory), agreement marking has consistently been analysed as the 'spelling out' of some structural relationship between two elements in a syntactic representation, either by copying over syntactic features from one category onto another or by moving an agreeing element from one position to another.[2] Despite a large (and growing) body of evidence that this view of agreement is insufficiently general to account for many properties of the phenomenon, the tree-theoretic approach to agreement has continued to predominate. Recently however, some generativists have acknowledged that agreement is probably not a purely syntactic matter but requires some direct semantic and pragmatic input. The interaction of agreement with reference transfer (Nunberg 1977), polite plurals (as in German and French) and honorific agreement in Japanese and Korean all point to the conclusion that a correct statement of constraints on agreement processes frequently requires reference to semantic and pragmatic factors.[3]

Constraints on predicate/argument agreement in Cherokee, as in a number of Native American languages, lend further support to the notion that semantics and pragmatics have a crucial and direct role in natural language agreement phenomena. Irrespective of how a formal analysis of the Cherokee agreement facts should proceed, it is clear that the choice of agreement markers on predicates in the language is strongly conditioned by some version of an A[nimacy] H[ierarchy] (Frishberg 1972, Hale 1972, Silverstein 1976, Comrie 1981, Scancarelli 1987, Jelinek 1991). In this paper, I will be investigating aspects of the relationship between agreement morphology and the Cherokee AH, focussing on certain animacy-based constraints on the form of clauses containing transitive and ditransitive predicates. The analysis of these constraints to be proposed here relies on correspondences between the expression of grammatical relations and the structure of discourse information as they are represented within the formalism of H[ead-driven] P[hrase] S[tructure] G[rammar] (Pollard and Sag 1987, 1993). The analysis also adapts certain assumptions from work on other Native American languages within the RG framework (Aissen 1983, Allen and Frantz 1983, Rude 1982, Allen, Frantz, Gardiner and Perlmutter 1990). The formalism is lexically-based and does not rely on tree-theoretic notions of G[rammatical] R[elation]s. The rather weak evidence for syntactically defined GRs elsewhere in the grammar of Cherokee (Scancarelli 1987, Beghelli, this volume) together with the apparent irrelevance of syntactic factors in the description of Cherokee agreement suggest that a lexically based analysis is likely to provide a reasonably plausible description of the data.

[1]I would like to thank our principal Cherokee consultant, Mrs. Virginia Carey, for sharing her knowledge of the Cherokee language and for her patience and good humour in dealing with our (sometimes) peculiar questions. I would also like to thank Mr. Levi Carey for his help as a consultant. Thanks are also due to all the other participants in the 1993 Field Methods class for discussion of various aspects of Cherokee grammar, particularly Filippo Beghelli and Pam Munro who discussed with me some of the issues addressed in this paper. Pam also provided extensive comments on an earlier draft which have helped to greatly improve the paper. Finally, I thank Janine Scancarelli for her comments on an earlier draft and for her generous encouragement. I hope the analysis presented here does justice to the account of Cherokee agreement in her dissertation.

[2]An extreme version of this approach is currently in vogue in GB, in which essentially all agreement is claimed to be the result of movement (either overt or post-syntactic) of agreement triggers to the 'Spec' positions of various functional projections (as has been suggested for Cherokee by Filippo Beghelli).

[3]A concise summary of much of this data can be found in Pollard and Sag (1993: chapter 2).

The contents of this paper will be organised as follows. In section 1, I will provide a general overview of the Cherokee agreement data and the constraints upon it, essentially reviewing the descriptions found in Pulte and Feeling 1975 and Scancarelli 1987. Section 2 outlines a lexically based account of the agreement data from intransitive and transitive clauses within a version of HPSG. Section 3 attempts to extend the analysis to the treatment of ditransitive clauses, which exhibit a grammaticalized restriction on the personhood of 'demoted' direct objects. Section 4 provides a brief review of some cross-linguistic issues raised by the Cherokee agreement data and considers the relative plausibility of two competing approaches to the treatment of animacy restrictions on ditransitive clauses.

1.1 An Overview of the Cherokee Agreement Data

Agreement morphology appears in Cherokee on verbs, adjectives and possessed nouns (which agree with their possessor in number and person) as well as on deverbal nominals and adjectivals (Pulte and Feeling 1975, Potter, this volume). Although the precise conditions on the form of this morphology vary across these categories, the agreement morphemes, which are in all cases prefixal, fall into two basic classes labelled 'set A' and 'set B' in the literature (Pulte and Feeling (1975: 278-9), Scancarelli (1987: 37)). In this paper I will restrict discussion to the treatment of verbal agreement. The animacy related effects to be discussed here are relevant only to the arguments of verbal predicates, as far as I am aware.[4]

When attached to verbs, A and B prefixes encode the person and number of one of the arguments of the verb (as well as inclusivity/exclusivity in the case of first person arguments). On intransitive verbs, an A or B prefix agrees with the subject (i.e. the sole argument of the verb). On transitive verbs, an A prefix agrees with the subject while a B prefix may agree with the subject or the object depending on certain factors to be outlined below.[5] In certain parts of the paradigm, transitive verbs also bear portmanteau agreement prefixes which simultaneously provide information about subject and object. All these cases will be discussed in more detail below. It is important to note that Cherokee verbs *always* bear agreement prefixes, even on verbforms that are referred to in the Cherokee literature as 'infinitival'. Thus all verbs bear either an A prefix, a B prefix or a portmanteau prefix. In addition to these A/B and portmanteau prefixes, transitive verbs with a third person plural object obligatorily bear a prefix called the 'distributive' in certain parts of the transitive paradigm. The conditions governing the appearance of the distributive are partly lexicalized and somewhat complicated but the inflectional properties of this morpheme are relevant to the treatment of Cherokee grammatical relations to be outlined in a later section of this paper. A few examples of Cherokee verbforms bearing the A/B prefixes, portmanteau and distributive morphology are provided here for illustration.

(1) Àagì-yóósìha
1sB-hungry;prs
'I'm hungry'

(2) Hì-wóónìha
2sA-speak;prs
'You're speaking'

[4]Relational nouns in Cherokee also employ the same set of transitive agreement prefixes as transitive verbs (Pulte and Feeling 1975: 313-16). It is unclear from Pulte and Feeling's discussion how the agreement system works when these nominals are being used as arguments rather than as predicates. It may be that the generalizations discussed in this paper also extend to these cases.

[5]For the purposes of describing the data I will follow Scancarelli (1987 :114) in assuming for the time being that subject and object "may be considered abstractions from semantic roles" (i.e. 'agent' and 'patient' respectively).

(3) Àagw-v`v`hnílv´v˜i
1sB-hit;pst
'I hit it'

(4) Dèè-j-v`v`hnílv´v˜i
dis-2sB-hit;pst
'You hit them (inn)'

The choice of A or B agreement on a particular verbform depends on several factors.[6] At the most basic level, Cherokee verbs can be divided into two basic lexical classes, 'A verbs' and 'B verbs'. B verbs *always* take set B agreement prefixes (except in thoses cases where a portmanteau must be used on a transitive verb).[7] The class of B verbs largely consists of intransitives, although there is a small set of transitive B verbs. A verbs take set A prefixes on some verbforms but B prefixes on other forms. According to Pulte and Feeling (1975: 277), all Cherokee verbs must appear in one of two basic (though apparently variable) stem forms, the progressive stem form or the non-progressive stem form. Intransitive A verbs which appear in the progressive stem form bear A agreement prefixes, those which appear in the non-progressive stem form bear B agreement prefixes.[8] Thus the situation in intransitive clauses is relatively straightforward once the identity of the verb and the correct stem form of the verb are determined in a given sentence. The full set of A and B intransitive prefixes are given in table 1 below:[9]

Table 1: **A and B Intransitive Agreement Prefixes**

Prefix Denotation	**A Forms**	**B Forms**
1s	g-, ji-	agi-, agw-
2s	hi-	ja-
3s	a-, ga-	uu-
1dinc	iinii-	ginii-
1dexc	oosdii-	ooginii-
2d	sdii-	sdii- (= A form)
1pinc	iidii-	iigii-
1pexc	oojii-	oogii-
2p	iijii-	iijii- (= A form)
3ns	anii-	uunii-

(adapted from Scancarelli (1987: 55))

[6]For a much more thorough description see Scancarelli (1987: chapter 2).

[7]There is one very interesting exception to this generalization noted by Pulte and Feeling (1975: 297-8). Transitive B verbs apparently turn into A verbs when the reflexive prefix *-adad-* is added to the stem. Thus the progressive stemform of a transitive B verb will take set A agreement prefixes if and only if it also bears the reflexive prefix. It is unclear to me at present whether this change in prefix selection should be treated as a lexical idiosyncrasy of the transitive B verbs (which are very idiosyncratic anyway) or whether it is reflective of a more general constraint on reflexivization in Cherokee.

[8]Scancarelli (1987: 65) provides a slightly more detailed breakdown of the facts, although the resulting description is essentially the same. A verbs take A prefixes on present, imperfective, punctual and future stems (the 'A stems') but B prefixes on perfective, infinitive, pre-inceptive and propensative stems (the 'B stems'). The latter correspond to Pulte and Feeling's 'non-progressive stem' and the former to their 'progressive stem'.

[9]It is clear that there is a considerable amount of internal structure to many of these agreement prefixes (e.g. *-oo-* consistently marks exclusiveness, *-ii-* consistently marks nonsingularity) which might bear further investigation. However, I am concerned in this paper with formal resemblances between intransitive and transitive prefixes and the constraints upon their appearance so I will not be discussing their internal structure unless relevant to the issue at hand.

In a clause headed by a transitive A verb, the constraints on agreement marking become somewhat more complicated. As mentioned earlier, two arguments are sometimes marked simultaneously on the verb by portmanteau morphemes. Thus, in a sentence such as (5) below, the verb is marked for a 1s subject and a 2s object, whereas in (6), the verb is marked for a 2s subject and a 1s object:

(5) Gv`vy-v`v`níha
1s>2s-hit;prs
'I'm hitting you'

(6) Sgw-v`v`hníha
2s>1s-hit;prs
'You're hitting me'

Portmanteau forms like those above are largely restricted to cases in which both arguments of the verb are non-third person. On verbforms agreeing with at least one third person argument, the transitive agreement prefixes are mostly identical to one or other of the intransitive A or B prefixes. The A vs B distinction is not relevant in the cases involving portmanteaus since both A and B verbs employ the same portmanteau forms. The distinction is thus neutralized. A full listing of the transitive agreement prefixes is given in Scancarelli (1987: 71). I will not repeat all the forms here. However, Table 2 below illustrates some generalizations regarding the form of agreement morphemes that follow from Scancarelli's table, most of which are noted by Scancarelli herself.

Table 2: **Agreement Morphemes For A Stem Verbforms**

O / S	1s	1d exc	1p exc	1d inc	1p inc	2s	2d	2p	3s an	3ns an	3s inn	3ns inn
1s	RFL					**PM**	**PM**	**PM**	**PM**	**PM**	A_S	DA_S
1d exc		RFL				**PM**	**PM**	**PM**	A_S	DA_S	A_S	DA_S
1p exc			RFL			**PM**	**PM**	**PM**	A_S	DA_S	A_S	DA_S
1d inc				RFL					***ee*A$_S$**	DA_S	A_S	DA_S
1p inc					RFL				***ee*A$_S$**	DA_S	A_S	DA_S
2s	**PM**	**PM**	**PM**			RFL			**PM**	DA_S	A_S	DA_S
2d	**PM**	**PM**	**PM**				RFL		***ee*A$_S$**	DA_S	A_S	DA_S
2p	**PM**	**PM**	**PM**					RFL	***ee*A$_S$**	DA_S	A_S	DA_S
3s	B_O	B_O	B_O	B_O	B_O	B_O	B_O	B_O	A_S/ B_O	A_S/ B_O	A_S/ B_O	DA_S/ B_O
3p	*g*B_O	*g*B_O	*g*B_O	*gee* B_O	*gee* B_O	*gee* B_O	*gee* B_O	*gee* B_O	A_S/ I_O	A_S/ I_O*nii*	A_S/ I_O	DA_S/ I_O*nii*

(adapted from Scancarelli 1987: 71)

Table 2 summarizes the type of prefixes that are found on A stem transitive verbforms. The subject is given vertically, the object horizontally. 'PM' denotes a field in the table in which a portmanteau prefix is found which agrees with both subject and object. 'D' denotes an obligatory occurrence of the distributive prefix. Italicized forms are actual Cherokee morphology found in those fields of the table. 'A_S' indicates that an A intransitive prefix form marks agreement with

the subject, 'B_O' indicates that a B intransitive prefix form marks agreement with the object. The 'A_S/B_O' and 'A_S/ I_O' forms in the bottom righthand corner of the table denote cases where the choice of agreement prefix is determined by the relative animacy of the two third person arguments. The verb may agree with the subject or the object (but not both). The inverse prefix *gvvwa-* (denoted I in table 2) is formally distinct from the B agreement forms but marks agreement with a third person object when the subject is third person plural and less animate than the object. Since it fulfills the role of a B prefix in a restricted part of the transitive paradigm I will treat it here as a suppletive form of the third person singular B prefix that must be substituted for the usual B form by an adhoc morphological rule.

The table for B stem verbforms would differ from table 2 only in the following respects — the 'A_S/B_O' and 'A_S/I_O' forms in table 2 would be replaced by B and I forms respectively. The verb would agree either with the subject or object, depending on animacy. The final two columns (i.e. the columns denoted by 3sinn and 3nsinn) would also be replaced by B forms.

Several interesting generalizations emerge from table 2 regarding the A/B split. Firstly, in certain parts of the transitive paradigm, the A/B split is neutralized. Thus, the forms marked in boldface do not change to B forms even if the verb is put in a B stem form. I will refer to the boldfaced forms, including the portmanteaus, as the 'non-alternating prefixes'. The existence of these nonalternating forms indicates further that transitive agreement must be learnt, at least partially, as a distinct system from intransitive agreement. The same conclusion is supported by the fact that the portmanteau morphemes which appear on transitive verbs are not simply sequences of A+B morphemes (see Scancarelli (1987: 71) for a full summary of the forms) — they are essentially distinct forms. Finally, transitive agreement prefixes display certain obligatory additional markers indicating plurality (e.g. the *g-* prefix in the bottom row of the table and the distributive prefix in the 3nsan and 3nsinn columns) or inclusion of the hearer within the reference of the subject or object (i.e. the *ee-* prefix found in most of the forms involving a second person) which the Cherokee speaker must learn to prefix to an A or B morpheme specifically in transitive sentences. I will refer to these additional morphemes as 'non-core' agreement prefixes to distinguish them from the 'core' A/B and non-alternating forms that seem to mark person, number, inclusivity as well as animacy straightforwardly.[10]

It is clear then that the transitive paradigm is considerably more than just a combination of the A and B intransitive forms. On the other hand, it seems reasonable to assume, following Scancarelli (1987: chapter 4), that in the cases where transitive agreement prefixes are identical to intransitive A and B prefixes, the transitive verb actually agrees with only one argument, either the subject or the object. The alternative is to assume that in these cases there is a 'zero morpheme' which covertly marks the second transitive argument (i.e. either the subject or the object). However, I think there are good reasons for rejecting this idea. Firstly, from a metatheoretical point of view, it is desirable to keep otherwise unmotivated unobservables to a minimum. The assumption that there are zero agreement morphemes is clearly unmotivated except to the extent that it 'regularizes' the transitive agreement paradigms. Secondly, from a Cherokee-internal point of view, we would be forced to say that every third person agreement morpheme (both A and B forms) has at least two distinct forms, an overt form and a covert form. But the distribution of the covert form (unlike the overt form, which appears in both transitive and intransitive clauses) is not predictable from any grammatical properties independent of the overt form. We would simply assume that it has to appear on every transitive verb that doesn't bear the corresponding overt form. Since we know that Cherokee verbs *do* overtly mark both

[10]I am assuming here, perhaps overoptimistically, that the 3p subject / 1s object forms *gvvgi-* and *gvvgw-* can be derived phonologically from a combination of the 1sB prefixes *agi-* and *agw-* preceded by some variant of the *g-* element found in the bottom row of table 2. I note that Scancarelli (1987: 127-8) makes a similar assumption about these forms. I will not be providing a treatment of the non-core prefixes in this paper.

subject and object information simultaneously (as in the portmanteau forms in table 2) there is no obvious reason why null morphemes should exist in such a large chunk of the transitive paradigm nor why null morphemes do not occur at all in the intransitive paradigms. The more natural assumption is that transitive verbs sometimes agree with only one argument and not both. The motivation for this phenomenon and its treatment in a formal grammar are the main concerns of this paper.

1.2 The Animacy Hierarchy

Examination of tables 1 and 2 reveals that the following generalizations regarding agreement triggers hold good:

> i. A first or second person argument always triggers a core (i.e. A, B or non-alternating) agreement prefix on a verb.
> ii. A transitive verb with two third person arguments differing in animacy always marks the more animate with a core agreement prefix.

The generalizations given above can be seen to be conditioned by the Cherokee Animacy Hierarchy (Cherokee AH), as given below in (7):

(7) **Cherokee Animacy Hierarchy** (Scancarelli 1987: 126)

1st person 2nd person	>	3 human	>	3non-human animate > 3 inanimate

Arguments at the top end of the Cherokee AH always trigger core agreement while those in the middle or at the bottom of the hierarchy usually only trigger core agreement if there are no more animate arguments in the clause. The examples in (8) illustrate some of the possibilities:

(8) a. Dìígi jìì-gòò'v sv`v`hi
Richard 1s>3san-see;pst yesterday
'I saw Richard yesterday'

b. Dìígi àagì-gòòhv sv`v`hi
Richard 1sB-see;pst yesterday
'Richard saw me yesterday'

c. Sgìnìì-gòòhv`v^i
2s>1dexc-see;pst
'You saw us'

d. Bàáb jò'i sv`v´kta d-ùu-gv`v^i
Bob three apple D-3sB-eat;past
'Bob ate three apples'

Scancarelli (1987: 340) discusses various approaches to motivating these animacy conditions which all agree that the roots of animacy hierarchies can be located in the structure of discourse. Grammarians working within the framework of Relational Grammar have noted animacy-based restrictions on agreement, advancements and/or demotions (Aissen 1987, Allen et al 1990) but have never to my knowledge offered an account of these restrictions beyond the statement of otherwise unmotivated constraints on the personhood of certain grammatical elements in a clause. In the following section I will tentatively outline an approach to Cherokee agreement and grammatical relations within HPSG that provides the kind of structure suitable for

motivating a formal account of the Cherokee AH. Since HPSG structures provide a representation for all kinds of information relevant to the utterance of a sentence (crucially, discourse information in this case) it is possible to formulate constraints on Cherokee grammar that are based on structures independently needed within the theory. The theory thus allows for the direct influence of nonsyntactic information on grammatical processes such as agreement. The formal constraints proposed within RG can thus be naturally motivated by basing them on some externally driven requirement — a possibility which is not available in theories that isolate morphosyntactic systems from 'nongrammatical' information.

2.1 Some Background on Cherokee in HPSG

In order to partially formalize the grammatical properties of Cherokee being considered here, it is necessary to give a thumbnail sketch of some basic properties of HPSG. HPSG represents lexical information in the form of structured matrices which are 'sorted' according to the kind of information they contain. The first major sorting of information breaks down a lexical representation into PHONOLOGY (phonological information) and SYNSEM (morphosyntactic, semantic and pragmatic information). I will have nothing to say here about information of the PHONOLOGY sort; suffice it to say that this corresponds to fairly standard notions about phonological representations of lexical elements. SYNSEM is broken into CATEGORY (CAT), CONTENT (CNT) and CONTEXT (CXT). CAT contains morphosyntactic information about a lexical item (subcategorization, lexical type, agreement features, etc), CNT contains semantic information (typically structured within some version of Situation Semantics (Barwise and Perry 1983)) and CXT contains information about the kinds of situations that a given lexical item can be used in.

Representations of sentences within HPSG do not differ in kind from the representations of lexical items. Sentences are structured matrices constructed via monotonic combination of constituent elements according to various syntactic, phonological, semantic and pragmatic constraints. Some constraints may be universal, others may be parochial. The overriding condition on the combination of elements into larger structures is stated in terms of 'unification' (Pollard and Sag 1987) — any two elements of the appropriate sort may be combined into larger objects provided that they do not contain *conflicting* information. Let us consider a couple of sentences to illustrate how the framework operates:

(9) Dìnì-yóotli ààn-dàwóó'a
p-child 3nsA-swim;prs
'The children are swimming'

(10) Bàáb wàhya d-ùu-hlv`v^i
Bob coyote D-3sB-kill;pst
'Bob killed the coyotes'

Oversimplifying a little in the meantime, a verbform such as *àándàwóó'a* would have a lexical representation like (11):

(11)

PHON	/àándàwóó'a/			
SYNSEM	CAT	[HEAD	[VFORM	A stem, 3nsA, prs, ...]]
		[SUBCAT	⟨NP[1]⟩]	
	CNT	[RELATION	swim]	
		[swimmer	[1] [INDEX	plural]]

CXT	[C-INDS	SPEAKER ....]
		ADDRESSEE ....]
	[BGRD	....[1]....]

The lexical entry gives the pronunciation of the verb, its morphosyntactic category and its subcategorization frame (called SUBCAT) which gives an ordered list of elements selected by the head.[11] CNT specifies that there is one (plural) referent that fulfills the single semantic role associated with the denotation of the verb *ààndàwóó'a*.[12] Note that the subject need not be specified morphosyntactically as a plural because no plurality constraint is imposed on the subcategorized NP in CAT. CNT ensures however that the subject denotes a plural entity (the distinction will be relevant to the treatment below of *wàhya* in (10)). CXT specifies that the index of the swimmer(s) must be one which has been introduced in the discourse as part of the BACKGROUND (BGRD). No constraints are placed on the indexing of the speaker or hearer by this particular verbform since it is not a first or second person verbform. If relevant, the referential indices of the speaker and hearer (along with locational and temporal information about the utterance situation) would be indicated in the CXT submatrix denoted CONTEXTUAL-INDICES (C-INDS). If the verbform is combined with the NP *dìnìyóotli* via unification to form sentence (9), the NP must bear the index [1] to satisfy the subcategorization requirements of the verb. Since *dìnìyóotli* satisfies the constraints imposed by the verb it may unify with the verb to give sentence (9).[13]

A verbform such as *dùuhlv`v"i* would have a lexical representation resembling that given in (12):[14]

(12)	PHON	/dùuhlv`v"i/		
	SYNSEM	CAT	HEAD	[VFORM B stem, 3sB, dis, pst, ...]
			SUBCAT	⟨NP[1], NP[2]⟩
		CNT	RELATION	kill
			killer	[1] [INDEX singular]
			killed	[2] [INDEX plural]
		CXT	C-INDS	SPEAKER ....
				ADDRESSEE ....
			BGRD	....[1], [2]....

As in the previous sentence, the verb places no morphosyntactic constraints on the form of the subcategorized NPs, but they must satisfy the index requirements given in CONTENT. Furthermore, the verb is marked with the distributive prefix because it is specified so in the VFORM features of the verb. Notice that *wàhya* (singular) will not be formally distinguished from *wàhya* (dual) or *wàhya* (plural) in Cherokee; all that changes is the semantic type of the referent assigned to the word *wàhya* in different situations. Only the shape of the verbformally

[11]Arguments of predicates in Cherokee typically do not appear overtly in a sentence unless they introduce new information. There are various ways that the nonappearance of a subcategorized element can be dealt with in the present framework but since the issue is not relevant to the discussion at hand it will not be taken up here.

[12]RELATION simply denotes the predicative meaning of some lexical element. See Pollard and Sag 1987 for discussion of this terminology (which originates with Situation Semantics (Barwise and Perry 1983)).

[13]The morphosyntactic information given as the value of VFORM in (12) is for expository purposes only and is not intended as an analysis of the structure of Cherokee verbs. However, some of this information will be reconstructed more seriously below.

[14]I will omit unnecessary bracketing and spacing in the matrices from now on; the structures employed in this paper are all parallel in structure to the example given more explicitly in (11).

indicates that *wàhya* has a plural referent in (10). Since *Bàáb* and *wàhya* both satisfy the constraints imposed by the verb, they may unify with the verb to give the well-formed sentence (10), where *Bàáb* will be associated with the 'agentive' semantic role and *wàhya* with the 'patient' role via coindexation.

The notions of 'subject' and 'object' can be reconstructed straightforwardly in the following way from the contents of SUBCAT lists. A 'subject' of some predicate is simply the first element on its SUBCAT list. Thus, an intransitive verb selects one argument which is (always) its subject. A transitive verb selects two arguments, the first of which is its subject, the second, its object. Thus, we define the second element on a SUBCAT list to be the object. The analysis exactly follows Pollard and Sag's (1987) reconstruction of Dowty's (1982) categorial definition of grammatical relations. The transitive / intransitive distinction need not be marked by any additional lexical feature since the valency of a verb can be determined simply by inspecting the length of its SUBCAT list; an intransitive verb takes one argument, a transitive verb takes two, etc.

2.2 Accounting for the Appearance of A and B Prefixes on Intransitive Verbs

We saw in section 1 that the choice of A, B or portmanteau agreement prefixes on a particular verbform is determined by several factors ranked in order of importance. Intransitive verbforms can be treated straightforwardly by dividing them into two basic lexical types, A and B, further subdivided according to whether the verbform is in a progressive (+PROG) or non-progressive (-PROG) stem form. There will thus be four subcategories of intransitive verbs in Cherokee determined by these features. I will assume that there is an additional feature specified on verbs called AGRSET which determines whether the actual prefixes marked on a verb come from the A set or the B set (the reader will recall that A verbs are frequently marked with B prefixes). Since A agreement prefixes only show up on type A intransitive verbs, the correct selection of prefixes in these cases can be defined by the following implicative lexical constraint:

(13) **FCR 1**:

$$\begin{array}{lll} \text{VFORM} & [\text{TYPE} \quad \text{A}] & \\ & [\text{STEM} \ +\text{PROG}] & \supset \quad [\text{AGRSET} \quad \text{A}] \\ \text{SUBCAT} & \langle \text{XP} \rangle & \end{array}$$

which requires that any progressive A verb bear set A prefixes. Following Gazdar et al 1985, I will refer to such conditional restrictions on the featural content of categories as Feature Co-occurrence Restrictions (FCRs). Hence, (13) is labelled 'FCR 1'. Implicit in this analysis is the assumption that set B prefixes are the *default* form of agreement. Again following Gazdar et al 1985, I will assume that default feature values are filled in via Feature Specification Defaults (FSDs). The default AGRSET value is determined via FSD 1:

(14) **FSD 1**: [AGRSET B]

Thus, unless some constraint like (x) comes into play, an intransitive verb will always be marked with B prefixes. The verb will mark the (person, number and inclusivity) features corresponding to the referent of its argument, which will be denoted in the HEAD features by the submatrix AGR[EEMENT]. The value of AGR for intransitives is defined via a set of lexical constraints which provide a morphosyntactic 'translation' of the kinds of situations that the verbforms may be used in. These translations correspond to the Cherokee speaker's knowledge that, for example, use of a verb marked with first person singular morphology (whether it is an A or B form) indicates that the utterer of the sentence is the one carrying out the activity described by the

sentence. Such constraints can be described as FCRs of the form given in (15)a-c, which determine the value of AGR for singular arguments in the first, second and third person respectively and correspond to standard 'subject / verb agreement':[15]

(15)a. **FCR 2a:**

SUBCAT	⟨NP[x]⟩			
C-INDS	SPEAKER	[x]	⊃	[AGR 1s]

b. **FCR 2b:**

SUBCAT	⟨NP[x]⟩			
C-INDS	ADDRESSEE	[x]	⊃	[AGR 2s]

c. **FCR 2c:**

SUBCAT	⟨NP[x]⟩		
BGRD	[x]	⊃	[AGR 3s]

The conjunction of all such translation constraints on the AGR value of Cherokee verbs (both intransitive and transitive) can be defined as the 'translation function' for the verbal paradigm, a description which will become useful in the analysis of transitive predicates. The value of the translation function can be seen to be determined in each case by the *location* of the index of one or more arguments of the verb. When the index of the subject is located in the C-INDS matrix we get first or second person agreement. When the index of the subject is in BGRD we get third person agreement. I will often refer to these various lists of indices (i.e. C-INDS, BGRD, etc) as 'files' in discussion below. Agreement marking on intransitive verbs in Cherokee is thus a function of the file, F, that the subject's index appears in. As a final example of the treatment of intransitive verbs outlined above, the verbform *hìwóónìha* 'you're speaking' (from (2)) will be assigned the representation given in (16):

(16)

PHON	/hìwóónìha/			
SYNSEM	CAT	HEAD	VFORM	[TYPE A]
				[STEM +PROG]
				[AGRSET A]
				[AGR 2s]
		SUBCAT	⟨NP[1]⟩	
	CNT	RELATION	speak	
		speaker	[1]	
	CXT	C-INDS	SPEAKER	
			ADDRESSEE [1]	
		BGRD	.....	

Transitive Verbs. The treatment of agreement morphology in Cherokee transitive clauses is a good deal more complicated than intransitive clauses because the value of AGR and AGRSET must be made to vary with respect to the relative animacy of the subject and object. As with intransitive verbs, we can assume two basic lexical splits; one between type A verbs and type B verbs and the other between progressive and non-progressive stems. These splits will be described via the same set of features outlined for intransitives (i.e. TYPE and STEM). In accounting for the effects of animacy, I will start by examining the status of first and second person arguments, since the treatment of these arguments can be defined in terms of absolute rather than relative animacy, before turning to the status of third person arguments.

[15]I omit specification of the constraints for other AGR values since it would require the spelling out of a number of assumptions regarding the treatment of plural indices in CONTEXT that are not directly relevant to the concerns of this paper.

First and Second Person Arguments—Absolute Animacy. One of the key generalizations regarding animacy from section 1.3.3 was that a first or second person argument always play some role in the determination of the form of agreement on a verb. This property of Cherokee morphosyntax can be described within HPSG by a condition on the translation function that defines the value of AGR for any given verbform. As shown earlier, CXT matrices are broken down into two main submatrices, C-INDS and BGRD. Since first and second person arguments are, by definition, coindexed with SPEAKER and ADDRESSEE, they are always coindexed with obligatory elements of any discourse, which are represented in the C-INDS file. Third person arguments by contrast are not coindexed with discourse participants, and their referents must be introduced as additional assumptions in the BGRD file. The relevant condition on the translation function can therefore be stated as 'Translation Condition 1' in (17):

(17) **TC 1:**

SUBCAT	$\langle ...NP_{[x]}... \rangle$		
C-INDS	.....[x]	$\supset$	[AGR f(F[x], ...)]

(17) requires that the value of AGR for some verbform with an argument whose index is found in the C-INDS file (i.e. a first or second person index) must be (at least partially) determined by the location of that index (i.e. the file it appears in).[16] No such condition holds of third person arguments since the form of agreement on a transitive verb with a third person argument is frequently determined solely by the index of the other argument (which may be first, second or third person). The index of a third person argument may be 'ignored' by agreement processes in the language. Thus the fact that first and second person arguments form a natural class with respect to agreement in Cherokee can be straightforwardly captured via the HPSG representation of context.

The condition given in (17) accounts for some of the absolute animacy effects involving first and second person arguments. However, there are two other problems which must be accounted for; the relationship between A and B prefixes in transitive clauses and the representation of non-alternating agreement prefixes (including the portmanteau prefixes). I will start by considering the second problem.

There are at least two possible approaches to the treatment of the non-alternating prefixes. One approach would involve treating them as a paradigm distinct from the A and B prefixes. Under this view, AGR would have a third possible value, which we might call C, that would neutralize the distinction between A and B and require that AGRSET be transitively valued (i.e. be specified for agreement with two (ordered) arguments). A second approach would involve the assumption that non-alternating morphemes are also defined in terms of the AGRSET values A and B but that the shape of the morphemes happens to be the same in parts of the paradigms. In this case it will be necessary to assume that both A and B AGR prefixes can sometimes be transitively valued. There is a considerable body of evidence favouring the first approach over the second. The second approach requires a large coincidental overlap of forms between the two paradigms that makes the A/B distinction meaningless in such cases. It also requires that A and B prefixes sometimes be intransitively valued and sometimes transitively valued. On the first approach however, A and B forms will always be intransitively valued for AGR even when they are marked on transitive verbs.[17] Furthermore, the lack of alternation of the boldfaced forms in table 2 between A and B agreement is immediately accounted for by the fact that they comprise a

[16]The expression '[AGR f(F[x], ...)]' should be read: 'The value of AGR is a function of the file in which [x] is located and possibly other files'.

[17]Conditions that fix this requirement will be stated below.

distinct inflectional set. The only disadvantage of employing a distinct C inflectional set is that there is some overlap in the shape of the A and C forms when objects are animate third person. However, since these A-like forms do not alternate with B forms they clearly cannot be considered typical A forms and the overlap must be considered accidental.

The analysis of non-alternating transitive morphemes can be formalized as follows. Firstly, I adopt the assumption that AGRSET may bear a third value, C, which is selected when a transitive verb has two arguments that are discourse participants or when the subject is a discourse participant and the object is an animate BGRD referent. It is necessary to postulate two distinct though formally parallel FCRs to account for these two cases because FCR 3b requires an additional condition that applies only to a third person *object* (i.e. it must have an animate referent):

(18)a. **FCR 3a**: SUBCAT $\langle NP_{[x]}, NP_{[y]} \rangle$
C-INDS .....[x], [y] $\supset$ [AGRSET C]

b. **FCR 3b**: SUBCAT $\langle NP_{[x]}, NP_{[y]} \rangle$
C-INDS .....[x] $\supset$ [AGRSET C]
BGRD [ANIM.....[y]]

FCR 3a accounts for the choice of non-alternating portmanteau morphemes that show up in the agreement paradigm when subject and object are both first and second person. FCR 3b accounts for the appearance of nonalternating agreement prefixes in cases where the subject is first or second person and the object is an animate third person argument. FCR 3b requires that the file of indices known as BGRD be further sorted into subfiles that distinguish indices depending on the animacy of their referents. This subsorting is also necessary to deal with the relative animacy effects involving third person arguments. I will assume that Cherokee speakers, like speakers of other languages with semantically based gender, distinguish different kinds of background referents for linguistic purposes. These distinct kinds will be represented (where relevant) as subfiles inside BGRD called HUM[AN], ANIM[ATE] and INAN[IMATE].[18] The subfile ANIM is referenced in FCR 3b because the choice of AGRSET value in such cases depends on whether or not the object has an animate referent.

Verbs specified with the C value for AGRSET must have their AGR value determined by information about the location of both argument indices. This datum can be represented as a condition on the translation function for transitive verbs analogous to the condition given earlier in (17) that applied to both transitive and intransitive verbs:

(19) **TC 2**:
[AGRSET C] $\supset$ [AGR f(F[x], F[y])]
SUBCAT $\langle NP_{[x]}, NP_{[y]} \rangle$

[18]The semantic distinctions postulated here do not suffice to completely account for the choice of agreement prefixes in Cherokee. Scancarelli (1987: 75-6) points out that the distinction between animate and inanimate referents for grammatical purposes does not completely match a real-world (or even supernatural) distinction between living and non-living beings. She notes that inanimate agreement forms can be used to mark animate referents when the referent is insufficiently 'individuated' from the point of view of the speaker. Weakly individuated referents are those which are not readily identifiable by the discourse participants and are, roughly speaking, 'nonspecific'. Chung 1981 discusses a similar grammatically relevant concept of 'individuation' in Chamorro; humans are treated as being more individuable than nonhumans which in turn are more individuable than inanimates. Degree of individuation may be a sufficiently general notion to replace the HUM / ANIM / INAN subfiles in the BGRD matrix (see also Lichtenberk 1982).

Thus for any transitive verbform whose agreement marker is selected from the C agreement paradigm the form of the agreement marker will be determined as a function of the location of the indices of both the subject and the object.

The above analysis accounts for the nonalternating forms within the Cherokee verb agreement paradigm by treating them as a distinct inflectional subparadigm labelled C. But in the remaining parts of the paradigm given in table 2 there are transitive agreement markers that are clearly members of either the A or B paradigm. When one argument of the verb is first or second person and the other is an inanimate third person, the verb always agrees with the first or second person NP. Furthermore, the choice of A or B agreement form for progressive A verbs is determined according to whether the triggering NP is subject (A agreement) or object (B agreement). Assuming again that B is the default value for AGRSET, these agreement facts can be derived by imposing the FCR given in (20):

(20) **FCR 4:**

$$\begin{array}{llll} \text{HEAD} & \text{VFORM} & \text{TYPE} & \text{A} \\ & & \text{STEM} & \text{+PROG} \\ & \text{SUBCAT} & \langle \text{NP}_{[x]}, \text{NP}_{[y]} \rangle & \supset \quad [\text{AGRSET} \quad \text{A}] \end{array}$$

$$\begin{array}{lll} \text{C-INDS} & \text{....[x]...} \\ \text{BGRD} & \text{INAN} & \text{....[y]...} \end{array}$$

FCR 4 guarantees that any relevant verbform (i.e. a transitive progressive A verb) for which the agreement trigger is the subject will be marked with an A agreement prefix. In any other circumstances it will be marked with a B prefix. That the subject *is* at least one of the agreement triggers is guaranteed by the condition given earlier in (17), which required that an NP coindexed with a discourse participant always be an agreement trigger. Ensuring that it is the *only* agreement trigger can be achieved by appealing to a condition suggested earlier requiring that the AGR value on verbs marked with A or B prefixes be determined by only one argument. This condition is given in (21), which specifies that AGR is a one-place function when AGRSET is anything other than C:

(21) **TC 3:**

$$[\text{AGRSET} \quad \neg\, \text{C}] \quad \supset \quad [\text{AGR} \quad \text{f(F[x])}]$$

Finally, it is necessary to provide a condition to ensure that a transitive progressive A verb agrees with its object when it is marked with B agreement:

(22) **TC 4:**

$$\begin{array}{lll} [\text{TYPE} \quad \text{A}] & & \\ [\text{STEM} \quad \text{+PROG}] & \supset & [\text{AGR} \quad \text{f(F[y])}] \\ [\text{AGRSET} \quad \text{B}] & & \\ \text{SUBCAT} \quad \langle \text{NP}_{[x]}, \text{NP}_{[y]} \rangle & & \end{array}$$

The conditions outlined above are sufficient to account for all the animacy effects involving first and second person arguments. It just remains to account for 'relative animacy' effects with two third person arguments before turning to the relationship between the Cherokee AH and ditransitive verbs.

Third Person Arguments—Relative Animacy. When a transitive verb has two third person arguments the choice of A or B agreement (as well as the choice of agreement trigger)

hinges on the relative animacy of the two arguments. A verb agrees with a human argument in preference to a nonhuman one and with an animate argument in preference to an inanimate one. An adequate account of this relative animacy can be given by making use of the idea introduced earlier that BGRD is broken into three subfiles, HUM, ANIM, and INAN. Unless further technical machinery is introduced however, it will be necessary to make use of disjunctive statements to describe these relative animacy conditions:

(23) **TC 5:**

VFORM	HEAD	SUBCAT ⟨NP, NP⟩			
CNT ...[x] ...[y]					
BGRD	HUM ...[x]				
	ANIM ...[y] v INAN ...[y]		⊃	[AGR	f(F[x])]
	v				
BGRD	ANIM ...[x]				
	INAN ...[y]				

TC 5 requires that any transitive verb must have its AGR value determined by the more animate argument whether it be subject or object. It is also necessary to ensure that a transitive progressive A verb agrees with its subject when it is marked with A agreement:

(24) **TC 6:**

HEAD	VFORM	[TYPE A]		
		[STEM +PROG]		
		[AGRSET A]	⊃	[AGR f(F[x])]
		SUBCAT ⟨$NP_{[x]}$, $NP_{[y]}$⟩		

The inverse condition matching TC 6 (i.e. that B agreement is object agreement on transitive progressive A verbs) is already covered by TC 4 and applies to verbs with two third person arguments in the same manner as to verbs with a first or second person argument. Thus cases of 'inverse' agreement (Scancarelli 1987: chapter 2) with third person objects are treated by exactly the same machinery as that which accounts for object agreement with first and second person arguments. The default AGRSET value for a transitive verb with two third person arguments will be set as B by FSD 1 when TC 6 fails to apply.

In cases where two third person arguments do not outrank each other in animacy, additional discourse factors decide which argument will trigger agreement on the verb (Scancarelli 1987:131). Such factors could also be formalized within the the kind of framework employed here though there is presumably variation from speaker to speaker as to precisely how these factors might be weighted, as there is in the determination of relative animacy (Scancarelli 1987: 128-33). I will not be addressing these issues in this paper.

3. Agreement Related Properties of Ditransitive Verbs

The analysis of the core cases of Cherokee agreement presented above relies on the interrelationship between different kinds of lexical information and the (Cherokee-particular) constraints upon those relationships. Grammatical relations in Cherokee were identified with positions in an ordered list of arguments within the lexical entries of verbs. No reference appears to be needed to truly syntactic information. In this section of the paper I will attempt to show how the analysis developed above relates to the behaviour of ditransitive verbs in Cherokee.

Ditransitive verbs in Cherokee exhibit a number of interesting properties with respect to agreement. In many languages, including English, such verbs often display two alternative syntactic patterns; one in which the a goal or benefactive argument is presented as a prepositional phrase and another in which the goal/benefactive (henceforth 'dative') argument is presented as a 'second object' of the verb. Typically, in this second case, the dative appears to assume the syntactic properties of the 'original' direct object. The rule by which this state of affairs comes about has been described as 'Dative Shift' in the transformational literature (e.g. Oehrle 1976) and as '3 -> 2 Advancement' (32A) in the RG literature (Blake 1990). Under these kinds of rules, the original direct object is demoted to some kind of marginal status where it no longer has the syntactic properties of a direct object. In RG terms it becomes a 'chomeur'.[19] In Cherokee, there is no alternation between two ditransitive structures. Ditransitive verbs obligatorily treat the dative argument as the object for core agreement purposes and cannot agree with the theme argument:

(25) Bàáb sv`v´kta ùu-hnèélv Èédi
Bob apple 3sB-give;C;**dat**;pst Edward
'Bob gave the apple to Edward'

(26) Bàáb sv`v´kta àak-ènèélv´v˝i
Bob apple 1sB-give;C;**dat**;pst
'Bob gave the apple to me'

(27) Bàáb wì-gv`v`y-àakáhnèélv´v˝i
Bob way-1s>2s-send;N;**dat**;pst
'I sent Bob to you'

Within RG, this state of affairs corresponds to the obligatory application of 32A in clauses headed by ditransitive verbs (typically marked in Cherokee by the presence of the dative suffix *-èél* on the verb (boldfaced in the examples above)). Such obligatory 32A has been motivated in a number of other languages.[20] Ditransitive benefactive verbforms are also (usually) marked with the same suffix:

(28) Nv`hgi ìígáa'i dèè-gv`v`y-òdáánèè'a
four quantity dis-1s>2s-build fire;**dat**;prs
'I'm building four fires for you'

(29) Jàtàági jìiy-àànìsdááne Èédi
chicken 1s>3san-cook;**dat**;prs Edward
'I'm cooking the chicken for Edward'

(30) Bàáb wì-gv`v`y-ànv´v˝èèlv´v˝i
Bob way-1s>2s-call;N;**dat**;past
'I called Bob for you'

If the analysis of core agreement on transitive verbs developed above is to be extended to deal with ditransitive verbs it will be necessary to simulate the RG analysis of obligatory 32A in order to explain the fact that such verbs agree with the dative argument rather than with the theme. The

[19]It should be noted however that analyses of 32A in RG have also been associated with a concomitant application of '2 -> 3 Retreat' (Blake 1990). In such cases, hypothesised for Kinyarwanda for example, the direct object does not become a chomeur but maintains a grammatical relation to the predicate (i.e. 3).

[20]Blake (1990: 6) cites Manam, Blackfoot, Mohawk, Tzotzil and Huichol as examples of languages with obligatory 32A. Rude 1982 claims that the same is true in Nez Perce.

alternative would be to develop a completely new set of constraints to account for ditransitive agreement which would nevertheless be identical to the transitive ones developed already except insofar as referencing the goal argument in place of the theme. Such a redundant analysis seems highly undesirable. On the other hand, there are reasons for thinking that the theme direct object may not be a chomeur. Firstly, there is the relationship between the theme argument and the distributive morpheme. As we saw in table 2, plural direct objects obligatorily trigger the appearance of the distributive prefix in certain parts of the transitive paradigm. In ditransitive clauses (as Scancarelli (1987: 223) notes), the theme still triggers the appearance of the distributive prefix even though it cannot trigger the appearance of core agreement prefixes (see also (28) above):

(31) Èédi gòòhwèèli dèè-gà-nv´v´ne Bàáb
Ed paper (book) dis-3sA-give;F;dat;prs Bob
'Edward is giving the books to Bob'

(32) Èédi gìihli dèè-gàà-káánèè'a àyóotli
Ed dog dis-3sA-give;N;dat;prs child
'Edward is giving the dogs to the child'

However, plural dative arguments also trigger the appearance of the distributive prefix, as one would expect if they are indeed objects:

(33) Èédi gìihli dèè-gàà-káánèè'a dìnì-yóotli
Ed dog dis-3sA-give;N;dat;pres p-child
'Edward is giving the dog to the children'

Thus, with respect to the marking of distributive morphology, Cherokee verbs appear to have two simultaneous objects. The treatment of the distributive morpheme is in general somewhat mysterious in Cherokee since it appears to have both inflectional and derivational uses (Scancarelli 1987: 216). But with respect to the obligatory inflectional uses of the prefix in the verbal paradigm it seems that both the theme and the goal must be treated as objects.

The second piece of data suggesting that themes in ditransitives are true arguments is an animacy-based restriction on the types of arguments that may be themes in ditransitive clauses. Cherokee does not allow first or second person themes when the verb also has a dative or benefactive argument. The examples given above in (25) - (33) with third person themes are all grammatical, but corresponding examples with first or second person themes are not. Attempts to elicit such examples led my consultants to restructure the subject matter of the target sentence in such a way as to avoid the use of a ditransitive with a first or second person theme. (34)a is a grammatical sentence with a third person theme but when the theme is switched to first or second person, my consultants omit the benefactive argument and the dative suffix, as in (34)b:

(34)a. Bàáb wì-gv`v`y-ànv´v"èè'i
Bob way-1s>2s-call;N;dat;prs
'I'm calling Bob for you'

b. Bàáb wì-chà-yánìì'a
Bob away-2sB-call;prs
'Bob is calling you' (for me) (no benefactive encoded)

In such cases the intended first person benefactive argument apparently must be understood inferentially. (35) illustrates a parallel case with a goal argument in which a free first person pronoun was suggested as a possible theme argument. Note that the well-formedness of examples like (35)a shows that the restriction is not simply one that requires themes to be inanimate or

nonhuman:

(35)a. Bàáb Èédi àagìì-káánèèlv`v`'i
Bob Ed 1sB-give;N;dat;pst
'Bob gave Edward to me'

(35)b. *Bàáb àya ùu-dàà-káánèèlv Èédi
Bob I 3sB-aca-give;N;dat;pst Ed
'Bob gave me to Edward'

If the theme were not selected as an argument of the verb (i.e. if it were not an element of the verb's SUBCAT list), it would be difficult to relate this animacy restriction to the previously stated Cherokee AH conditions, because these conditions were almost all stated in terms of relationships between files of indices and the SUBCAT list.

One other piece of data provides further evidence for the view that theme arguments in ditransitive clauses are in fact selected by the verb in some manner. Scancarelli (1987: 123) briefly discusses a process of quantifier float (QF) in which the plural universal quantifier *nìgáada* may be floated away from the noun phrase with which it is construed to attach to the left of the verb. (When unfloated, *nìgáada* precedes the nominal it modifies.) Scancarelli suggests that the process may be restricted to absolutives (i.e. transitive objects and intransitive subjects) but points out that the data is inconclusive. In my own attempts at elicitation, I have found that Mrs Carey accepts QF from transitive subjects and objects:

(36)a. Bàáb dìnì-yóotli nìgáada d-ùù-tàwèèdáánv`v"i
Bob p-child all dis-3sB-kiss;pst
'Bob kissed all the children'

b. Dìnì-yóotli nìgáada gv`v`wà-tàwèèdáánv Bàáb
p-child all 3p>3s-kiss;pst Bob
'All the children kissed Bob'

and from both goal and theme arguments of ditransitive verbs:

(37)a. Bàáb dìnì-yóotli nìgáada d-ùu-náànèèlv dì-gòòhwèèli
Bob p-child all dis-3sB-give;F;dat;pst p-book
'Bob gave all the children a book'

b. Bàáb gòòhwèèli nìgáada d-ùu-náànèèlv Mèéli
Bob book all dis-3sB-give;F;dat;pst Mary
'Bob gave Mary all the books'

(38)a. Bàáb àjìilv´vsgi nìgáada d-ùu-náànèèlv`v"i dìnì-yóotli
Bob flower all dis-3sB-give;F;dat;pst p-child
'Bob gave all the children a flower'

b. Bàáb ùnì-jìilv´vsgi nìgáada d-ùu-náànèèlv`v"i Mèéli
Bob p-flower all dis-3sB-give;F;dat;pst Mary
'Bob gave Mary all the flowers'

These data suggest that goal and theme objects may both be targetted by the rule of QF, along with subjects. But if theme objects in ditransitive clauses are 'demoted' from their usual grammatical function it is difficult to account for the fact that they behave like subjects and objects for the purposes of QF. It should be borne in mind however that examples involving

floated *nìgáada* were never freely volunteered (with the exception of (38)b) but had to be checked as possible alternatives to volunteered examples in which *nìgáada* was not floated. The data clearly require further investigation.[21]

I propose to treat the ditransitive data in the following manner. I will first provide a lexical rule that relates a transitive lexical entry to a ditransitive one and promotes the dative argument to object for the purposes of agreement. Secondly, I will discuss the status of the animacy restriction on theme arguments of ditransitive verbs and finally I will discuss the grammatical status of the theme argument demoted by the lexical rule with respect to distributive marking and QF.

Let us assume that the dative suffix *-èél* derives a lexical category in which a dative argument is represented as direct object. Since there is no 'underlying level' at which the dative is something other than an object, the analysis does not involve an advancement of the dative, unlike the RG 32A proposal. Nevertheless, the analysis shares with 32A the assumption that the dative is an object at surface. I will assume for the time being that the former direct object is demoted to 3 (i.e. third element on the SUBCAT list) and is thus still an argument of the verb. The lexical rule therefore adds an extra element to the SUBCAT list of a transitive verb that it attaches to and adds an extra semantic role to CONTENT:

(39) **Lexical Rule for Dative Suffix:**

CAT	HEAD	[VFORM .....]
	SUBCAT	$\langle NP_{[1]}, NP_{[2]} \rangle$
CNT	RELATION	ROLE [1], ROLE [2]

↓

CAT	HEAD	[VFORM ....dat;.....]
	SUBCAT	$\langle NP_{[1]}, NP_{[3]}, NP_{[2]} \rangle$
CNT	RELATION	ROLE [1], ROLE [2], FOR/TO [3]

Since the NP coindexed with the dative semantic role occupies the second position on the SUBCAT list, the constraints on agreement that apply to ordinary transitive objects will also apply to dative objects. The core agreement facts observed in ditransitive clauses are thus immediately derived.

Just as the agreement paradigms in Cherokee are heavily constrained by animacy

[21]The following data indicate that at least some derived arguments of causativized verbs must be grammatically distinguished from dative and theme objects of ditransitive verbs. Floated *nìgáada* can be construed with the derived theme of 'show' (literally 'make see') in (i) but not with the coerced argument (i.e. 'children') - a claim supported by the unacceptability of (ii) in which the theme is singular and so cannot possibly be construed with *nìgáada.*

(i) Bàáb ùnì-jǜlv´vsgi nìgáada d-ùu-gòòtv´h-dàn-v dìnì-yóotli
Bob p-flower all dis-3sB-see-cs-pst p-child
'Bob showed the children all the flowers'
*'Bob showed all the children the flowers'

(ii) *Bàáb àjǜlv´vsgi nìgáada d-ùu-gòòtv´h-dàn-v dìnì-yóotli
Bob flower all dis-3sB-see-cs-pst p-child
'Bob showed all the children the flower'

considerations, the lexical rule given in (39) can be motivated in similar terms. Goal and benefactive arguments almost always denote animate and typically human referents; indeed, the use of most ditransitives verbs entails or at least strongly implies that the dative argument is sentient. By contrast, theme arguments of ditransitive verbs usually denote inanimate objects and even when they do not, their referent displays none of the prototypical properties of a sentient individual. A rule like (39) can thus be seen as a grammaticalization of the prototypically greater animacy of the goal argument with respect to the theme. Crucially, this kind of conventionalized animacy restriction must be distinguished from the Cherokee AH discussed earlier because the dative lexical rule is not sensitive to the relative animacy of the arguments in a particular sentence. It simply applies obligatorily whether or not the AH would determine the goal to be more animate than the theme.

The constraint which blocks first and second person theme arguments with ditransitives can be stipulated straightforwardly as the following FCR (assuming that the demoted theme is treated as a 3):

(40) **FCR 5:** SUBCAT ⟨NP, NP, $NP_{[2]}$⟩ ⊃ [BGRD ....[2]..]

FCR 5 requires that any 3 must have a referent drawn from the set of background indices, thus ruling out the possibility that the theme would be first or second person. However, it is arguable that the effects of FCR 5 are independently derived as a consequence of the interaction of two constraints introduced earlier and need not be stated as an additional constraint. The condition described by this constraint can be seen as the result of competition between the theme and the dative for the grammatical role of object arising from the conflicting requirements imposed by the Cherokee AH and the dative lexical rule. Consider what happens if a Cherokee speaker wants to use a ditransitive verb with a first or second person theme. By the stipulated lexical rule in (39), the verb must agree with the dative if it outranks the subject on the Cherokee AH or if it otherwise qualifies as an agreement trigger according to the translation conditions given earlier that apply to the objects of transitive verbs. But TC 1, the translation condition given in (17), will demand that the verb agrees with the theme if it is a first or second person argument. Therefore the result in such cases is a conflict between (17) and (39) because only one argument can act as the trigger for core object agreement. The grammaticalized animacy requirements imposed by the dative lexical rule override the pragmatically determined requirements of the Cherokee AH, blocking the possibility of agreement between the theme and the verb. The speaker must restructure the information conveyed by such a sentence in order to resolve the conflict between the theme and the dative. There are at least two options available in such cases. As we saw in (34)b, the speaker may simply omit the dative argument and rely on the inferential abilities of the hearer in comprehending the intended proposition. A further example of this strategy is given in (41):

(41) Bàábi wì-ch-àyv´di jìiy-òosèèlv´v̂i
Bob way-2sB-call;inf 1s>3s-ask;dat;pst
'I asked Bob to call you' (for me) (no benefactive encoded)

Alternatively, with certain predicates like 'sell', which lacks a benefactive form in Cherokee (Scancarelli 1987: 105), the speaker may break down a proposition expressed by one ditransitive clause in English into two or more related transitive clauses, as in (42):

(42) Àagì-ndùúga. Nìhi sgè-wàhi
1sB-sell;pst you 2s>1s-buy;pst
'He sold me to you' (literally, 'He sold me. You bought me')

Finally, the speaker may employ some construction or other with a meaning closely related to the

English dative equivalent but in which there is no dative suffix and no true dative argument:

(43) Bàábi j-èèhv´v`'i wì-dà-gv´v`y-ààkv`hni
Bob rel-3s;live;pst way-fut-1s>2s-send;fut
'I will send you to Bob' (lit: 'I will send you to where Bob lives') (c.f. (27))

As we saw earlier, the theme argument of a ditransitive verb appears to retain object-like status with respect to the processes of quantifier float and the marking of distributive morphology. These data require some comment. The claim that any argument of a ditransitive verb triggers QF can be accounted for if we assume that the prefixation of *nìgáada* to the verb requires that at least one SUBCAT element has a plural referent. Under the analysis of ditransitives proposed here, according to which the demoted object is treated as a subcategorized element, this requirement can be tentatively implemented via an FCR that requires at least one plural argument on the SUBCAT list of a verb prefixed with *nìgáada* (I assume that some additional stipulation will be required to ensure that the quantifier is construed with the correct argument):

(44) [*nìgáada* + Verb] ⊃ SUBCAT ⟨... $NP_{[x:plural]}$ ...⟩

Any argument can satisfy this requirement whether it is a subject, object (dative or theme) or theme demoted to 3. If the demoted theme were not treated as subcategorized, some disjunctive condition would be required to describe the treatment of floated *nìgáada*, a condition which I believe it would be more difficult to state in a descriptively adequate way.

The appearance of distributive morphology on ditransitive verbs with plural themes is only a little more difficult to account for than the behaviour of floated *nìgáada*. One possible approach, given the lexical rule in (39), would be to assume that distributive morphology can be triggered by either a plural direct object or a plural demoted object (i.e. a 3). Putting aside the details of precisely which third person plural object NPs trigger distributive morphology (as table 2 shows, not quite all of them do), such a requirement can be roughly formalized as in (45):

(45) V [SUBCAT ⟨NP, ...NP[3pl], ...⟩] ⊃ V[+D]

This constraint requires that a verb must bear distributive morphology if any argument other than the subject is third person plural. Such an approach to the distributive leaves open the question of whether there are other predicate types (causatives, for example) that might also subcategorize for more than two arguments. I do not know at this stage whether true three argument causatives exist in Cherokee nor whether they behave in parallel fashion to ditransitives.[22]

4. Restrictions on Ditransitive Themes in Other Languages

Treating demoted themes as subcategorized arguments allows for a straightforward account of the grammatical properties of ditransitive verbs surveyed in section 3. One of those properties, the unacceptability of first or second person ditransitive themes, has been discussed by several linguists working in Relational Grammar and it is worth briefly comparing the treatment of this phenomenon proposed here with the ones proposed in the RG literature. Aissen (1987: 116-7) states the following condition on arguments demoted by passive and 32A in Tzotzil (Mayan):

(46) All chomeurs are third person

[22]But see footnote 21.

Since 32A is obligatory and since demoted themes are apparently chomeurs in Tzotzil (Aissen 1983), (46) has the effect of blocking ditransitive clauses with first or second person themes. Allen et al (1990: 330) state the condition in (47) as a constraint on clause structure in Southern Tiwa (Tanoan):

(47) The Participant Chomeur Ban: A relational network in which a first or second person nominal heads a chomeur arc is ill-formed.

Ditransitive clauses in Southern Tiwa that are derived by 32A are ruled out by (47) if they have a first or second person theme because themes are demoted to chomeur in such cases.[23]

There are two fundamental problems with the chomeur constraints stated in (46) and (47). Although they suffice to describe the fact that chomeurs in Tzotzil and Southern Tiwa may not be first or second person they fail to provide any motivation for the contrasting behaviour of those arguments as compared to third person ones. The grammatical framework provides no mechanism by which first and second person arguments form a natural class to the exclusion of third person arguments. The second problem with these constraints is that they stipulate conditions which may not need to be stipulated at all provided that discourse information can be mentioned in grammatical representations. The claim was put forward in section 3 that the nonexistence of first and second person ditransitive themes in Cherokee follows from the interaction of the Cherokee AH and the dative lexical rule, which corresponds to 32A within the RG framework. This analysis makes the prediction that any language with an animacy hierarchy similar to the one in Cherokee will lack first and second person ditransitive themes in structures derived by 32A. Although any conslusions are highly tentative at this stage, this prediction is largely borne out to the extent that I have been able to investigate it. Aissen (1987: 40) notes that first and second person arguments in Tzotzil "always determine number agreement *somewhere* [Aissen's emphasis; M.D.] in the sentence, while third person nominals do not". This datum is extremely reminiscent of the animacy based conditions on agreement in Cherokee noted earlier in this paper (i.e. TC 1). Taken together with the obligatory nature of 32A in Tzotzil, the restriction on ditransitive themes in this language appears to follow from essentially the same constraints as in Cherokee. Allen et al (1990) provide numerous examples and constraints indicating the pervasive influence of an animacy hierarchy on the determination of grammatical relations in Southern Tiwa.[24] In cases where 32A applies, the unacceptability of first and second person ditransitive themes will follow for the same reasons noted for Cherokee and Tzotzil.[25]

The impossibility of ditransitive themes is observed in other languages in which 32A is obligatory. Lichtenberk (1982: 265) notes that ditransitive verbs always index agreement with the goal argument rather than the theme in Manam (Austronesian). He also describes an animacy hierarchy in Manam governing transitivity and agreement marking that is strikingly similar to that found in Cherokee. It does not seem to be a coincidence therefore that Manam speakers "are rather uneasy if forms with non-3rd person patient objects are suggested to them" [i.e. in ditransitive clauses; M.D.] (Lichtenberk (1983: 166)). Comrie (1982: 109) also notes the unacceptability of first and second person ditransitive themes in Huichol (Uto-Aztecan). Huichol

[23]I do not address the issue here of whether constraints of this sort, including the one given for Cherokee in (40), should be stated in terms of chomeurhood or demotion or some other grammatical concept within the HPSG framework. The analysis of ditransitive themes in Cherokee as 3s could perhaps be replaced by a multistratal analysis in which they are treated as chomeurs, but developing such an analysis is not practical here for reasons of space.

[24]See Rosen 1990 for an account of Southern Tiwa agreement based on a mixed grammatical / pragmatic hierarchy that incorporates a personhood hierarchy of the kind proposed for Cherokee.

[25]Note that when 32A (which is not obligatory) does not apply in Southern Tiwa, first and second person themes are acceptable (Allen et al (1990: 333)).

has, in RG terms, obligatory 32A but I have been unable to find any reference to an animacy hierarchy in my Huïchol sources (Comrie 1982, Grimes 1964).[26]

It seems clear that a motivated account of the relationship between agreement and grammatical relations in Cherokee (as well as other languages) requires reference to contextual information that is not usually made available in generative frameworks. The animacy hierarchies which partially determine this relationship directly model the relative prominence of information in discourse situations. I hope to have shown that an HPSG account of such data goes some way towards accounting for these correlations between grammar and discourse.

[26]Pam Munro (p.c.) points out that there may be other languages which ban first and second person ditransitive themes even though they lack evidence of animacy hierarchies. If it turns out that such languages really do lack animacy hierarchies it may be necessary to employ stipulations of the kind discussed here after all. Perhaps such cases can be motivated in diachronic terms if it can be shown that related languages still have 'active' animacy hierarchies.

Cherokee Possession and the Status of *-jeeli*[1]

Robert S. Williams

1. Introduction

This paper examines the system of possession marking in Cherokee, an Iroquoian language spoken mainly in Oklahoma and North Carolina, and focuses in particular on certain syntactic properties of *-jeeli*, the Cherokee lexical possessive marker. Possession is expressed in Cherokee using both lexical items and morphosyntactic devices.

Cherokee, as is the case with many other American Indian languages, often indicates possession by prefixing a possessive marker to the possessed noun. The Cherokee system uses two sets of markers to indicate person and number agreement with the possessor which are allomorphs of pronominal agreement markers. These are identical to the two sets of pronominal agreement markers, discussed in detail elsewhere in this volume, which are prefixed to intransitive verb stems and are referred to here and elsewhere in the literature as A and B markers.[2] Examples of A and B possession constructions are as follows:

(1) jii-nhgo
1sA-tongue
'my tongue'

(2) ag-sgwoohli
1sB-stomach
'my stomach'

Where possession is not marked by affixation, it is indicated by a separate word, *-jeeli*, which is always prefixed with one of a set of agreement markers similar, but not identical to, B markers.

(3) Goohweeli digoolieedi eegwa agwa-jeeli
paper reading large 1sJ-pss
'My book is large'

(4) Goohweeli digoolieedi eegwa iijaa-jeeli
paper reading large 2pl-pss
'Our (plural) book is large'

I refer to such markers as J markers since they only occur when prefixed to *-jeeli*.

(5) *J + jeeli*

1s	agwa-jeeli	2s	ja-jeeli
1din	giin-jeeli	2dl	sda-jeeli
1dex	oogiin-jeeli	2pl	iijii-jeeli
1pin	iigii-jeeli	3s	uu-jeeli
1pex	oogii-jeeli	3ns	uunii-jeeli

[1]I am very much indebted to Mrs. Virginia Carey, who is my Cherokee teacher and who provided all of the original data used in this paper. Thanks are also due to Professor Pamela Munro and all of my fellow students in the 1994 UCLA Field Methods class, as well as to Cynthia Walker and Karn King for their thoughtful comments.
[2]For a more detailed account of the pronominal agreement system, see Dukes (this volume).

J markers are identical to B markers in all but three forms. Both first person dual forms lack the final /-ii/ found in their B marker counterparts, while the second person dual form ends in /-a/ rather than the /-ii/ of its B counterpart.

2. Specification of Agreement Marker Class

The most important factor in determining which agreement marker class a particular noun will take is alienability. With few exceptions, nouns which are considered as alienable from their possessors take *J+jeeli*, as in the following examples:

(6) giihli gin-jeeli
dog 1dinJ-pss
'our dog'

(7) kwvvna agwa-jeeli
peach 1sBA-jeeli
'my peach'

With the exception of kinship terms, the specification of possession marker type for inalienable nouns is specified for either A or B markers, lexically, rather than semantically. This can be seen in the arbitrariness of possession marking for the following nouns.

(8)

Nouns taking A markers		Nouns taking B markers	
tongue	*gaanhgo*	hand	*uuwooyeeni*
leg	*gaanvvsgeeni*	hair	*uusdiihgv*
head	*aasgooli*	lip	*uuhaaneega'lv'i*
arm	*gaanoogeeni*	stomach	*uusgwoohli*
tooth	*ganhdohgv'i*	foot	*uulasdeeni*
eye	*agda*	heart	*uudanhdo*
nose	*gaayvvsooli*	shoes	*uulaasuulo*
mouth	*aahooli*	friend	*uunaali'i*
ear	*ga'leeni*	girlfriend/boy friend	*uunaligdi*
arm	*gaanoogeeni*	husband	*uhyeehi*
finger	*gaayeesa'dv'i*	wife	*uudaali'i/*
toe	*gaanaasa'dv'i*		*uusdaayvvhvvsgi*
pants	*aasuulo*	dress	*uusaano*
sock	*aaliiyo*	shirt	*uuhnawo*
husband	*aaniineeli*		

All body parts and clothing terms must appear with agreement marking, even when they are not possessed. Previous studies suggest different two-way oppositions for agreement marking showing possession of clothing, which includes clothing not possessed, clothing possessed but not being worn, and clothing being worn. For example, the Cherokee word for 'shirt' *ahnawo* includes the 3sA marker *-a*. Scancarelli (1987:290) states that for certain articles of clothing, like 'shirt', the A prefix is used when the article is not possessed and the B prefix is used for a possessed article.

(9) a-hnawo
3sA-shirt
'shirt'

(10) uu-hnawo
3sB-shirt
'his/her shirt'

According to Holmes and Smith (1977), articles of clothing which are being worn are treated as inalienables and thus are marked for possession with either A or B prefixes. When they are not being worn, they take *J+jeeli*.

(11) agwa-hnawo
3sB-shirt
'my shirt (the one I'm wearing)'

(12) agwa-jeeli uu-hnawo
1sB-jeeli 3sB-shirt
'my shirt (the one I'm not wearing)'

Holmes and Smith also state that body parts, which are normally considered to be inalienable, take *+jeeli* when they are detached from the body, though the noun must still be marked with a possessive marker.

(13) ja-jeeli ga-nvvsgeeni
2sB-jeeli 3sA-leg
'your (severed) leg'

For my consultant, Mrs. Virginia Carey, however, marking body parts with *J+jeeli*, be they attached or not, is unacceptable.

Kinship terms are the only class of inalienables which appear to be semantically specified for possessive marker type, always taking B markers. They can never occur without possessive markers.

(14) oogii-do
1pexB-sister
'our sister'

(15) j-uu-duuji
pl-3sB-uncle
'his uncles'

3. Possessor Raising

Cherokee appears to have possessor raising, a syntactic process which makes the possessor, rather than the possessed NP, a central argument of the clause. In the case of Cherokee, possessor raising is indicated by verbal agreement with the possessor instead of the possessed NP. In examples (16) and (17) the possessor is raised; in (18) and (19) it is not.

(16) Hi-nvvsgeen ja-sdaane-'a.
2sA-leg 2sB-hurt-prs
'Your leg is hurting'

(17) Jii-nhgo ji-leeyvvh-i.
1sA-tongue 1sA-burn-prf
'I burned my tongue'

(18) Vvgee-do uu-dlaagaa'i.
1sB-sister 3sB-sick
'My sister is sick'

(19) Jii-nvvsgeen uu-jsgweeda.
1sA-leg 3sB-bend
'My leg is bent'

Note that the verbal agreement marking must agree only in person and number with the possessor and not in agreement marker class, as in example (16). As stated previously, the assignment either A or B possession marker class is arbitrary for all inalienables except kinship terms and the assignment of either A or B verbal agreement depends upon factors independent of possession markers.[3]

Though possessor raising is optional in other American Indian languages, such as Choctaw and Chickasaw, it is never so in Cherokee. Possessor raising appears to occur only with body parts and seems to be regulated by the semantic class of the verb. According to the data gathered in this study, possessor raising is obligatory with a subclass of verbs of physical sensation, as in (16) and (17) and in the following examples.

(20) a. Agwa-laasihdeen agi-joode.
1sB-foot 1sB-itch

b. *agwa-laasihdeen a-joode
1sB-foot 3sB-itch
'My foot itches'

Example (20b) shows the nonoptionality of possessor raising. In all other cases with body parts as subjects, including verbs of temperature, possessor raising is prohibited.

(21) a. Agwa-laasihdeen uu-dihleega.
1sB-foot 3sB-be hot

b *agwa-laasihdeen agwa-dihleega
1sB-foot 1sB-be hot
'My foot is hot'

(22) a. Agwa-laasihdeen uu-hyvvdla.
1sB-foot 3sB-be cold

b. *agwa-laasihdeen agwa-hyvvdla
1sB-foot 1sB-be cold
'My foot is cold'

(23) a. Ag-sdiihgv uu-dlisgwaaneeda.
1sB-hair 3sB-be curly

b. *ag-sdiihgv agwa-dlisgwaaneeda
1sB-hair 1sB-be curly
'My hair is curly'

[3]See Scancarelli (1987: 65-70) for a description of assignment of verbal agreement class.

(24) a. Jii-nvvsgeen ga-liijoohiida.
1sA-leg 3sA-be fat

b. *jii-nvvsgeen jii-liijoohiida
1sA-leg 1sA-be fat
'My leg is fat'

In one instance Mrs. Carey accepted both raised and non-raised versions of a possessed sentence but noted aspectual difference between the two. A raised possessor with the verb *wotiisa* 'to swell' (25), denotes progressive aspect for Mrs. Carey and an unraised possessor (26) perfective aspect.

(25) Jii-noogeeni uu-wotiisa.
1sA-arm 3sB-swell
'My arm is swollen'

(26) Jii-noogeeni ag-wotiisa.
1sA-arm 1sB-swell
'My arm is swelling'

No other such instnaces of possessor raising carrying aspectual or any other grammatical information were found in the data.

5. Possession, Word Order, and the Status of *B+jeeli*

There are many constraints on word order in Cherokee, though word order within the NP is relatively free and preposing of objects is allowed, making both SOV and OSV word orders possible. Within both possessive and non-possessive NPs, the only word order constraint, noted in data from Nhlanhla Thwala, is that if a quantifier is present, it must preceed all other NP constituents. Post-quantifier order within the NP appears to be completely free.

(27) Maayg tahli juutan diigiige aadamobil duuhwa'hi.
Mike two big red car buy
'Mike bought two big red cars'

Maayg tahli juutan aadamobil diigiige duuhwa'hi.
Maayg tahli diigiige juutan aadamobil duuhwa'hi.
Maayg tahli diigiige aadamobil juutan duuhwa'hi.
Maayg tahli aadamobil juutan diigiige duuhwa'hi.
Maayg tahli aadamobil diigiige juutan duuhwa'hi.

(28) Tahli di-gwa-jeeli anigvvhnvvge giihli duuna-lihwooja'i.
two dist-1sB-pss pl;black dog du-die
'My two black dogs died'

Tahli digwajeeli giihli anigvvhnvvge duunalihwooja'i.
Tahli anigvvhnvvge digwajeeli giihli duunalihwooja'i.
Tahli anigvvhnvvge giihli digwajeeli duunalihwooja'i.
Tahli giihli anigvvhnvvge digwajeeli duunalihwooja'i.
Tahli giihli digwajeeli anigvvhnvvge duunalihwooja'i.

Pulte and Feeling (1975: 352) state that *-jeeli* can either precede or follow the possessed

noun. Mrs. Carey agrees with this but usually places *-jeeli* after the possessed noun when asked to translate a possessive structure into Cherokee. In instances such as (29) where *J+jeeli* is predicative, and for intransitive and transitive sentences with only one overt NP, such as (30), (31), and (32), Mrs. Carey accepts all possible word orders, even those involving split constituents.

(29) Eegwa gvvhnvge giihli agwa-jeeli.
huge black dog 1sA-pss
'The huge black dog is mine'

Eegwa gvvhnvge agwajeeli giihli.
Eegwa giihli gvvhnvge agwajeeli.
Eegwa giihli agwajeeli gvvhnvge.
Eegwa agwajeeli gvvhnvge giihli.
Eegwa agwajeeli giihli gvvhnvge.
Gvvhnvge eegwa giihli agwajeeli.
Gvvhnvge eegwa agwajeeli giihli.
Gvvhnvge giihli eegwa agwajeeli.
Gvvhnvge giihli agwajeeli eegwa.
Gvvhnvge agwajeeli giihli eegwa.
Gvvhnvge agwajeeli eegwa giihli.
Giihli gvvhnvge eegwa agwajeeli.
Giihli gvvhnvge agwajeeli eegwa.
Giihli eegwa gvvhnvge agwajeeli.
Giihli eegwa agwajeeli gvvhnvge.
Giihli agwajeeli eegwa gvvhnvge.
Giihli agwajeeli gvvhnge eegwa.
Agwajeeli eegwa gvvhnvge giihli.
Agwajeeli eegwa giihli gvvhnvge.
Agwajeeli gvvhnvge giihli eegwa.
Agwajeeli gvvhnvge eegwa giihli.
Agwajeeli giihli gvvhnvge eegwa.
Agwajeeli giihli eegwa gvvhnvge.

(30) Giihli agwa-jeeli uu-dlaaga.
dog 1sB-pss 3sB-be sick:prs
'My dog is sick'

Giihli uudlaaga agwajeeli.
Agwajeeli giihli uudlaaga.
Agwajeeli uudlaaga giihli.
Uudlaaga giihli agwajeeli.
Uudlaaga agwajeeli giihli.

(31) Goohweeli agwa-jeeli agi-yohuusi
paper 1sB-pss 1sB-loose:prf
'I lost my paper'

Goohweeli agiyohuusi agwajeeli.
Agwajeeli goohweeli agiyohuusi.
Agwajeeli agiyohuusi goohweeli.
Agiyohuusi goohweeli agwajeeli.
Agiyohuusi agwajeeli goohweeli.

(32) Giihli ja-jeeli uu-sgaala
dog 2sB-pss 3s>3san-bite:prf
'Your dog bit him'

Giihli uusgaala jajeeli.
Jajeeli uusgaala giihli.
Jajeeli giihli uusgaala.
Uusgaala jajeeli giihli.
Uusgaala giihli jajeeli.

However, when a sentence with two overt arguments contains a possessed NP as either a subject or object, discontinuous constituents are not allowed. This is because word orders resulting in an NP intervening between *-jeeli* and the possessed noun appear to interrupt the anaphoric relationship between the two.

(33) Agwa-jeeli giihli uu-sgaala Peemi
1sB-pss dog 3sB-bite Pam
'My dog bit Pam'

*Agwajeeli uusgaala Peemi giihli.
*Giihli uusgaala Peemi agwa-jeeli.
*Peemi giihli agwajeeli uusgaala.

Partly because of Cherokee's relatively free word order within the possessed NP, the grammatical status of *-jeeli* is problematic. Scancarelli (1987: 289) glosses *-jeeli* as a 'possessive' but does not speculate as to its grammatical status. Pulte and Feeling (1975: 328-29) cite *-jeeli'i* as the stem of this word and state that it is a possessive pronoun which also functions as an adjective, as in their examples (43) and (45),[4] reproduced here as (34) and (35).

(34) ayv agwa-jeli'i osda
I mine good
'Mine is good'

(35) dagwalela ja-jeli'i gigage'i
car yours red
'Your car is red'

That *J+jeeli* functions like a possessive pronoun is clear, though there is no other empty pronominal form which inflects for person and number. The fact that *-jeeli* inflects for person and number does make it similar to an adjective. It is also a fact that *J+jeeli* can in certain circumstances function as a predicate, but that it might actually be a verb of some kind is problematic, since it is unable, like other verbs, to inflect for aspect and mode. For example, *J+jeeli* can only be used as a predicate in the present aspect, as in the following example:

(36) Agwa-jeeli.
1sB-pss
'It is mine'

In expressing other temporal aspects, such as perfective or future, a verb must also be used, indicating that perhaps *-jeeli* is a noun or an adjective.

[4]Underlined vowels correspond to underdots in Pulte and Feeling and represent short syllable-final vowels.

(37) Uulsdana agwa-jeeli.
be:prf 1sB-pss
'It was mine'

(38) Agwa-jeeli geesesti.
1sB-pss be:fut
'It will be mine'

6. Conclusion

In Cherokee, possession is indicated either by affixation of one of two sets of possessive agreement markers (A and B markers) to the possessed NP or by use of the possessive word *-jeeli*, which is prefixed with a set of markers similar possessive agreement markers. What type of agreement marker a particular noun takes is generally determined by alienability, with inalienable nouns taking affixed marking and alienable nouns *-jeeli*. With the exception of kinship terms, which take B marking, inalienable nouns are specified for either A or B marking lexically.

Cherokee also has possessor raising, which occurs only with body parts and is specified by the class of the verb. Possessor raising is obligatory for a subclass of verbs of physical sensation and prohibited for all other verbs. While possessor raising confers argument status on the possessor NP, it is not clear whether subjecthood is also conferred.

Word order within possessive NPs is constrained only in that quantifiers must precede all other NP constituents, a constraint which also holds for non-possessive NPs. However, discontinuous possessive NPs are allowed only in single argument clauses. Though both SOV and OSV word orders are allowed, Mrs. Carey did not readily accept postposing of the subject in two argument clauses, either in the immediate post-verbal or end positions.

Cherokee Clause Structure

Filippo Beghelli

1. Introduction

Cherokee syntax is largely unexplored territory. Cook (1979)—which focuses of the North Carolina dialect—and Pulte and Feeling's (1975) brief grammar contain articulated descriptive sketches. More recently, Scancarelli (1987) offers in-depth analyses of a number of phenomena, especially inverse constructions and pronominal agreement. Yet some of the basic issues in clause structure remain to this day unaddressed in the literature.

This paper is an attempt at addressing some of these issues.[1] In particular, the status and position of argument NPs will be discussed. Of special relevance in this respect is the work of Mark Baker on a related language, Mohawk (cf. Baker 1992, 1993). The conclusion that will be reached is that Baker's account of Mohawk non-configurationality seems largely applicable to Cherokee.

Given that our current knowledge of Cherokee syntax is generally quite poor, and—especially—given the very limited data at my disposal (all the data come essentially from one native speaker),[2] the claims in this paper should be taken as tentative, pending verification with further data, and rather than conclusive, as suggestive of relevant areas for future research.

2. Lack of Asymmetries between Subjects and Objects

Cherokee appears to be a non-configurational language, characterized by a free word order at the clausal level. Although there seems to be a preference for the copula to follow predicate nominals, in a simple sentence containing only subject and object NPs and the verb, all word orders are attested.[3] Scancarelli (1987:168ff) suggests that word order is essentially determined by discourse functions such as newsworthiness and topic, and that "word order in Cherokee is determined by pragmatic rather than syntactic factors" (Scancarelli 1987:119).

The issue, then, is how the syntactic structure of Cherokee allows for such freedom. This is all the more significant considering that the usual constituency tests which show that in languages like English the subject asymmetrically c-commands the object, do not seem to yield comparable results in Cherokee. A syntactic definition of 'subject' seems elusive. Scancarelli admits to not knowing of any subject properties in Cherokee.

Let's consider this point in greater detail. There is evidence that in Cherokee subjects and

[1] The original version of this paper contained a section on Cherokee pronominal agreement. This part has been omitted in the present version. I wish to thank Pamela Munro for helpful discussion of a number of issues of relevance to this paper. All errors are of course my own.

[2] My Cherokee consultant for this paper has been Mrs. Virginia Carey, a native Cherokee speaker from Tahlequah, Oklahoma. I am very grateful to Mrs. Carey for her patience and for sharing with me her insights on her language.

[3] In fact, a number of word order restrictions exist in Cherokee within phrasal constituents, as pointed out by Scancarelli herself. Observations like the following suggest a head-final propensity:

1. Only postpositions (and not prepositions) exist;
2. Adverbial modifiers must precede adjectives they apply to;
3. Inflection (Infl) is suffixal: tense and aspect, as well as causatives, are suffixes;
4. It is far more common for adjectives to precede, rather than follow, nominals; it is also more common for genitives to precede nominals.

objects c-command each other. This evidence is provided by Scancarelli's observation that WEAK CROSS-OVER (WCO) effects are absent in this language.

As first observed by Reinhart (1976), for a pronominal to acquire a bound reading, it must be c-commanded by the thematic position of its binder (a quantified NP or a Wh-operator). Yet in Cherokee a bound reading is possible even when the thematic position of the binder is the object position, and the pronominal is in subject position. Consider (1) below: speakers can interpret the pronominal as being part of the subject NP, and the thematic position of the Wh-element to be the object. Alternatively, they can interpret the pronominal to be inside the object, and the Wh-element to fill the role of subject.

In English, on the contrary, a bound reading is possible only with *Who loves his mother.* A sentence like *Who does his mother love* does not have a bound variable reading (unless focus is applied to *his mother*), and the pronominal must be interpreted as referring to a unique third person previously introduced in the context. Example (1) indicates, then, that subject and object position mutually c-command each other in Cherokee.

(1) Gaago uu-ji'i a-nhdadi'a?
who 3sB-mother 3sA-remember:prs
OK 'For what x, does x's mother remember x?'
OK 'For what x, does x remember x's mother?'

The next examples (2-3) show similar effects with Quantifier Phrases (the examples illustrate both verbs marked with set A prefixes and verbs marked with set B prefixes—cf. Part II). These data offer a less compelling argument, however, since it is not clear whether we have true bound variable readings. Bound pronouns are typically singular; and Cherokee does not seem to have a universal quantifier comparable to English *every*, which binds a singular pronoun. The universal quantifier in Cherokee rather resembles English *all,* a determiner that supports collective as well as distributive readings, and which shows less pronounced WCO effects (if at all).

(2) J-uu-niiji d-anii-nhdadi'a niigaada dii-nii-yoohli
dis-3sB-mother dis-3pA-remember:perf all dis-p-child
OK 'All the children remember their mothers'
OK 'Their mothers remember all the children'

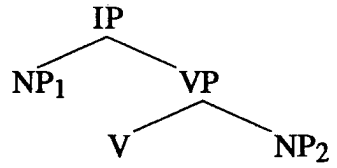
(3) J-uunii-ji j-uunii-lvvkwdi niigaada dii-nii-yoohli
dis-3pB-mothers dis-3pB-like:perf all dis-p-child
OK 'All the children like their mothers'
OK 'Their mothers like all the children'

The lack of WCO effects in sentences like (1) offers the strongest argument for the claim that subjects and objects symmetrically c-command each other in Cherokee. Another reliable test can be provided by negative polarity licensing: the licensor of a negative polarity item must c-command the polarity item. Unfortunately, this test does not seem to be available, as I haven't been able to find negative polarity NPs in this language.[4]

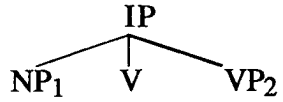
[4]Another test of c-command may be provided by quantifier scope construals. This test is, however, less significant owing to the subtlety of judgments involved. Cross-linguistically, it is generally the case that if a quantifier phrase Q_1 c-commands a quantifier phrase Q_2, then Q takes scope over Q_2 (subject QPs generally can be construed as wide scope over object QPs). The inverse configuration, when Q_2 takes scope over Q_1 even though Q_1 a-symmetrically c-commands Q_2, is not always available cross-linguistically. When inverse scope is possible,. however, as it is in Germanic and Romance, it is only selectively available with certain quantifier types (cf. Liu 1990, Beghelli 1993, Ben-Shalom 1993). Indefinites like 'some' in object position may take scope over a c-commanding quantified subject, but other indefinites, like 'no', 'few', etc. cannot. The examples below illustrate:

Scancarelli's conclusion is that Cherokee has a 'flat' clausal structure. For her (1987:122), the clausal structure of Cherokee would look like (4b), instead of (4a), the commonly assumed clausal structure of English:

(4) a.



b.



As suggested by Jelinek (1984) and Baker (1992), this conclusion is not inescapable. Lack of asymmetrical c-command between subjects and objects does not in principle exclude the possibility that there may be a VP constituent.

3. VP Constituency Tests

There is in fact no clear evidence for the lack of a VP constituent. Evidence against a VP node appears inconclusive. VP pronominalization and deletion in Cherokee are at present too poorly understood to provide data crucial to the issue. The same can be said about position of adverbs: Scancarelli's observation that adverbs may be placed either between subject and verb or between object and verb (ibid.:121-2) does not offer a strong argument for the lack of a VP constituent.

Arguments for the opposite claim, that VP exists, seem more cogent. Noun incorporation is a well-known characteristic of Iroquoian languages, and is present in Cherokee as well, though to a much more limited extent than for example in Mohawk. As related by Scancarelli (1987:38) it involves only body parts and items of personal clothing. The existence of object incorporation, but significantly, not of subject incorporation, suggests that objects have structurally a closer relationship with verbs than subjects do, consistently with the hypothesis that there exist a VP constituent including the verb and its complement(s). An example of object incorporation is the following (curiously complex) verb form, provided by Scancarelli (1987:36):

(i) Every man loves a woman
OK 'For every man x, there is a (possibly different) woman that x loves'
OK 'There is a woman y, such that every man loves y'

(ii) Every boy climbed few trees
OK 'For every boy x, there is a (possibly different) set of trees, few in number, that x climbed'
* 'There are few x's, x a tree, such that every boy climbed x'

If subjects and objects c-command each other in Cherokee, one would expect a sentence like "all the boys kissed few girls" to mean both 'all the boys (each) kissed (possibly different) groups of few girls' and 'few girls are such that each was kissed by all the boys'. This seems in fact to be the case:

(iii)

Anii-chuuja	nigaada	gaayoohli	anii-geehyuuja	d-aan-dawedohvsga
3p-boy	all	few	3p-girl	dis-3pA-kiss:prs

OK 'All the boys kiss few girls'
OK 'Few girls are kissed by all the boys'

(5) yi-w-agw-adaa-**sk**-gwaloo-sd-a'n-ido-'li
irr-transl-1sB-rfl-**head**-bump-cs-ambul-prf
'if I go about bumping my head at a distant place'

Another example of incorporation, where again the incorporated argument cannot be a subject, comes from reflexivization. Reflexive predication is realized, at the clausal level, by an affix (*-aadaad-*) on the verb; the presence of a *self*-pronominal is apparently optional. As pointed out by N. Thwala (p.c.), the reflexive affix cannot be a subject, since it cannot occur whenever an overt object of the verb is present. In addition, the affix *-aadaad-* is used to mark a covert animate direct object in nominals. Altogether, these observations indicate that the affix *-aadaad-* is an incorporated object pronominal. The following data (collected by B. Potter) illustrates:

(6) a. h-vvhniha
2sA-hit:prs
'you are hitting it'

b. h-aadaad-vvhniha
2sA-rfl-hit:prs
'you are hitting yourself'

(7) a. wahya dii-hiih-i
coyote dis-kill-nom
'coyote killer'

b. aadaa-hiih-i
aca-kill-nom
'poison' or 'killer'

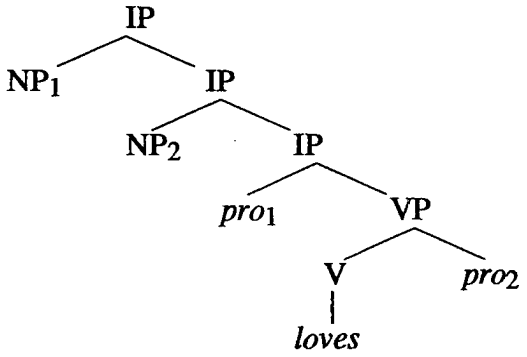
Since subjects and objects can be freely ordered with respect to each other, the lack of subject incorporation would be quite surprising if Cherokee's clause structure were indeed a 'flat' one, as in (4b). If data from incorporation are consistent with the hypothesis of a VP constituent, these don't provide a strong argument, as it could be claimed that incorporation facts have really a morphosyntactic and not strictly syntactic nature. In the next sections, facts of the kind discussed in Baker (1992) will be considered. These data provide stronger syntactic evidence for a VP constituent, and suggest the hypothesis that Cherokee is, at an abstract level, closer to the basic clause structure of English than suggested by the flat structure hypothesis.

4. A Constituent Structure Paradox and a Possible Solution

Before reviewing other evidence for VP, we need to consider the obvious question: If a VP constituent does exist in Cherokee, how can we have symmetrical c-command between overt subject and object NPs? The apparent paradox is solved by assuming that these overt NPs are not the actual arguments of the verb, but occur in adjunct positions. This is a solution along the lines of Jelinek (1994), who extends this treatment to 'pronominal argument' languages. As we shall see later, this profile seems to fit Cherokee quite well. Baker (1992), who follows the spirit of Jelinek's proposal, argues that in Mohawk the basic clause structure has the same hierarchical organization as in English, except that the actual arguments of the V are pronominals, with which the overt NPs (in adjunct positions) are co-indexed.

The underlying structure of a simple transitive sentence like 'John loves Mary' in Cherokee would, then, be paraphrasable as 'John, Mary, he loves her'. The tree diagram below illustrates this:

(8)



In this and the next section, I will argue that this proposal is consistent with Cherokee data. I will assume, accordingly, that in Cherokee the following condition holds, as proposed in Baker 1992 for Mohawk; Baker assumes that it holds at S-Structure:

(9) **Licensing of Overt NPs**
A phrase in an adjoined position is licensed if it c-commands a coreferent NP in an argument position.

This clause structure account is consistent with the data reviewed so far: in fact it suggests some explanation for the facts that we have observed, as well for other features of Cherokee grammar: [5]

1. (Relatively) free word-order: adjuncts vary in their surface position;
2. Omission of overt subject and object pronouns: overt pronouns are unnecessary, if silent pronominals are present;
3. Lack of non-thematic, i.e., pleonastic arguments. Cherokee does not display constructions that include expletive subjects, like English Existential-There contexts and Raising constructions. Expletive arguments are unnecessary when silent pronominals typically occupy argument positions.

The account is also consistent with data on pronominalization presented by Scancarelli as evidence for non-configurationality. She observes (1987:122) that in sentences like the following:

(10) Jaani uu-waahnilv Meeli hale uu-hloohyilvv'i [Scancarelli's (10)]
John 3sB-hit:prf Mary and 3sB-cry:prf
'John hit Mary and he/she cried'

the verb of the second conjunct can be understood as having either John or Mary as its subject. This contrasts with pro-drop languages like Italian, where sentences similar to the one above are obtained by VP conjunction; this forces the subject of the first verb to be the same as that of the second:

(11) Gianni colpì Maria e pianse
Gianni hit Mary and cried
'John hit Mary and he (*she) cried'

If the arguments of the verb are pronominals, the Cherokee sentence in (10) above is not an example of VP conjunction, but of clausal conjunction, and the subject ambiguity derives simply from the fact that gender is not marked on the verb (*uuhloohyilvv'i*).

[5]I am grateful to Pamela Munro for discussion of these points.

5. *Wh*-Movement and the Status of Clausal Complements

Baker's proposal is that overt NPs that are thematically arguments are, syntactically, in A'-positions. This is a strong claim. Fortunately, it is possible to check this prediction, since Cherokee appears to have *Wh*-movement.

Evidence for *Wh*-movement in Cherokee comes first from examples like the following, where the *wh*-word is extracted out of a complement clause and placed in sentence-initial position:[6]

(12) Gaagwu h-eeli'a uu-tahweedoohne Meeli?
. who 2sA-think:prs 3sB-kiss:prf Mary
'Who do you think that Mary kissed?'

(13) Gaagwu h-eeli'a hla Meeli y-uu-lvvkwdi
who 2sA-think:prs neg Mary irr-3sB-like:prf
'Who do you think that Mary didn't like?'

Next, Cherokee shows the familiar distinction between *Wh*-extraction from complement clauses, which is fine as we just saw, and extraction from adjunct clauses, which is typically deviant (by Subjacency). For example, the following extractions are unacceptable:

(14) a. * gaagwu n-uu-yoohuusvv'i ja-dloohylvv'i[7]
who after-3sB-die:prf 2sB-cry:prf

b. * gaagwu uu-yoohuusv ja-dloohylvv'i[8]
who 3sB-die:prf 2sB-cry:prf
'who did you cry after (s)he died?'

(15) * gaagwu hi-dloohyihoo'i y-uu-wooniisa[9]
who 2sA-cry:hab when-3sB-speak
'who do you always cry when (s)he speaks?'

Extraction out of relative clauses is also ungrammatical:

(16) a. * gagwu ji-j-vvhnilvv'i uu-tadlawoosvv'i
who rel-2sB-kill:prf 3sB-anger:prf
'who that hit you made you mad?'

b. * gadouusdi giihli hiiluuga j-uu-noosgisv?
what dog 2sB-kill:prf rel-3sB-steal:prf
'what did you kill the dog that stole __?'

It could be objected, at this point, that the above examples, despite the distinction between complement/adjunct clauses, do not really involve *wh*-movement, but result from the widespread topicalization processes that operate in Cherokee (and are perhaps in part responsible for the free

[6]As observed by Scancarelli, Wh-words are typically placed in sentence initial position or immediately following a topicalized argument.

[7]For 'after' clauses, cf. Feeling and Pulte (1975:351)

[8]The a. and b. sentences are apparently variants of each other in Mrs. Carey's speech.

[9]For 'when' clauses, cf. Feeling and Pulte (1975:351)

word order). In other words, it could be argued that in (12-13) the *wh*-word is placed in sentence-initial position simply because of its discourse-prominence. Of course, the 'topicalization' theory will also have to explain why (14, 15, 16) are bad, if *wh*-movement is not involved. It is possible, however, to provide evidence that topicalization is not involved in (12-13).

Topicalization (which does not involve extraction) and *wh*-movement can be distringuished because they obey different restrictions. A minimal pair like the following indicates that (14, 15, 16) are—very likely—bad because they feature impossible extractions. (17a), which is similar to (14b) except for the negation in the matrix clause, is ungrammatical, but (17b), with no fronted *wh*-element, is much better. Negation has been inserted in (17a,b) to insure that the sentence-initial word is outside of the embedded clause: negation in Cherokee seems to act as a boundary to free re-ordering within the sentence (B. Potter, p.c.).

(17) a. * gagwu hla i-ja-dloohylvv'i uu-yoohuusv
who neg irr-2sB-cry:prf 3sB-die:prf
'who didn't you cry after (s)he died?'

b. Meeli hla i-ja-dloohylvv'i uu-yoohuusv
Mary neg irr-2sB-cry:prf 3sB-die:prf
'(As for) Mary, you didn't cry after she died'

Another minimal pair is given: (16b), a degraded sentence featuring extraction out of a relative clause, contrasts in acceptability with (18):

(18) Hawiiya giihli j-uu-noosgisv hiiluuga
meat dog rel-3sB-steal:prf 2sB-kill:prf
'(As for) the meat, you killed the dog that stole it'

Assuming, as the above data seems to indicate, that Cherokee has a syntactic process comparable to *Wh*-extraction in English, we are faced with a seeming contradiction: since there is a difference between extraction out of complement clauses and adjunct clauses, these must be distinguished structurally—recall that we have assumed that lexically realized verbal complements are really adjuncts. The most plausible conclusion, as suggested by Baker (1992), is that adjunct status must be limited to nominal arguments: clausal arguments will not be adjuncts, but sit in true argument positions.

I will henceforth assume that clausal arguments are in A-positions at D-Structure. This follows Baker's (1992) account of Mohawk: nominal arguments are in A'-positions, but clausal arguements are in A-positions.

One further issue needs to be considered, as pointed out by Baker. Assuming (with Jelinek and Baker) that lexical arguments are adjuncts does not force the conclusion that extraction of thematic arguments is actually extraction of adjuncts. Baker assumes that the licensing condition in (9) strictly holds only of overt NPs. The crux of the matter is the position of the trace left by extraction: is the trace in an A or A' position? Baker proposes that when we extract the whole NP, and this NP is thematically an argument, we are indeed extracting an argument and not an adjunct: i.e., the trace of the movement is in an A-position. This is because Condition (9) is taken to affect only overt NPs, and not traces. Baker assumes that this is because the condition holds at S-Structure: if an NP moves out of its original A-position by S-Structure, the trace it leaves behind is not subject to Condition (9).

6. Pronominal Status of NP-Arguments

In this section I will consider the following question: how can we support the hypothesis that the NPs that occur in argument positions in Cherokee are (covert) pronominals. The tests are essentially those in Baker 1992, and involve the use of Principle C of the Binding Theory, with its corollary below (sometimes referred to as 'Principle D'):

(19) If a pronominal c-commands an NP, coreference is not possible.

As pointed out by N. Thwala (p.c.), and in light of the brief discussion of reflexivization given above, it appears that the data are consistent with the operation of Principles A and B of the Binding Theory. The following data (courtesy of N. Thwala) provide evidence that Principle B applies, and that its application is consistent with the hypothesis that covert pronominal elements are present whenever their theta-positions are required by the verb.

(20) a. Digi hi'a a-gowhti'a
Dick it-emph 3sA-see:prs
'Dick$_1$ sees it$_2$' (1 π 2)

b. Digi a-gowhti'a
Dick 3sA-see:prs
'Dick$_1$ sees him$_2$' (1 π 2)

The general applicability of Principle C to Cherokee is confirmed by the examples below. In part, the pronominal agreement prefixes that appear on verbs (considered in section 5 below) can be seen as overt reflections of the covert pronominals that we are assuming are underlying. Note however that often not all arguments of the verb are marked by agreement prefixes, but only the most prominent on the Animacy Hierarchy (see section 5 below). Our assumption is, at any rate, that all (non-clausal) theta-marked positions are occupied by pronominal elements.

Let's now review some data that illustrates the application of Principle C in Cherokee. The following examples show that in Cherokee, like in English, a pronominal subject cannot be construed as coreferent with an NP in a complement clause: i.e., within the pronoun's c-command domain. Recall that unlike NP complements, clausal complement are in A-positions.

(21) U-wooseelvv'i Eedi hla Maaygi y-uu-lvvkwdi
3sB-tell:prf Ed neg Mike irr-3sB-like:prs
'He$_1$ told Ed not to like Mike$_2$' [Disjoint Reference Only]

If however the positions of the pronominal and the NP are switched, coreference is possible:

(22) a. Maaygi uu-wooseelvv'i Eed hleesdi i-ja-keewsi
Mike 3sB-tell:prf Ed neg irr-2sB-forget;imp
'Mike$_1$ told Ed not to forget him$_1$' [Coreference OK]

b. Maaygi uu-wooseelvv'i Eed hleesdi i-ja-nalaseesdi
Mike 3sB-tell:prf Ed neg irr-2sB-anger;fpg
'Mike$_1$ told Ed not to make him$_1$ angry' [Coreference OK]

An NP in a clausal subject, being outside the c-command domain of a pronominal in the matrix VP, also allows coreference to go through.

(23) Maaygi jiiya-hnihv hla y-uu-tadlawoosvv'i
Mike 1sA-hit:prf neg irr-3sB-anger:prf
'That I hit Mike$_1$ didn't make him$_1$ angry' [Coreference OK]

All these data further support the hypothesis that complement clauses in Cherokee are arguments of V, and hence structurally distinct from adjunct clauses.

Coreference is also possible in the following example, where the overt NP ('Mike') in the matrix clause is not c-commanded by the object pronoun in the adjunct clause:

(24) Jii-woo'a hla Maaygi i-jii-tahlawoohisdanee'i
1sA-bathe:prs neg Mike irr-1s-make.angry:rep
'By bathing him$_1$, I didn't make Mike$_1$ angry' [Coreference OK]

Having established that Principle C does seem to apply to Cherokee, we can now show that Principle C effects are consistent with the clause structure hypothesis developed so far, lending support to it.

First, if A-positions are occupied by pronominals, one would expect—given Principle C—that a pronominal argument could be construed as coreferent with an overt NP contained in an adjunct clause. This is because such a clause would be outside the c-command domain of the pronominal. This is in fact what can be observed:

(25) a. Jiiyaa-hnilvv'i uuneelagi Maaygi uu-tana j-igi
1s>3an:o-hit:prf even.though Mike 3s-big sub-3s:be:prs
'I hit him$_1$ even though Mike$_1$ is big' [Coreference OK]

b. Jiiyaa-hnilvv'i hla oose Maaygi y-igi
1s>3an:o-hit:prf neg good Mike irr-3s:be:prs
'I hit him$_1$ because Mike$_1$ was not nice' [Coreference OK]

c. Jiiyaa-hnilvv'i hla Maaygi i-ji-lvvkwdi
1s>3an:o-hit:prf neg Mike irr-1s-like:prs
'I hit him$_1$ because I don't like Mike$_1$' [Coreference OK]

On the other hand, if the overt NP sits in a complement clause, a pronominal argument in the matrix c-commands it, and we would expect—again, given Principle C—that the pronominal argument could not corefer with the NP. The examples below confirm this prediction:

(26) a. Jii-hnooseelvv'i hla Maaygi i-ji-lvvkwdi
1sA-tell:prf neg Mike irr-1sA-like:prs
'I told him$_1$ that I don't like Mike$_2$' [Disjoint Reference Only]

b. Jii-hooseelvv'i hla Maaygi i-jiya-nhdi'a
1sA-tell:prf neg Mike irr-1sA-remember:prs
'I told him$_1$ that I don't remember Mike$_2$' [Disjoint Reference Only]

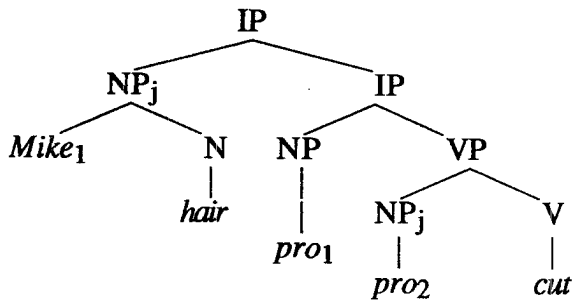
Naturally, for the above tests to be valid, we need to argue that the overt NP is in fact inside the adjunct/complement clause, and not part of the matrix. The point is not obvious, owing to freedom in word order. To control for scrambling of the NP out of the adjunct in (25a), the NP has been placed to the right of *uuneelagi*: this connective seems to work as a complementizer, given that the copula *igi* is prefixed with the subordinating marker *j-*. Generally in Cherokee a complementizer defines a boundary to scrambling of NPs. In (25c), we control for scrambling by

positioning the overt NP (an object) between negation and V. As noted, word order restrictions in Cherokee are such that in a negative clause the object cannot be placed to the left of the negation word.

Principle C effects do not only provide support for the assumption that there is a structural difference between complement and adjunct clauses; they also give us some positive evidence that A-positions are occupied by small pros and that overt NP arguments are in A'-positions. The relevant data involve pronominal reference with possessor phrases.

Consider the case where the overt referential expression is a possessor NP embedded inside another lexical NP. If this overt argument is in fact an adjunct, it would be outside the c-command domain of a pronominal in argument position, and coreference should be possible. The underlying structural configuration of a sentence like 'He$_1$ cut Mike$_1$'s hair' (whose interrogative counterpart is given in (28) below) would be, in other words, as follows:

(27)



The prediction is borne out:

(28) Maaygi uustiigv-s uu-gaalsv ?
Mike hair-Qm 3sB-cut:prf
'Did he$_1$ cut Mike$_1$'s hair?' [Coreference OK]

In the above example, the position of the question clitic ('-s') ensures that 'Mike's hair' is a constituent.

A structural configuration akin to the one considered above with possessor phrases is given by sentences with locative phrases. The example below displays the same coreference effect:

(29) Maaygi uustiigv-s na'v uu-goohe iinaada
Mike hair-Qm near 3sB-see-prf snake
'Near Mike$_1$'s hair did he$_1$ see a snake?' [Coreference OK]

7. Conclusion

This paper has been an attempt at addressing some issues in Cherokee syntax. The status and position of argument NPs has been discussed, and I concluded that Baker's account of Mohawk non-configurationality (1992, 1993) seems largely applicable to Cherokee.

Cherokee Agentive Nominalizations

Brian Potter

1. Introduction to the Cherokee Nominalization Construction

In this paper I discuss the distributional properties and syntactic status of Cherokee agentive nominalizations.[1] Examples (1a) and (1b) illustrate the essential paradigm as noted in Pulte and Feeling (1975).

(1a) p. 319	Ga-wooniis-g-oo'i. 3sA-speak-imp-hab 'He speaks habitually'	(1b) p. 319	ga-wooniis-g-i 3sA-speak-imp-nom 'speaker'

Example (1a) is the non-punctual stem for the verb 'to speak', inflected for third person via the prefix *ga-*, and marked aspectually with the imperfective and habitual suffixes *-g-* and *-oo'i* respectively. As given in the gloss, Pulte and Feeling translate (1a) as a complete sentence with a non-overt subject. In contrast, Pulte and Feeling translate the minimally distinct (1b) as a nominal expression. Note that (1b) varies from (1a) only in the suffixal ending. Pulte and Feeling suggest that the suffix *-i* in (1b) is an agentive nominalizing suffix similar to English *-er*.

Holmes and Smith (1976) also gloss *-i* forms such as (1b) with the English suffix *-er* but suggest that the distinction between Cherokee *-i* and *-oo'i* is one of meaning, with the former translated as "it is made to happen repeatedly through personal effort" and the latter as "it happens habitually". Holmes and Smith would gloss (1b) as the complete sentence "he is a speaker" (Holmes and Smith 1976: 130).

Cherokee constructions involving the *-i* suffix can also include an overt object and subject argument. Examples (2b) and (3b) demonstrate the basic possibilities. (2a) and (3a), which I assume without argument are standard Cherokee sentences, are given for comparison. Interestingly, my consultant for this paper translates the *-i* constructions as either nominalized expressions similar to English agentive nominalizations, or, as complete sentences equivalent to the habitual forms using the *-oo'i* suffix.[2]

(2a)	Dloogeesi gaa-daluugiis-g-oo'i. field 3sA-plow-imp-hab 'He plows the field'	(2b)	Dloogeesi gaa-daluugiis-g-i field 3sA-plow-imp-nom i) 'field plower' ii) 'He plows the field'

(3a) Asgaya dloogeesi gaa-daluugiis-g-oo'i.
man field 3sA-plow-imp-hab
'The man plows the field'

[1]I am grateful to my consultant, Mrs. Virginia Carey, whose mastery of the Cherokee language and willingness to teach made this paper possible, and to the other members of the field methods class.

All data in this paper is taken either from the UCLA 1993 field methods class data set, or from Pulte and Feeling's grammar (1975). In the latter case, the page number of the grammar is noted for each example.

[2]Cherokee nouns referring to humans may be used as complete sentences (Pulte and Feeling 1975: 308). This does not, however, eliminate the need to verify the categorial status of the Cherokee nominalizations. In fact, it introduces the additional question, which will not be considered in this paper, of the proper treatment of nouns referring to humans.

(3b) Asgaya dloogeesi gaa-daluugiis-g-i
man field 3sA-plow-imp-nom
i) 'The man is a field plower' ii) 'The man plows the field'

The categorial status of these Cherokee constructions cannot be decided on the basis of gloss alone. However, if the *-i* forms in the (b) examples above are in fact nominalized expressions, syntactically distinct from the habitual (a) constructions, distributional asymmetries between the two types of expression should exist.

In the discussion below, I examine such asymmetries between Cherokee verbs with the habitual *-oo'i* suffix and with the *-i* suffix and demonstrate that Pulte and Feeling are correct in classifying the *-i* forms as nominalized expressions. I then discuss the Cherokee nominalizations from a typological perspective with similar constructions in English and Navajo. Although the Cherokee forms exhibit a number of properties common to both English agentive compounds and Navajo agentive nominalizations, certain distinctions among these languages suggest that the Cherokee data cannot be the result of a single, structure-based constraint that theoretically accounts for the English and Navajo forms.

2. Distributional Properties of Cherokee Nominalizations

A variety of distributional asymmetries between standard Cherokee sentences and constructions involving verbs with the *-i* suffix clearly demonstrate that the latter are nominalizations. To begin, although my consultant translates the *-i* forms as either complete sentences or nominalized expressions, the *-i* construction cannot be used as a sentential complement to a verb. In example (4), the Cherokee verb for 'know' takes as complement a sentence headed by the habitual form of the verb 'kill'.

(4) Virginia uunhta asgaya wahya d-aa-hiih-oo'i.[3]
Virginia 3sB.know.prs man coyote dis-3sA-kill-hab
'Virginia knows that the man kills coyotes'

As example (5) demonstrates, although a constituent headed by a verb with the *-i* suffix can be glossed as a sentence, that constituent cannot serve syntactically as a sentential complement to the verb 'know'. To make (5) a grammatical construction, the addition of the copular verb after the *-i* constituent, as in (6), is necessary.

(5) *Virginia uunhta asgaya wahya dii-hiih-i.
Virginia 3sB.know.prs man coyote dis-kill-nom
'Virginia knows the man is a coyote killer'

(6) Virginia uunhta asgaya wahya dii-hiih-i geesvv'i.
Virginia 3sB.know.prs man coyote dis-kill-nom to.be
'Virginia knows that the man is a coyote killer'

As illustrated in (7), an auxiliary verb is also required to negate a Cherokee construction headed by a verb with the *-i* suffix. Again, the copular 'be' is not required in a corresponding construction without this suffix (8).

[3]Note that the imperfective markers *-g-* or *-h-* are present before the final suffix in all habitual sentences and *-i* nominalizations. For the purposes of space and clarity, however, I will only gloss these markers when they are critical to the discussion.

(7) Maaygi hla ga-wooniisgi yigi.
Mike neg 3sA-speak-nom neg.be
'Mike is not a speaker'

(8) p. 343 Asgaya hla yi-ga-wooniha.
man neg neg-3sA-speak.prs
'The man isn't speaking'

The syntactic asymmetries in (4)-(8) are unexpected if verbs with the *-i* suffix only vary in meaning from verbs with habitual or present tense suffixes. The data are clearly more consistent with a structural distinction between the *-i* constructions in (5)-(7) and the standard sentences in (4) and (8). Examples (9)-(20) further support a structural distinction between Cherokee *-i* and *-oo'i* constructions. Cherokee sentences can be conjoined via the clitic *-hno* as in example (9).

(9) Wahya d-aa-hiih-oo'i dloogeesi-hno dee-gaa-daluugiisg-oo'i.
coyote dis-3sA-kill-hab field-and dis-3sA-plow-hab
'He kills coyotes and plows fields'

When *-hno* is used to conjoin a construction headed by a verb with the *-i* suffix and a standard sentence, however, the resulting sentence does not have an interpretation of two conjoined clauses. In (10), the *-i* construction follows the conjunction clitic and is interpreted as the object of the initial verb in the sentence. In (11), the *-i* construction precedes the clitic and is interpreted as the subject argument of the sentence.

(10) Wahya d-aa-hiih-oo'i dloogeesi-hno gaa-daluugiisg-i.
coyote dis-3sA-kill-hab field-and 3sA-plow-nom
'The coyote kills the field plower'

(11) Wahya dii-hiih-i dloogeesi-hno gaa-daluugii'a.
coyote dis-kill-nom field-and 3sA-plow.prs
'The coyote killer plows the field'

While it is unclear what function the clitic *-hno* serves in these latter two examples, the distinct interpretation of these sentences from that of (9) clearly motivates a structural distinction between *-i* constructions and standard Cherokee sentences.

Another form of conjunction in Cherokee also points toward a syntactic distinction between *-i* constructions and sentences. Sentences in Cherokee can be conjoined via the word *haleeh* as in (12).

(12) Dloogeesi gaa-daluugiisg-oo'i haleeh wahya d-aa-hiih-oo'i.
field 3sA-plow-hab also coyote dis-3sA-kill-hab
'He plows fields and also kills coyotes'

Example (13) illustrates that two *-i* constructions can be conjoined in this manner.

(13) Dloogeesi gaa-daluugiisg-i haleeh wahya dii-hiih-i.
field 3sA-plow-nom also coyote dis-kill-nom
'He plows the field and also kills coyotes'

As examples (14) and (15) demonstrate, however, *haleeh* cannot conjoin a Cherokee sentence with a *-i* construction.

(14) *Dloogeesi gaa-daluugiisg-oo'i haleeh wahya dii-hiih-i
field 3sA-plow-hab also coyote dis-kill-nom
'He plows fields and is also a coyote killer'

(15) *Dloogeesi gaa-daluugiisg-i haleeh wahya d-aa-hiih-oo'i
field 3sA-plow-nom also coyote dis-3sA-kill-hab
'He is a field plower and also kills coyotes'

The ungrammaticality of (14) and (15) thus motivate a structural distinction between Cherokee sentences and *-i* constructions. Note that the ungrammaticality of these examples cannot be due to a requirement that two conjoined clauses exhibit similar tense and aspect morphology. In (16) for example, a present tense habitual clause is conjoined with a future tense perfective.

(16) Dloogeesi gaa-daluugiisg-oo'i haleeh da-ga-wooniisi.
field 3sA-plow-hab also fut-3sA-speak.fut
'He plows fields and also will speak'

Word order variation offers an additional argument in favor of a structural distinction between the *-i* and *-oo'i* constructions. Word order in Cherokee is fairly free and, as examples (17) and (18) illustrate, adjectives and alienable possessive elements can surface in positions non-adjacent to the nouns they modify.

(17) Dloogeesi gaa-daluugiisg-oo'i uutaana.
field 3sA-plow-hab big
'He plows big fields'

(18) Dloogeesi gaa-daluugiisg-oo'i aagwa-jeeli.
field 3sA-plow-hab 1-pss
'He plows my field'

In constructions based on verbs with the *-i* suffix, however, such freedom of word order is either constrained or results in distinct interpretation. Except for the suffixal ending on the verb, example (19) is equivalent to (17). In (19), however, the adjective is interpreted as modifying the derived nominalization, which denotes the non-overt third person subject of the verb, rather than as modifying the overt object.

(19) dloogeesi gaa-daluugiisg-i uutaana
field 3sA-plow-nom big
'big field-plower' (= 'big one that plows fields')

Furthermore, non-adjacency of a possessive element and the possessed noun is ungrammatical if a verb taking that noun as argument ends in the *-i* suffix. Compare example (18) with the nearly identical example (20).

(20) *dloogeesi gaa-daluugiisg-i aagwa-jeeli
field 3sA-plow-nom 1-pss
'plower of my field'

Examples (9)-(20) suggest that a Cherokee verb with the *-i* suffix forms a syntactic unit with an argument that is distinct from the structural configuration of a verb and argument in the absence of this suffix. The necessity of an auxiliary verb in (6) and (7) further suggests that this structural unit does not bear the verbal features necessary to form a sentential complement or participate in sentential negation.

In fact, there are good reasons to accept Pulte and Feeling's characterization of these *-i* forms as nominalizations. Cherokee postpositions, which take nominal arguments, cannot take sentential complements. (21) illustrates the use of the postposition 'toward' with the nominal complement 'house'.

(21) p. 341 Gaahljoode diidla waa'i.
house toward 3sA.walk.prs
'He's walking toward the house'

Example (22) demonstrates the ungrammaticality of a construction in which Cherokee 'toward' modifies a sentential constituent.

(22) *Dloogeesi gaa-daluugiisg-oo'i diidla waa'i.
field 3sA-plow-hab toward 3sA.walk.prs
'He's walking towards he plows the field'

Example (23), however, which is distinct from (22) only in the presence of the suffix *-i*, is grammatical. This case thus suggests that Cherokee constructions headed by a verb with the *-i* suffix are categorically appropriate as nominal complements to postpositions.

(23) Dloogeesi gaa-daluugiisg-i diidla waa'i.
field 3sA-plow-nom toward 3sA.walk.prs
'He's walking towards the field plower'

Finally, example (24) demonstrates that Cherokee *-i* constructions can be conjoined with canonical nominal expressions.

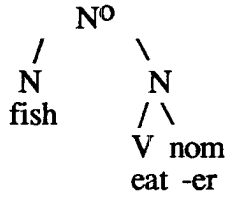
(24) wahya dii-hiih-i haleeh asgaya
coyote dis-kill-nom and man
'a coyote killer and a man'

In summary, there is strong evidence in favor of a structural distinction between *-i* constructions and standard sentences in Cherokee and motivation for an analysis of *-i* forms as nominal expressions. I will therefore adopt Pulte and Feeling's characterization of the *-i* morpheme as a nominalizing suffix and will refer to these constructions in general as deverbal nominalizations.

3. Compound Properties of Cherokee Nominalizations

At least superficially, the Cherokee *-i* constructions can be glossed as English synthetic compounds involving the agentive suffix *-er*. Grimshaw (1990) defines synthetic compounds as compounds in which the non-head member of the construction satisfies an argument position in the argument structure of the compound head. Figure (25) illustrates the structure for a typical English agentive compound in which the non-head element *fish* satisfies the theme argument of the verbal stem in the nominalized head *eater*. For English, the result of compounding is a word level category (or X^0 level category in Xbar terminology) and the derivation of examples such as (25) is treated as a process of word formation.

(25)



One straightforward hypothesis regarding Cherokee nominalizations is that they are structurally and derivationally equivalent to their English compound counterparts. If so, taking into account independent differences between Cherokee and English syntax, correlations should exist across nominalizations for the two languages. In the following sections, I demonstrate that Cherokee nominalizations exhibit two properties characteristic of English synthetic compounds. In each case, I review accounts of the English data which rely crucially on the word level status of compounds.

3.1. Dative Nominalizations and Indirect Object Arguments. Grimshaw notes an interesting asymmetry within the English synthetic compound data. While a theme argument is acceptable as the non-head element in a compound formed from a nominalized dative verb (26), a goal argument is excluded from such constructions (27).

(26) gift-giving to children (27) *child-giving of gifts

To account for these asymmetries, Grimshaw uses the prominence theory of theta assignment as developed in Grimshaw and Mester (1988). The prominence theory contends that theta marking respect the organization of argument structure, the least prominent element of a given argument structure being theta marked first and the most prominent last. Prominence is defined according to relative position on a thematic hierarchy (cf. Jackendoff 1972). Under the assumption that the theme theta role is less prominent or lower in the thematic hierarchy than the goal theta role, the prominence theory predicts that theme theta roles be assigned before goal theta roles. This analysis correctly rules out (27) in which the goal role, internal to the compound, is assigned before the theme role.

Under the assumption that the prominence theory is sensitive to the argument structure of the deverbal head of a synthetic compound, and not simply the arguments overtly realized, Grimshaw's account might be extended to include the examples in (28). In (28), a theme argument of a dative verb is acceptable in a compound construction while a goal argument is not.[4]

(28a) gift-giver (28b) *child-giver (= giver to children)

With respect to dative verbs, Cherokee *-i* constructions pattern similarly to the English agentive synthetic compounds. For example, (29) illustrates the Cherokee word for 'giver' and (30) demonstrates that it is possible to include an overt theme argument of the nominalized form of 'give'.

(29) aadaa-neeh-i
aca-give-nom
'giver'

(30) svvhkta aadaa-neeh-i
apple aca-give-nom
'apple giver'

[4]Potter (1991) attempts to extend Grimshaw's (1990) account of **child-giver* to ditransitive verbs which do allow compounding with a goal such as *building-fund contributor*. Although the issue is tangential to the Cherokee data, that work suggests that goal arguments be independently excluded from compound structures due to an inability of nominalized verbs to enter into the bi-directional relationship of Inherent Case. Goal adjuncts, as in the example above with *contributor*, are permitted, subject to the prominence theory of theta assignment, within compound constructions.

Example (30) might be uttered in a context where there is a particular person who regularly hands out apples to someone or some group of people. Assuming a context in which children are the recipients of the apples, however, 'child' is unacceptable as the sole argument of the nominalized verb (31). Note that the intended reading of (31) is with 'child' as the goal argument of the nominalized verb.

(31) *ayoohli aadaa-neeh-i
child aca-give-nom
'child giver' (= 'giver to children')

Adopting for the moment Grimshaw's analysis of English dative compounds, the unacceptability of goal arguments in Cherokee nominalizations supports an analysis of the Cherokee *-i* forms as word level constructions. The presence of the morpheme *aadaa* in (31), however, introduces a complication into the dative paradigm. Pulte and Feeling note that *aadaa* is placed before a consonant initial verb stem to indicate a covert animate direct object of the verb. For example, the nominalized form of 'kill' is realized as in (32) if there is no explicitly stated direct object, but as in (33) if there is an overt direct object.

(32) aadaa-hiih-i
aca-kill-nom
'poison'/'killer'

(33) wahya dii-hiih-i
coyote dis-kill-nom
'coyote killer'

Pulte and Feeling state that *aadaa* will *only* surface if there is no overtly expressed direct object (1975: 298). With the dative verb 'give' in example (30), however, *aadaa* is present despite the overt realization of the direct object argument. (31), in which the presence of an overt indirect object is unacceptable, thus suggests that with dative verbs *aadaa* marks a covert animate indirect object.[5]

That *aadaa* denotes an indirect object argument for dative verbs can also be demonstrated by a comparison with dative stems without the *aadaa* morpheme. Example (34) illustrates a grammatical sentence including a dative verb and three overt arguments.

(34) Maaygi svvhkta ayoohli aa-hneeh-oo'i.
Mike apple child 3sA-give-hab
'Mike gives apples to children'

In sentences without *aadaa* on the verb stem and with only one overt argument (35), the overt argument can be interpreted as subject, direct object,[6] or indirect object. With *aadaa* present, however, a lone argument cannot be interpreted as indirect object (36).

(35) Ayoohli aa-hneeh-oo'i.
child 3sA-give-hab
i) 'He gives it to the child'
ii) 'The child gives it to him'

(36) Ayoohli aadaa-neeh-oo'i
child aca-give-hab
i) *'He gives it to the child'
ii) 'The child gives it to him'

[5]The terms "direct object" and "indirect object" are not defined in and of themselves and are used here for informal reference to the arguments assigned theme and goal theta roles respectively. As Pulte and Feeling do not define their use of the term "direct object" it is possible that the account given in this paper is compatible with their analysis of *aadaa*.

[6]I do not have confirmation from my consultant that (35) can specifically mean 'He give the child to it', but such an interpretation is entirely compatible with other class data. For the issue at stake, the crucial interpretations of (35) and (36) are with *ayoohli* as indirect object.

On the basis of the discussion above, it seems clear that *aadaa* marks a covert animate indirect object of a dative verb. The ungrammaticality of (31), which includes both *aadaa* and an overt indirect object, is therefore predicted independently of the prominence theory of theta assignment and does not by itself constitute a correlation between the Cherokee nominalizations and their English counterparts. Additional data, however, do point to such a correlation.

Although *aadaa* , as evidenced by (34) and (35), is not an obligatory element in Cherokee dative sentences, nominalization constructions based on dative verbs without the *aadaa* morpheme, such as (37) and (38), are unacceptable.[7]

(37) *svvhkta aa-neeh-i
apple 3sA-give-nom
'apple giver'

(38) *ayoohli aa-neeh-i
child 3sA-give-nom
'child giver'

Although the relevance of the prominence theory is unclear in Cherokee, it is interesting that nominalized Cherokee dative verbs obligatorily require the presence of the covert indirect object argument marker *aadaa*. So in the nominalization construction, Cherokee draws a distinction between direct objects (themes) and indirect objects (goals) that is not present elsewhere in the grammar. Precisely in this environment, English grammar distinguishes between direct and indirect object arguments as discussed above and in Grimshaw and Mester (1988), Grimshaw (1990) and Potter (1991). Moreover, Potter (1992) notes that this same environment entails a similar distinction between direct and indirect object arguments in Navajo.

Still, it is not obvious that Grimshaw's prominence theory[8] can explain the Cherokee data. Under the assumption that *aadaa* receives the goal theta role assigned by a dative verb, Grimshaw's prominence theory approach requires that the theta role assigned to *aadaa* be assigned after the theme role is assigned to the direct object *svvhkta*. Exactly the opposite ordering of assignment is expected, however, if as Grimshaw suggests, structural proximity to the theta assigning stem directly correlates with early assignment. In summary, the correlation between Cherokee constructions involving dative verbs with the *-i* suffix and equivalent nominalizations in English and Navajo does not offer independent motivation for the prominence theory of theta assignment. Therefore, although a crosslinguistic account of the dative paradigm might prove consistent with a word level analysis of the Cherokee nominalizations, the data do not in and of themselves constitute evidence for such an analysis.

3.2. Tense. Another property characteristic of English compounds is the unacceptability of tense on a nominalized verb stem. For English, tense is generally indicated by an auxiliary verb and the relevant nominalization data is thus somewhat sparse. Clearly however, examples (39b) and (40b), which include past tense morphology on a nominalized verb stem, are ungrammatical.

(39a) fish eater (39b) *fish ater

(40a) apartment renter (40b) *apartment renteder

Navajo tense is realized via morphology on the verb stem. As with English, verbs marked for tense cannot be nominalized. (41) and (42) offer a nice minimal contrast between a tensed verb with the nominalizing suffix and a tensed verb with the relativizing suffix respectively.

[7]'Give' is the only dative verb I have found in Cherokee so the above generalization trivially holds for the entire class of datives. Other verbs which are dative in English, 'send' for example, pattern with transitive verbs in Cherokee.
[8]Potter's (1991) constraint regarding Inherent Case assignment in compounds requires the additional stipulation for Cherokee that *aadaa* is assigned a theta role outside of the bi-directional relationship of Inherent Case.

(41) Navajo[9] *ma'íí neidóółtsił-i'
coyote kill.fut-nom
'coyote killer (future)'

(42) Navajo ma'íí néídóółtsił-i'gíí
coyote kill.fut-rel
'the one that will kill coyotes'

Cherokee constructions involving the suffix *-i* and a verb stem marked for tense are similarly ungrammatical. As (44) indicates, the future tense form of the verb 'speak' cannot be nominalized. To indicate past or future time for a nominalized verb, an auxiliary must be used as in (45).

(43) Da-ji-wooniisi.
fut-1sA-speak.fut
'I will speak'

(44) *Da-ji-wooniis-g-i
fut-1sA-speak-imp-nom
'I will be a speaker'

(45) Jii-wooniis-g-i geeseesdi.
1sA-speak-imp-nom will.be
'I will be a speaker'

Note that (45) demonstrates that the ungrammaticality of (44) is not a result of the 1 person subject morphology on the nominalized verb stem. First and second person marking on nominalized verbs will be discussed in more detail in the next section.

DiSciullo and Williams (1987) formulate a theory of syntactic atomicity which attempts to account for the lack of referential and non-generic material within word level categories of a language. Briefly, DiSciullo and Williams suggest that X^0 level categories are the smallest units visible to syntactic rules and principles and argue that no linguistic information important to sentence or discourse level syntax and semantics can be wholly contained below word level. I will return to this theory below in a discussion of the referentiality of arguments of nominalized verbs in Navajo and Cherokee. For now, note that syntactic atomicity is applicable to the lack of tense in English compounds if, as commonly assumed, these compounds are word level categories. To account for the lack of tense in the Navajo and Cherokee examples along similar lines it is therefore necessary to tentatively assume that the nominalization constructions, or at least their deverbal heads, are word level categories in these languages as well.

In this section I examined two properties characteristic of agentive nominalizations in English, Navajo and Cherokee. For English, an account of each of these properties exists which relies crucially on the fact that English compounds are word level categories. If the accounts presented above are both correct and applicable to Navajo and Cherokee then the nominalization constructions in these languages must also constitute word level categories. Below however, I pursue this hypothesis and demonstrate that there are significant differences between the three languages with regards to these nominalization constructions. In particular, data from Cherokee very clearly suggests that the word level accounts of English synthetic compounds are not universally applicable.

4. Transitive Nominalizations and Xbar Theory

In this section I discuss two ways in which Cherokee and Navajo nominalization constructions are distinct from English synthetic compounds. First, I demonstrate that the object argument of a nominalized transitive verb can be phrasal in both Cherokee and Navajo and note that this is incompatible with a word level account of these nominalizations. Second, I argue that the presence of third person agreement marking on nominalized Cherokee and Navajo verbs indicates that these constructions constitute nominalized verb phrases and are not, as proposed for

[9]I would like to thank Ms. Lilly Lane of the Navajo Nation, who provided the Navajo examples given in this text.

English, simply nominalized verbs which retain theta marking properties.

4.1. Phrasal Arguments. The argument noun of a nominalized transitive verb can be modified by an adjective in both Cherokee and Navajo. In Cherokee, adjectives can occur either to the left or right of the noun they modify.[10] Examples (46) and (47) illustrate that either ordering is possible between an adjective and a noun argument of a nominalized verb.

(46) uutaana dloogeesi gaa-daluugiisg-i
big field 3sA-plow-nom
'big-field plower' (= 'plower of big fields')

(47) dloogeesi uutaana gaa-daluugiisg-i
field big 3sA-plow-nom
'big-field plower' (= 'plower of big fields')

Adjectives can also modify the arguments of nominalized verbs in Navajo. Example (48) demonstrates that modification of the nominal by multiple adjectives is acceptable.

(48) Navajo ma'ii łibah yázhí néíłtsééd-í
coyote gray very.small kill-nom
'[very small gray coyote] killer'

Within analyses in which adjectives project adjective phrases which either adjoin to or dominate modified noun phrases, the facts in (46) - (48) suggest that the arguments of nominalized verbs in Navajo and Cherokee are phrasal. It is also possible, however, that the adjectival modification in these examples represents adjective-noun compounding. Thus, on the basis of these cases alone it cannot be concluded that the argument of a nominalized Cherokee or Navajo verb may be phrasal. The examples below, however, do indicate phrasal status for the arguments of nominalized verbs.

In the examples below, Cherokee nominalized verbs have syntactically complex phrasal arguments. The argument in (51), for example, includes a canonical instance of a Cherokee relative clause.

(49) daa-goohvvsdiih-i dloogeesi dee-jii-daluugiisg-vv'i
pl.3-burn-nom field dis-1sA-plow-pst
'burner of the fields I plowed'

(50) wahya dii-ni-nvvsgeeni juu-sgwaalida dii-hiih-i
coyote dis-pl.pss-leg pl.3-broken dis-kill-nom
'killer of coyotes with broken legs'

(51) Filippo dii-goohvvsdiisg-i aanii-sgaya ahni ji-d-aaniidoog-a.
Filippo dis-3sA.burn-nom[11] pl-man here rel-dis-stand-prs
'Filippo is the burner of the men who are standing here'

Example (52) indicates that the argument of a nominalized Navajo verb may also be a complex phrasal constituent.

[10]Underlying order is yet to be conclusively determined.
[11]The underlying form is most likely *dii-a-goohvvsdiis-g-i* : dis-3sA-burn-hab-nom.

(52) Navajo hastóí shi-dá'á'k'ééh nidéíniłhéésh-i'gíí nééłtsééd-í
men 1-field irrigate-rel kill-nom
'[men that irrigate my field] killer'

The presence of phrasal arguments with the Cherokee and Navajo nominalized verbs poses a serious problem for any account of these constructions which suggests that the nominalized expression is a word level category. (53) once again gives the structural analysis commonly applied to English synthetic compounds. Assuming that the Cherokee and Navajo nominalizations are as minimally distinct as possible from this construction, the phrasal arguments of the nominalized verbs in these languages requires the structure given in (54).

(53) English

```
          N0
      /        \
     N          N
  argument   verb + er
```

(54) Cherokee and Navajo

```
               N0
         /              \
    NP/CP/AdjP           N
    argument          verb + i
```

The structure in (54), however, is incompatible with Xbar theory (cf., Stowell 1981). Xbar theory holds that all heads or word level categories project phrases. But in (54) the noun that results from affixation of the nominalizing suffix to a verb stem does not project any higher structure. Furthermore, although in compounding constructions such as (53) all heads need not project higher order structure, (54) cannot be an example of compounding as the argument of the nominalized verb is phrasal. DiSciullo and Williams do note a few cases in French that seem to require that a phrasal constituent be dominated directly by a word level category, but require that such structural configurations be limited to idiomatic and/or lexicalized expressions. For both Cherokee and Navajo, however, nominalized verbs productively take phrasal arguments.

Within an Xbar theoretic framework, the phrasal arguments of Navajo and Cherokee nominalized verbs must be realized external to any word level nominal category. But the question remains as to the surface syntactic location of these arguments as well as the nominalization clitic itself. The rough format for two candidate structures are given in (55) and (56).

(55)

```
          NP
      /        \
     NP         N
  argument    verb -i
```

(56)

```
                NP
         /              \
        VP               N
   argument+verb        -i
```

In (55), the *-i* suffix is treated similar to the English agentive suffix *-er* and affixes to a verb to form a noun. In this case, the phrasal arguments in the Cherokee and Navajo nominalizations are realized in some adjunct position within the noun phrase projected by the nominalized verb. In (56), the nominalization suffix is treated as a noun which takes as argument some verbal projection and projects a noun phrase. In the next section, I provide evidence from Cherokee and Navajo which clearly supports the structure given in (56).

4.2. Agreement Morphology on Nominalized Verbs. In many of the Cherokee and Navajo examples above, agreement morphology surfaces on the nominalized verb stem. For Navajo such agreement is limited to third person.[12] (57) and (58) illustrate two simple examples of third person agreement on nominalized verb stems.

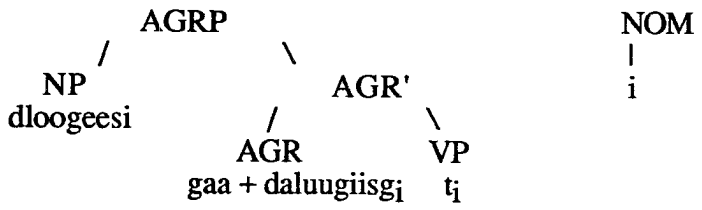
[12]Potter (1992) argues that this 3rd person marking is not a default case. The Navajo 3rd person object *yi* surfaces only if there is an object referent. For an unspecified object the morpheme *a'i* is used.

(57) dloogeesi gaa-daluugiisg-i
field 3sA-plow-nom
'field plower'

(58) Navajo ma'íí néíłtsééd-í
ma'ii na-yi-ł-tseed-i
coyote iter-3.obj-cl-kill-nom
'coyote killer'

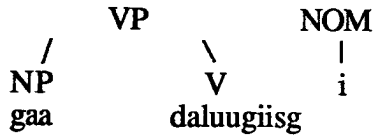
There are two general possibile analyses of agreement morphology in Cherokee and Navajo nominalizations. First, along the lines originally proposed in Pollock (1989) and Chomsky (1989) on the basis of IndoEuropean languages, agreement morphology in examples (57) and (58) surfaces as a result of a specifier-head relationship in syntax between the verb and its noun phrase argument. Such a relationship necessarily entails the existence of a verb based, phrasal constituent. Figure (59) illustrates the basic syntactic structure involved for a Cherokee nominalization.[13]

(59) Agreement Markers Result from Spec-Head Relationship



Alternatively, agreement markers in some languages might actually be the overt realization of verbal arguments. Baker (1992) argues that the overt noun phrases in Mohawk sentences are actually adjuncts adjoined to the sentence. Baker suggests that the actually arguments in Mohawk sentences are the agreement markers which surface on the verb stem. In fact, Beghelli (1993) and Jelinek (1989) argue that Baker's analysis of Mohawk is applicable to Cherokee and Navajo respectively. These accounts suggest that the third person agreement morphology in (57) and (58) represents incorporated third person arguments. Since these arguments are the complement or object arguments of the given verbs, they must originate in a complement position to these verbs. But the presence of a complement position to a verb necessarily implies a verb phrase constituent. Figure (60) provides a simplified illustration of the proposed structure.

(60) Agreement Markers = Arguments



In summary, within any Principles and Parameters based approach to Cherokee and Navajo agreement morphology, the presence of agreement marking on the nominalized verb stem clearly indicates a phrasal projection of the verb within the nominalization construction. Rather than transform a verb into a noun, as argued for English *-er*, the Cherokee and Navajo nominalization suffixes transform verbal projections into nominals.

Of course this argument is based upon the assumptions that phrasal constituents cannot be dominated by word level categories and that the presence of agreement morphology entails a phrasal projection. Without these assumptions, the possibility that the Cherokee and Navajo nominalizations consist of word level nominalized verbs to which phrasal arguments adjoin might still be considered. Potentially such an account could make extensive use of the word level status

[13]Speas (1990) argues that the agreement affixes are attached to the verb stem via a process of lowering. Although Speas (pc) no longer favors a lowering approach, the alternatives are unclear. Crucially for this paper, any account formulated within current Principles & Parameters theory makes use of the specifier-head relationship.

of these nominalizations to explain the properties characteristic of the construction cross-linguistically. Additional examples discussed below, however, demonstrate that Cherokee and Navajo nominalizations are distinct from each other as well as from English. This three-way distinction among the English, Navajo and Cherokee constructions strongly suggests that the power of several independent principles, as opposed to the elegance of a single constraint on word level categories, is necessary for a comprehensive theory of nominalization.

5. Specific and Referential Arguments to Nominalized Verbs

As noted, the theory of syntax/morphology interaction proposed in DiSciullo and Williams (1987) holds that words, the atomic units of syntax, are referentially opaque to sentence level rules of syntax and semantics. Beyond tense, DiSciullo and Williams suggest that agreement and specific NP are excluded from opaque domains. For English synthetic compounds these predictions are correct. Furthermore, with the exception of third person agreement,[14] these predictions hold of Navajo nominalizations as well. Since Cherokee patterns with English and Navajo in several respects including the exclusion of tense from nominalization constructions, a universal word based opacity account of Cherokee nominalization predicts that the Cherokee forms should also exclude first and second person agreement and specific NP. As the data below indicate, however, Cherokee nominalizations are not referentially opaque.

5.1. Specific NP in Nominalizations. Specific determiners in both Cherokee and Navajo can occur either to the left or right of the noun they modify. As (61) and (62) demonstrate, a specific determiner can modify a noun argument of a Cherokee nominalized verb.

(61) hi'a dloogeesi gaa-daluugiisg-i
this field 3sA-plow-nom
'this-field plower'

(62) dloogeesi hi'a gaa-daluugiisg-i
field this 3sA-plow-nom
'this-field plower'

The Cherokee data contrast sharply with Navajo nominalizations which do seem subject to a constraint against specific arguments. In (63), a specific determiner to the left of the noun argument of a nominalized verb can only be interpreted as modifying the entire nominalization construction. Moreover, specific determiners are unacceptable to the right of a noun argument of a nominalized verb (64). In such cases, I assume that the construction internal position of the determiner prevents an interpretation, as in (63), where the modified constituent is the entire nominalization.

(63) Navajo díí dá'á'k'ééh néínił hééésh-i'
this field irrigate-nom
'this [field irrigator]'

(64) Navajo *dá'á'k'ééh díí néínił hééésh-i'
field this irrigate-nom
'[this field] irrigator'

Cherokee permits other specific and/or inherently referential noun phrases as arguments of nominalized verbs. As with the specific determiner examples above, the corresponding English and Navajo constructions are ungrammatical. Example (65) demonstrates that the name of an individual can occur as an object argument in a Cherokee nominalization.

(65) Maayg uu-hlv Filippo j-uu-leediisg-i.
Mike 3sB-kill.past Filippo dis-3sB-burn-nom
'Mike killed the Filippo burner'

In the corresponding Navajo example (66), however, the name cannot refer to a specific

[14] Quite possibly 3rd person marking is not referential in the same sense as discourse relevant 1st and 2nd person marking.

individual but may only represent the class of people named 'John'. The English example in (67) has a similar interpretation.

(66) ??John neiłtsééd-í
John kill-nom
'killer of people named John'

(67) John killer
=killer of people named John
* killer of John (the individual)

Finally, the argument of a nominalized Cherokee verb can be modified by a possessive construction. Although the syntactic status of the possessive *aagwajeeli* in (68) is unclear, the interpretation of the utterance is that the speaker owns or is associated with the 'field'.

(68) dloogeesi aagwa-jeeli gaa-daluugiisg-i
field 1sB-pss 3sA-plow-hab
'plower of my field'

Again the corresponding Navajo nominalization is ungrammatical. As example (69) illustrates, the Navajo possessive prefix can only be interpreted as modifying the entire nominalization construction to which it is affixed.

(69) Navajo shi-dá'á'k'ééh néínił hééésh-i
1-field irrigate-nom
'my [field irrigator]' *'irrigator of my field'

As the examples above illustrate, Cherokee nominalizations do not exhibit the referential constraint on nominalization arguments that is prevalent in the English and Navajo examples. If the absence of tense on Cherokee nominalized verbs is due to such a constraint, these data are surprising. However, it is again possible to appeal to the adjunct theory of Cherokee lexical phrases and suggest that the object NP in the Cherokee examples above are not included within the nominalization construction and are thus not subject to opacity constraints. Still, the nominalized verb stem, which under any account must be included within the nominalization structure, also exhibits violations of opacity constraints.

5.2. Agreement Morphology on Nominalized Verbs. Although nominalized Cherokee verbs cannot surface with tense morphology, first and second person agreement marking can be included on the verb stem. Examples (70) and (71) demonstrate that first person marking for either subject or object can appear on a nominalized verb stem.[15]

(70) Jii-wooniisg-i
1sA-speak-nom
'I am a speaker'

(71) dii-gii-leediisg-i
dis-1sB-burn-nom
'me burner'

Once again, the corresponding Navajo and English examples are ungrammatical.

[15]According to Pulte and Feeling (1975) nouns referring to human beings are inflected for person and number.

(i) dict p. 307 jii-sgaya
1sA-man
'I - man'

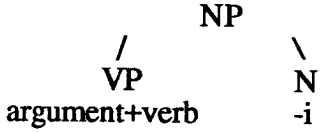
Since the nominalizations discussed in this paper refer to human beings, ie. 'coyote killer', 'field irrigator', etc..., the presence of subject agreement morphology in (70) may not be a result of a syntactic relationship between the verb stem 'speak' and a covert 1st person subject. Crucially, however, the presence of object agreement morphology, as with the 1st person marking in (71) and the 3rd person marking exhibited in the examples throughout this paper, clearly suggest a syntactic relationship between the verb stem and its thematic object.

(72) Navajo *shi-diłid-'i
1-burn-nom
'me-burner'

(73) *me-burner
'one who burns me repeatedly'

Clearly, Cherokee nominalizations do not exhibit the opacity constraint against agreement and specific NP that is operative in English and Navajo nominalizations. Despite this fact, Cherokee still patterns with English and Navajo in the exclusion of tense from nominalization constructions. The Cherokee data thus present a paradox for the theory of referential opacity. If tense, agreement and specific NP are excluded from nominalization constructions in English and Navajo because of a general opacity constraint that applies to word level categories, then this constraint should either apply in whole or not at all to Cherokee. As noted, however, only tense is excluded from the Cherokee forms. The Cherokee data thus offer no support in favor of a single word based account of referential opacity. Furthermore, since the arguments of Cherokee nominalized verbs can be phrasal as well as specific and/or referential, there is no reason to hypothesize that these arguments are dominated by a word level nominal category as in the case of English synthetic compounds. These facts in conjunction with the presence of agreement morphology on the nominalized verb stem strongly suggest that the Cherokee nominalizing suffix transforms a verbal projection into a nominal.

(74)



6. The Phrasal Status of Cherokee Nominalizations

The internal properties of the Cherokee nominalizations, such as the possibility of phrasal arguments and agreement morphology, suggest that the nominalization construction contains a phrasal projection of the verb stem. As noted, the presence of phrasal projections under an X^0 level category, the situation if Cherokee nominalizations are word level categories, is incompatible with Xbar theory. From a theoretical perspective then, there is reason to believe that the Cherokee nominalizations are phrasal. In this section I discuss one potential data based argument that the result of Cherokee *-i* suffixation is phrasal.

There are several suffixes which Pulte and Feeling note are restricted to nouns. One such suffix is the *-'i* morpheme which can be loosely translated as 'place of'. In (75), this suffix attaches to the Cherokee noun for 'crow' and results literally in 'the place of the crow'. The resulting expression is currently the name of a market in Oklahoma. (76) gives another example of the *-'i* suffix. In this case, affixation results literally in 'the place of the women' which might be used in the context of an all women's seminar.

(75) koogvv-'i
crow-place.of
'Crow's Place'

(76) aaniigeehyvv-'i
women-place.of
'women's place'

Interestingly, the 'place of' suffix cannot attach to a nominalized verb. Although example (77) could theoretically correspond to a room where speakers wait off stage, and (78) could be interpreted as a diner that farmers frequent, both constructions are completely ungrammatical.

(77) *ga-wooniisg-i-'i
3sA-speak-nom-place.of
'place of speakers'

(78) *dloogeesi gaa-daluugiisg-i-'i
field 3sA-plow-nom-place.of
'place of field plowers'

Another suffix restricted to nouns in Pulte and Feeling is the suffix *-yaa'i* which means 'real' or 'pure'. In (79), this suffix attaches to the noun for 'people' and the literal result 'pure people' signifies a Native American. Attached to the noun for 'pig' in (80), this suffix results in the meaning 'pure bred pig'.

(79) ayvvwii-yaa'i
person-pure/real
'full blooded Indian'

(80) sihgwaa-yaa'i
pig-pure/real
'pure bred pig'

Again, however, this noun suffix is incompatible with deverbal nominalizations. (81) might have the logical interpretation of 'qualified speaker' and (82) might describe a dog that was bred specifically to kill coyotes, but both examples are ungrammatical.

(81) *ga-wooniisg-i-yaa'i
3sA-speak-nom-pure/real
'true speaker'

(82) *wahya dii-hiih-i-yaa'i
coyote dis-kill-nom-pure/real
'pure bred coyote killer'

Pulte and Feeling also note a number of suffixes that can attach to either nouns or verbs. (83) and (84) illustrate the use of the suffixes *-ju* and *-dv* which correspond to interrogative and focus markers respectively. Note that these suffixes are compatible with the nominalization construction. (85) demonstrates affixation of the interrogative morpheme to a verb.

(83) Wahya dii-hiih-i-ju ?
coyote dis-kill-nom-int
'Is he a coyote killer ?'

(84) V, wahya dii-hiih-i-dv .
yes coyote dis-kill-nom-foc
'Yes, a coyote killer'

(85) Wahya d-aa-hiih-oo'i-ju ?
coyote dis-3sA-kill-hab-int
'Does he kill coyotes ?'

It is somewhat surprising that the noun suffixes in (75)-(82) cannot attach to the *-i* constructions if these constructions are indeed nominal. One possible explanation for this fact, however, is that these suffixes attach to a word level category, N^0, but that the nominalization construction is phrasal. Assuming that the suffixes in (83)-(85) attach to any phrasal constituent of a sentence, the suffixation of these morphemes to the nominalization construction is then straightforward.

There is, however, another possible explanation for the data above. Fabb (1988) explicitly suggests that some English suffixes simply will not attach to an already suffixed word. Such an analysis of the Cherokee 'place of' and 'pure' suffixes would readily account for the lack of suffixation to nominalized verbs. Alternatively, Richard Wright (pc) suggests that adjunction of these suffixes to a nominalized verb might result in some form of unresolvable intonation clash. Since I have largely ignored the intonational contours of these nominalization constructions, I cannot at this point comment on the potential of such an account.

7. Summary Discussion

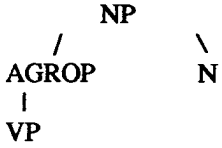
The distributional properties of Cherokee *-i* constructions offer conclusive support that these forms are appropriately characterized as deverbal nominalizations. Moreover, the Cherokee nominalizations share two properties particular to nominalization constructions in Navajo and English. In each of these languages, the nominalization construction excludes tense and exhibits a distinction between direct and indirect objects of dative verbs that is not present elsewhere in the

grammar. Unlike English and Navajo, however, the Cherokee nominalizations do not exhibit referential opacity effects with regard to agreement and specific NP.

Word based accounts of English compounds exist for each of the properties common to the nominalizations of all three languages. If the nominalization forms of these three languages are to be grouped together and treated similarly, however, one universally applied, structurally based constraint on word level categories cannot explain both the lack of tense, agreement and specific NP in English and Navajo constructions and the lack of tense but presence of agreement and specific NP in the Cherokee forms.

As noted, a word level approach to Navajo and Cherokee nominalizations is itself problematic from the perspective of Xbar theory. This fact, along with the three way distinction between Cherokee, English and Navajo suggests that word level status cannot be the universal root of explanation for the properties of nominalization constructions. In conclusion, future research must recognize the fact that nominalization constructions can be phrasal syntactic units and yet still exhibit some of the properties of English synthetic compounds. Such research must determine what universally applied set of principles can account for the symmetries and asymmetries of the nominalization construction cross-linguistically.[16]

[16]Potter (1994) investigates the possibility that Navajo nominalizations are actually NP headed by the nominalizing suffix with an AGROP complement.

(i)


Under this approach, the ungrammaticality of specific NP arguments within the nominalization construction follows from the fact that the positions above AGROP necessary for the licensing of specific NP (cf. Sportiche 1992 and Diesing 1990) are not available. The Cherokee data might be derived in a similar fashion with the nominalizing suffix selecting a verbal projection higher than AGROP as complement.

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